

2012
CATALOG 9



Construction Materials Testing Equipment



Testing Equipment for



Construction Materials

HUMBOLDT

COLOR-CODED

SECTIONS
For Fast Browsing

ASTM D7698
EDG
DENSITY MOISTURE NUCLEAR FREE

Electrical Density Gauge

Soil - Field

Li-ION

GPS

Find my Gauge

HUMBOLDT

Electrical Density Gauge - N-6114SD-3P
The Electrical Density Gauge (EDG) is a nuclear free, portable, rugged, and accurate device for measuring the density of soils and aggregates in the field.

All machines feature:
Space-saving
Comprehensive
Hydraulic pump

Compression Machines

117

Ductility Testing Machines

These machines determine ductility of bonded concrete or precast beams by measuring the elongation of a specimen, which is pulled apart at the specific speed and temperature. Comply with ASTM D711, D2890, D688, ASTM D707

Ductility

166

Asphalt

Client from these Digital Load Indicators are pages for information.

How to O HC

Mach

Humboldt Ductility Machine, 120V 60Hz - N-1068R
The N-1068R is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

A single force head screen mounted above water level protecting and a 160mm diameter steel wheel mounted on a 160mm diameter steel wheel. The unit has three integrated channels for testing and an O.C. detector.

The N-1068R is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068C
The N-1068C is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068B
The N-1068B is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068A
The N-1068A is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068S
The N-1068S is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068T
The N-1068T is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068U
The N-1068U is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068V
The N-1068V is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068W
The N-1068W is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068X
The N-1068X is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068Y
The N-1068Y is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

Standard Ductility Machine, 120V 60Hz - N-1068Z
The N-1068Z is a compact, rugged, and accurate machine for testing and Force Ductility tests. The unit has three integrated channels for testing and an O.C. detector. The unit has three integrated channels for testing and an O.C. detector.

HUMBOLDT

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Testing Equipment for



Construction Materials

HUMBOLDT

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hmc@humboldtmfg.com

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CONTACT US at the top of the page.

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Electrical Requirement Codes used in Catalog

Electrical Requirement	Code
120V 60Hz	
120/220V 50/60 Hz	.3F
220V 50/60Hz	.4F
220V 50Hz	.5F
220V 60Hz	.2F

Catalog items that require electricity to function use the codes to the right to designate the electrical requirements. These codes appear as a suffix to the base part number, i.e. H-4239A with no suffix is 120V 60Hz and H-4239A.4F with a .4F suffix is 220V 50/60Hz.

 Requires Truck Shipment

Conversion Charts

Search By Model Number, Name, ASTM, AASHTO Standards

Soil-Field

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Testing Equipment for



Construction Materials

HUMBOLDT

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ASTM D7698 EDG

DENSITY
MOISTURE

NUCLEAR
FREE



Touch-Screen or Touch Pad—

You have your choice with the new Humboldt H-4114SD EDG. The gauge features a 4.3" touch-screen, which provides complete control or you can also use the menu-driven touch pad.

Li-ION

Easy to Power—

The EDG is powered by a rechargeable Li-ION battery, which provides up to 60 hrs. of runtime. A car charger is available, order H-4114SD.100

GPS

GPS—

The EDG is equipped with GPS, which keeps track of the actual location of your readings to ensure locations and validity of tests.

Find my Gauge

Find my Gauge (optional)—

You can now track the location of your gauge with the Find My Gauge service. If it's lost or stolen, you will get text messages pinpointing its location.



Bluetooth Enabled—

The new EDG gauge can connect to your PC for downloading test results via its Bluetooth wireless technology. No more cables and gauges on your desk. Bluetooth provides a reliable and secure connection up to 30 feet.



USB Port—

The EDG also has a USB slot, which provides a convenient way to capture test data and take it with you, as well as provide an easy way to upgrade the gauge's firmware. Firmware upgrades will be available via the internet from our website.

Electrical Density Gauge— H-4114SD.3F

The Electrical Density Gauge (EDG) is a nuclear-free alternative for determining the moisture and density of compacted soils used in road beds and foundations. The EDG is a portable, battery-powered instrument capable of being used anywhere without the concerns and regulations associated with nuclear safety. Its user-friendly, step-by-step menu guides the user through each step of the testing procedure and cautions the user when values do not correspond to established curves for the material being tested.

Easy-to-use, the EDG can be used as a construction aid to monitor day-to-day compaction operations by providing performance and measurement results highly comparable to those achieved with traditional methods, including the nuclear gauge and/or a sand-cone and oven moisture test combination. When conducting a test, the EDG measures and displays the results for wet and dry density, gravimetric moisture content and percent compaction.

For contractors the advantages of using the EDG are:

- it does not require a highly-trained or licensed technician,
- it does not require special handling for shipping or regulatory compliance for hazardous materials
- it is easy to learn and easy to use with its step-by-step menu
- lightweight and easily transportable
- it is accurate and repeatable with results that mirror known testing methods

The EDG measures the electrical dielectric properties and moisture levels of compacted soil using high, radio frequency traveling between darts driven into the soil being tested. The dart's depth of penetration positively determines the depth of measurement. Darts are available in 4", 6", 8", 10" and 12" lengths. In addition, the darts have been designed with a taper, which ensures a continual positive contact with the soil for accurate measurements.

During the testing procedure, four tapered electrodes (darts) are driven into the ground in a cross pattern using the supplied template. Between the two sets of two tapered darts, four point-to-point electrical measurements are made and the electrical characteristics averaged. The dielectric properties that are measured by the unit are compared to a "soil model", which has been developed and programmed into the unit prior to testing. These soil models are required only once for each soil type. The soil model is used as a calibration reference during the testing procedure. It is developed by establishing a curve of measured dielectric properties for different densities and moisture combinations of the actual soil to be tested or a similar material. This soil model is used by the unit through a proprietary correction algorithm to automatically determine the wet and dry density, gravimetric moisture content and percent compaction values for the material being tested. Soil models can be named using the unified soil classifications listed in the drop-down menu or unique names can be entered using the alpha-numeric keypad. In addition, the temperature probe, which is inserted into the material being tested ensures accurate results by compensating for changes in recorded temperatures. Similar to nuclear gauges, proctor numbers for optimum compaction may be input into the gauge, which would allow for percent compaction to be automatically calculated and displayed at the end of each test. The Proctor numbers would be input into the gauge during the development of the soil model. When determined, this value is entered into the EDG to enable the computation of percent compaction.

EDG Software

EDG Software will allow you to communicate effortlessly with your EDG gauges and only requires minimal setup by the user. EDG Software provides a complete solution for the acquisition, storing, and presentation of Job and Soil Model data. EDG Software works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel. Jobs can be grouped together within projects for organization and reporting.

EDG Software Features

- Communicate with all your EDG gauges.
- Download Job Data.
- Create customized reports from downloaded job data.
- Download Soil Model Data.
- Create reports from downloaded soil model data.
- Upload soil models to any EDG.
- Input proctor data for use in job data or soil model data.
- View maps of test locations, using Google Earth.
- Time/Date, GPS stamps for each test

EDG Gauge includes: Console/Case; 4-tapered 6" darts; hammer; soil sensor and cables; dart template, temperature probe, battery charger, field verifier, safety glasses.

Specifications	
Wet Density Range	typical compacted earth sites range
Dry Density Accuracy	within 3% of standard tests
Moisture Content Range	typical compacted earth sites range
Moisture Content Accuracy	within 2% of standard tests
Operating Temperature	0-50°C
Ambient Operating Humidity	5-90%, non-condensing
Power	Li Ion battery (AA battery optional)
Battery Life	approx. 60 hrs. of runtime
Battery Charger	110-240 V 50/60Hz
Dimensions	21" x 17" x 8" (533 mm x 432 mm x 203mm)
GPS	± 3m
Net Weight	15 lbs. (6.8kg)



- 4" Dart— H-4114.4**
- 6" Dart— H-4114.6**
- 8" Dart— H-4114.8**
- 10" Dart— H-4114.10**
- 12" Dart— H-4114.12**

Darts are designed in various lengths to correspond to different lift heights. They can be sold individually, and (4) are required.



EDG Calibration Verifier— H-4114.CAL



The Humboldt HS-5001SD Nuclear Density Gauge— state-of-the-art



Humboldt's NEW HS-5001SD Moisture/Density Gauge provides easier and more efficient operation, data collection and processing, safety and repair than any other gauge in its class. This new Gauge uses state-of-the-art technology to bring you a host of new features to make your job easier. Featuring a 4.3" touch-screen, the SD Gauge provides intuitive operation of all gauge operations. You also have the option to use the gauge's touch pad instead of the touch-screen, if desired.

The SD's versatility allows it to measure density through direct transmission and backscatter modes, as well as including thin lift and trench modes, as well as moisture determinations. The gauge uses an advanced micro-processor-based technology to provide highly-accurate measurements of density and moisture that are automatically computed for direct readouts of wet density, dry density, moisture content, percent of moisture, percent of compaction (Proctor or Marshall), void ratio and air voids. The SD Gauge complies with all pertinent standards: ASTM D6938, D2950, C1040 and AASHTO T310.

The gauge is calibrated by the Five-block calibration method.

Touch-Screen or Touch Pad—

You have your choice with the new Humboldt HS-5001SD Moisture/Density Gauge. The gauge features a 4.3" touch-screen, which provides complete control or you can also use the menu-driven touch pad.

Easy to Power—

The SD Touchscreen Gauge is powered by a rechargeable Li-ION battery, which provides up to 60 hrs. of runtime. In addition, the gauge can also be powered by six standard AA alkaline batteries, which provide up to 1 month of service. Car charger available.

GPS—

The SD Gauge is equipped with GPS, which keeps track of the actual location of your readings to ensure locations and validity of tests.

Find my Gauge—

You can now track the location of your gauge with the Find My Gauge service. If it's lost or stolen, you will get text messages pinpointing its location.

Bluetooth Enabled—

The new SD gauge can connect to your PC for downloading test results via its Bluetooth wireless technology. No more cables and gauges on your desk. Bluetooth provides a reliable and secure connection up to 30 feet.

USB Port—

The SD gauge also has a USB slot, which provides a convenient way to capture test data and take it with you, as well as provide an easy way to upgrade the gauge's firmware. Firmware upgrades will be available via the internet from our website.

Easy Self Repairs—

The SD Gauge's modular design enables it to be serviced in the field by you, if necessary. No need to send the gauge in for repair, we'll send you the necessary components and walk you through any repair procedure.

Moisture/Density Gauge— HS-5001SD121

Measures to 12" (300mm) depth in 1" (25mm) increments.

Moisture/Density Gauge— HS-5001SD122

Measures to 12" (300mm) depth in 2" (50mm) increments.

Moisture/Density Gauge— HS-5001SD081

Measures to 8" (200mm) depth in 1" (25mm) increments.

Moisture/Density Gauge— HS-5001SD082

Measures to 8" (200mm) depth in 2" (50mm) increments.



Li-ION

GPS

Find my
Gauge



Nuclear Density Gauge Sales: 1.800.537.4183



Easy to Operate—

Humboldt's HS-5001EZ Moisture/Density Gauge is just that— easy to operate. The EZ gauge features a menu-driven control panel with easy-to-use, built-in test routines and auto features, making testing a quick and accurate operation.



Easy to Power—

The EZ is powered by six standard AA alkaline batteries, which provide up to 2000 hrs of service. No chargers are needed and you can buy batteries almost anywhere, including the corner convenience store.



Easy Self Repairs—

The EZ gauge also uses a modular design, which allows it to be serviced in the field, if ever necessary. With this gauge, you don't have to send it back to the factory for repairs, we'll send you the necessary components and walk you through any repair procedure.

Plus, the Humboldt 5001EZ Gauge now only requires leak tests every 12 months.

Humboldt's HS-5001EZ Moisture/Density Gauge is just that— easy. Easy to operate, easy to power and easy to service. The EZ gauge features a menu-driven control panel with easy-to-use, built-in test routines and auto features, making testing a quick and accurate operation. It also features our innovative trigger release handle that eliminates pinched fingers while providing smooth operation.

Available in 8" (200mm) and 12" (300mm) lengths with either 1" (25mm) or 2" (50mm) increments, the EZ gauge provides a single gauge solution to density and moisture measurements.

The EZ's versatility allows it to measure density through direct transmission and backscatter modes, as well as including thin lift and trench modes, as well as moisture determinations. The gauge uses an advanced micro-processor-based technology to provide highly-accurate measurements of density and moisture that are automatically computed for direct readouts of wet density, dry density, moisture content, percent of moisture, percent of compaction (Proctor or Marshall), void ratio and air voids.

The EZ Gauge complies with all pertinent standards: ASTM D6938, D2950, C1040 and AASHTO T310.

The gauge is calibrated by the Five-block calibration method.

The Humboldt HS-5001EZ Nuclear Density Gauge— easy is just the beginning



Moisture/Density Gauge— HS-5001EZ081

Measures to 8" (200mm) depth in 1" (25mm) increments.

Moisture/Density Gauge— HS-5001EZ082

Measures to 8" (200mm) depth in 2" (50mm) increments.

Moisture/Density Gauge— HS-5001EZ121

Measures to 12" (300mm) depth in 1" (25mm) increments.

Moisture/Density Gauge— HS-5001EZ122

Measures to 12" (300mm) depth in 2" (50mm) increments.

Nuclear Density Gauge Sales: 1.800.537.4183

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Nuclear Density Gauge Sales: 1.800.537.4183

Radioactive Materials Data Needed for License Application

Radioactive Material	Chemical/Physical Form	Maximum Amount
Cesium-137	Sealed Source Humboldt 2200064	Not to exceed 11 millicuries per source
Americium-241:Be	Sealed Source Humboldt 2200067	Not to exceed 44 millicuries per source

Radiological

Gamma Source	
Material, Type and Amount:	Cs-137, 370MBq (10mCi)
Special Form Registration:	USA/0356/S-96 Rev 12
ANSI and ISO Class:	ANSI 77C66535
Neutron Source	
Material, Type and Amount:	Am-241: Be, 1.48GBq (40mCi)
Neutron Yield:	70 Knps ±10%
Special Form Registration:	CZ/1009/S-96 Rev 1
ANSI and ISO Class:	ISO/99/C66545
Source	
Type:	Sealed Source, Special Form
Housing:	Stainless Steel, Double Encapsulated
Surface Dose Rates	18.7 mrem/hr Maximum (Neutron and Gamma)
Transit (shipping) Case	DOT 7A, Type A, Yellow II Label, O.2 TI

Measurement: Density at 125 pcf (2000 kg/m³)

Direct Transmission, 6" (150mm)	15 seconds (Fast)	1 minute (Std.)	4 minutes (Slow)
Precision, pcf (kg/m ³)	±0.5 (8)	±0.25 (4)	±0.13 (2)
Chemical Error, pcf (kg/m ³)	±1.0 (16)	±1.0 (16)	±1.0 (16)
Surface Error, pcf (kg/m ³)	-0.5 (8)	-0.5 (8)	-0.5 (8)
Measurement Depth: 2 to 12" (50 to 300mm)			
Backscatter, 3.5" (88mm)	15 seconds (Fast)	1 minute (Std.)	4 minutes (Slow)
Precision, pcf (kg/m ³)	±1.0 (16)	±0.5 (8)	±0.25 (4)
Chemical Error, pcf (kg/m ³)	±2.5 (40)	±2.5 (40)	±2.5 (40)
Surface Error, pcf (kg/m ³)	-3.0 (48)	-3.0 (48)	-3.0 (48)
Measurement Depth: 3.5" (88mm)			
Moisture at 10pcf (160kg/m ³)	15 seconds (Fast)	1 minute (Std.)	4 minutes (Slow)
Precision, pcf (kg/m ³)	±0.5 (8)	±0.25 (4)	±0.13 (2)
Surface Error, pcf (kg/m ³)	-0.25 (4)	-0.25 (4)	-0.25 (4)
Measurement Depth: 4-8" (100 to 200mm)			

Electrical

Displays—	
HS-5001SD:	TFT, color LCD with back-light, 16:9, 480 x 272 pixel
HS-5001EZ:	4 lines x 20 alphanumeric w/ backlit liquid crystal display
Timer Stability:	0.01%
Power Supply Stability:	0.10%
Power Source—	
HS-5001SD:	Li Ion battery (AA battery optional)
HS-5001EZ:	Six alkaline AA-size batteries
Power Consumption—	
HS-5001SD:	Active—110mA — Battery Life—60 hours runtime
HS-5001EZ:	Active—6.5mA — Battery Life—1400 hours
Power Protection:	Main Batteries—Circuit Breaker Regulated Supplies—Short Circuit Proof
Low Battery Condition:	LOBAT Alarm and Auto Shutoff for low and dead battery conditions
Battery Life	Remaining Battery Life Automatically Estimated at Power-up by activating TEST routine



All models Include:

Gauge, Reference Standard, Source and Case Certification, Wipe Test Kit, Rod Guide/Scraper Plate, Drill Pin, Four Pound Hammer, Drill Pin Extraction Tool, Zippered Accessory Case, Transit Case, Radiation Safety Manual and Operator's Manual.

Mechanical

Operating Temperature:	14 to 158°F (-10 to 70°C) ambient, 347°F (175°C) Material Surface
Storage Temperature:	-70 to 185°F (-55 to 85°C)
Humidity:	98% without condensation, Rain-Resistant Construction
Vibration:	0.1" (2.5mm) at 12.5 Hz
Materials:	
Shielding:	Tungsten Powder Alloy
Source Rod:	440C Stainless steel, Induction, heat treated to 55 Rockwell C
Gauge Base:	Computer-Machined 6061-T6 Aluminum, Hard-Coated and Teflon Impregnated
Post and Frame:	Computer-Machined 6061-T6 Aluminum, Anodized for Anticorrosion
Index Rod:	7075 aluminum, Hard Coated and Teflon Impregnated
Top Shell:	Injection-Molded Noryl with Integral Color
Bearing:	Relieved Bronze with Neoprene Seals
Screws/Fittings:	Stainless Steel and Brass

Dimensions/Weight

Gauge:	
Dimensions (base):	15.75" x 8.66" x 5.5" (400 x 220 x 140mm)
Handle Height:	18" or 21.5" (450 or 550mm)
Weight:	30 lbs (13.6kg)
Reference Standard:	
Dimensions:	25" x 7.8" x 3" (350 x 200 x 75mm)
Weight:	10 lbs (4.5kg)
Transit Case:	
Dimensions:	31" x 14" x 19.5" (787 x 356 x 495mm)
Weight:	31 lbs (11.8kg)
Accessory Case (loaded):	
Dimensions:	19.7" x 9.8" x 5" (500 x 250 x 125mm)
Weight:	16 lbs (7.3kg)
Total Shipping Weight:	90 lbs (41kg)

Tool Set
HS-200112

HS-000176



HS-200127

HS-200145

HS-200130



HS-200177



HS-001057



HS-200313



HS-200820

EZ Gauge Tool Set, Complete with Case— HS-200112

Tool kit includes: rod guide/scraper plate, drill pin, four-pound hammer, pin extraction tool and zippered accessory case.

Drill Rod— HS-200130

Rod Extraction Tool— HS-200145

Scraper Plate/Rod Guide— HS-200127

4 lb Double-Faced Hammer— HS-000176

Leak Test Kit, 10-pack— HS-200177

Leak Test Kit, 2-pack— HS-200185

Each leak test kit contains all of the materials necessary for users to perform a leak test on sealed source devices. These test kits include analysis service from Humboldt. Humboldt Scientific, Inc. provides leak test kits and analysis services for both portable and fixed nuclear gauges in accordance with Wipe Test Procedures. Humboldt is licensed by the North Carolina Division of Radiation Protection license # 092-0750-1 to provide sealed-source leak testing on any radioactive material with atomic number 3-105 inclusive; and, has National reciprocity recognition. State-of-the-art leak testing equipment, low cost, and prompt turn-around service ensure accurate and convenient measurement of your samples.

Infrared RS232 Data Cable and Software— HS-200313

Cable and software for connecting EZ Gauge to a computer or printer via RS232 port.

Caution Radioactive Material Sign— HS-001057

8" x 10" metal sign.

Nuclear Gauge Security Restraint— HS-200820

Cable security restraint effectively locks containment box to vehicle or other structure. One-piece cable web drops easily over box and allows user to lock cables directly to containment box closures to prevent opening, as well as securing the complete box to prevent removal. Web is easily moved from vehicle to vehicle and collapses for easy storage when not in use. Allows for visibility of security labels on case when in use. A minimum of three padlocks are required, but not included.

Padlock— HS-000177

Padlock, which can be keyed so a set uses the same key.



Radiation Safety and Certification Classes

Radiation Safety Course

A one-day course in radiation safety and operation for users of nuclear portable Moisture Density Gauges. The class satisfies the USNRC and Agreement States' requirements for gauges manufactured by Humboldt and other manufacturers of portable, nuclear Moisture Density Gauges. A certificate of training will be issued to those who successfully complete the class.

Radiation Safety Officer's Course

A one-day training class to qualify participants to serve as facility Radiation Safety Officers. This course satisfies USNRC and US Dept. of Transportation Regulations, and is directed toward the individual responsible for the organization's radiation safety program. Course participants will receive a comprehensive training manual, as well as the recent NRC Guidance Document: Program-Specific Guidance About Portable Gauge Licenses (NUREG-1556, Vol. 1).

For information and class schedules for Radiation Safety Classes and Radiation Safety Officer Courses, click the training classes link on our website:

www.humboldtscientific.com
or call: 1.800.537.4183

Hazmat Refresher Course also available



HS-130508



HS-130512



HS-200800— Boxes include mounting bracket

Digital Radiation Survey Meter— HS-130508

Digital Radiation Survey Meter, NIST Traceable— HS-130508C

The HS-130512C survey meter provides an easy-to-use tool for surveying worksites, storage areas and transportation vehicles and is an inexpensive way to adhere to the survey requirements of an ALARA (As Low As Reasonably Achievable) Program. The HS-130512C measures alpha, beta, gamma, and x-rays. Its digital display shows readings in your choice of counts per minute (CPM) or mR/hr, or in accumulated counts. A red LED flashes and beeper sounds with each count detected and when the radiation reaches a user set alert level. Uses one 9-volt alkaline battery. Battery life is up to 2,000 hours at normal background radiation levels.

Operating Range	mR/hr - .001 (1µR) to 100 mR/hr; µSv/hr - .01 to 1000; CPM - 0 to 350,000; CPS - 0 to 5000; Total/Timer - 1 to 9,999,000 cts.
Gamma Sensitivity	1000 CPM/mR/hr referenced to Cs-137
Accuracy	±10% typical (NIST), ±15% maximum
Energy Sensitivity	Detects alpha down to 2.5 MeV; typical detection efficiency at 3.6 MeV is greater than 80%. Detects beta at 50 keV with typical 35% detection efficiency. Detects beta at 150 keV with typical 75% detection efficiency. Detects gamma and x-rays down to 10 keV typical through the window, 40 keV minimum through the case. Normal background is 5-20 CPM.

For Recalibration and NIST traceable calibration of meters, contact Humboldt Scientific at: 1.800.537.4183

Analog Radiation Survey Meter— HS-130512

Analog Radiation Survey Meter, NIST Traceable— HS-130512C

The HS-130512C survey meter is a compact, general purpose meter capable of detecting alpha, beta, gamma, and x-rays over 3 selectable ranges. A red count light flashes and a beep sounds with each event detected. Uses one 9-volt alkaline battery. Battery life is up to 2,000 hours at normal background radiation levels.

Operating Range	0-.5, 0-5, 0-50 mR/hr; 0-500, 0-5,000, 0-50,000 CPM or 0-500 µSv/hr 0-50 mR/hr.
Gamma Sensitivity	1000 CPM/mR/hr referenced to Cs-137
Accuracy	±15% of reading (referenced to Cs-137)
Energy Sensitivity	Detects alpha down to 2.5 MeV; typical detection efficiency at 3.6 MeV is greater than 80%. Detects beta at 50 keV with typical 35% detection efficiency. Detects beta at 150 keV with 75% typical detection efficiency. Detects gamma and x-rays down to 10 keV typical through the window, 40 keV minimum through the sidewall of the detector. Normal background is approximately 10-20 CPM.

Nuclear Gauge Containment System for Nuclear Gauges

The NUX safety containment box is an enhanced field security system for nuclear gauges. Constructed of heavy-duty aluminum diamond plate, the NUX can be securely mounted to a host vehicle using the locking hinge pin. The box features a titanium series, high-strength lock assembly, which provides a secure storage enclosure for your gauge in its factory protective container. In addition, the NUX tilting feature makes accessing your gauge an easy operation. Help prevent theft, damage, back injuries, misuse of equipment, improper or unauthorized access to equipment or other misguided actions, which may result in unforeseen costs to your company.

NUX Safety Containment Cases

Mounting Bracket for all style cases	HS-200801
Nux Case for Humboldt Gauge	HS-200800
Nux Case for Troxler 3400 Series Gauges	HS-200802
Nux Case for CPN Gauges	HS-200803

NOTE: When the metal transportation box is mounted in a vehicle it effectively becomes part of the vehicle. It is not part of the TYPE A package nor is it an overpack as defined by U.S. DOT. Therefore, the mounted transportation box is not subject to HAZMAT labeling requirements and no radiation warning markings are required on it.

Percometer— H-4112.3F

The Percometer is a reliable, accurate, lightweight and easy-to-use instrument for measuring the dielectric value (ϵ_r), electrical conductivity (J) and temperature of materials indoors and outdoors. Dielectric value is an indication of the volumetric moisture content and the state of molecular bonding in a material. Electrical conductivity is a reflection of ionic concentration, water content and temperature. The ability of the Percometer to measure these values has made it an extremely versatile tool in a multitude of tasks.

The Percometer has been very successful in providing data for The Tube Suction Test (TST) which was developed by the Finnish National Road Administration and the Texas Transportation Institute (TTI) for assessing the moisture susceptibility of granular base materials. Moisture susceptibility represents the potential of a soil to develop or retain water through capillary action, which can produce a detrimental or unstable condition under road surfaces and related structures, such as bridges. In this type of study the Percometer is capable of reading differences in the soil's relative dielectric value, which is impacted by the capillarity of rising water in the soil. The water rising due to capillarity transforms the soil's relative dielectric value. The dielectric value (DV) is a measure of the unbound water within a soil sample. Unbound water directly influences material strength and the ability of a soil to resist the effects of repeated freeze-thaw cycling. The Tube Suction Test reveals the state of water bonding within the soil particles and should not be considered as a simple measure of moisture content. The Percometer is used today by the laboratories, geoservice and road data service units of the Finnish Road Enterprise, and in the Geotechnical Laboratory of the Tampere University of Technology. In the United States and Canada, Percometers are used by, among others, the Texas Transportation Institute, the Texas Department of Transportation, the Office of Minnesota Road Research and the University of Saskatchewan. Other uses of the Percometer include:

Moisture Damage (Structural damage)

When moisture infiltrates a wall, causing damage, ϵ_r values will be significantly higher than those from undamaged areas of the wall.

Asphalt Air Voids (Pavement quality control)

Air is also one of the volumetric components that influences ϵ_r . Measuring ϵ_r can provide an indication if a pavement has been sufficiently compacted.

PROBES**H-4112.SF— Surface Probe (60mm dia.)**

ϵ_r (1 to 40) with an accuracy of +/- (0.1 + 1%) Electrical conductivity (0 to 9999mS/cm) Temperature (-40 to +80C)
Recommended applications: Laboratory use, Tube Suction Test, detection of moisture in structures with even surfaces (e.g. behind shower room tiling)

H-4112.SV— Surface Probe (60mm dia.)

ϵ_r (1 to 200) with an accuracy of +/- (0.25 + 2%) Electrical conductivity (0 to 9999mS/cm) Temperature (-40 to +80C)
Recommended applications: Laboratory use (high ϵ_r)

H-4112.TFS— Short Tube Probe TFS (L = 18 cm)

ϵ_r (range: 1 to 15) with an accuracy of +/- (0.05 + 1%) Electrical conductivity (0 to 9999mS/cm) Temperature (-40 to +80C)
Recommended applications: Laboratory tests, e.g. triaxial testing of aggregates

H-4112.TFL— Long Tube Probe TFL (L = 100 cm)

ϵ_r (range: 1 to 15) with an accuracy of +/- (0.05 + 1%) Electrical conductivity (range: 0 to 9999mS/cm) Temperature (range: -40 to +80C) Recommended applications: Field measurements.

Other Probes available, please enquire.



H-4112.3F includes H-4112.SF surface probe. Other probes available.

Soil Moisture

Since ϵ_r is a function of the amount of free water in a material, Percometer can be an effective tool for determining soil moisture.

Frozen/Unfrozen (Soils and Road Structures)

When the free water in a material freezes the conductivity drops to around zero and ϵ_r values decrease to values ranging from 4 to 12.

Frost Susceptibility (Soils and subgrade)

A strong correlation exists between ϵ_r and frost susceptibility of unsaturated soils.

Salinity/Sulfates

J is a function of soil salinity, colloid content and temperature. The presence and fraction of sulfates is an important factor in determining if road subgrade can be stabilized with lime

Dielectric value (ϵ_r) measurements

- Measurement range varies according to probe type
- Measurement frequency: 40 - 50 MHz
- Measurement method: ϵ_r is measured through the change in the electrical capacity of the electrode (probe) attributable to the influence of the material being measured. The term dielectric constant ϵ_r is used here to indicate the real part of the complex relative dielectric permittivity (ϵ_r).
- ϵ_r measurements are reliable when the conductivity of the material being measured is:
 - < 1000 $\mu\text{S/cm}$ for Tube Probe measurements
 - < 2000 $\mu\text{S/cm}$ for Surface Probe measurements

Conductivity (J) Measurements

- Measurement range: 0 to 9999 $\mu\text{S/cm}$
- Measurement frequency: 2 kHz square wave signal

Data storage, PC connection

- Number of measurements stored: 1000
- 24 calibrated probes can be attached to a Percometer:
- Data transfer to PC via RS232; modem optional

Power supply and battery management

The Percometer is powered by an internal 12 V, 1.5 Ah battery, which ensures a minimum of 8 hours continuous operating time. It can also operate using a +9 to +14 V external power supply.

GeoGauge® Compaction Uniformity via in-place Stiffness Measurement ASTM D6758

GeoGauge

12

Soil—Field

GeoGauge— H-4140

The GeoGauge is a unique, QC/QA field tool that can be used to measure the uniformity of unbound pavement layers by measuring the variability in stiffness throughout a structure. It is an excellent tool for identifying construction anomalies that would otherwise go undetected during construction where only density or percent compaction measurements were used. By measuring stiffness, the GeoGauge can reveal and thus help reduce variabilities in layer properties, which density measurements may miss, thus allowing corrective actions to be taken during construction to ensure that the highest quality base and subgrade are achieved despite variations in materials used.

The GeoGauge is the perfect companion instrument for density measuring devices such as nuclear gauges and the electrical density gauge. Density measuring devices can be used to ensure that proper compaction is achieved and the GeoGauge can be used to verify that the stiffness/modulus values assumed in the design specifications of new or rehabilitated pavement structures are met. Compacting and monitoring pavement layers directly to design requirements of structural layer stiffness or material modulus in addition to percent compaction during the construction process establishes the means to effectively control structural uniformity, strength and deflection, as well as enabling the monitoring and control of the construction quality of various materials. This leads to better smoothness and longer lasting pavement surfaces at lower cost.

The GeoGauge works by applying a vibrating force at 25 specific frequencies, which produce small deflections in the material. The resulting displacement is measured by the GeoGauge and displayed as stiffness determined by the ratio of the force to deflection. The GeoGauge produces stress and strain levels common for pavement,

bedding and foundation applications.

In addition, Young's and shear modulus can be determined from GeoGauge measurements if a Poisson's ratio is assumed. This dynamic technology used by the GeoGauge simulates real in-use conditions. This factor allows the GeoGauge to directly measure in-place engineering properties during the construction process. The GeoGauge supports and directly links the in-place engineering properties of compacted materials with Mechanistic-Empirical Design for effective QC/QA. Successful control of compaction creates a quality functional structure with the desired engineering properties for the application and life intended.

Applications include subgrade, sub-base, base, monitoring the strength gain of lime, cement, fly-ash and polymer stabilized materials, monitoring the re-compaction of underground utility backfills to previous properties matching surrounding undisturbed materials, monitoring the compaction of asphalt and cold in-place recycling to peak properties to prevent wasted effort and damaging over-compaction.



Features include:

- Dynamically measures in-place engineering properties using structural layer stiffness, MN/m (klbf/in) and Young's Modulus of a material, MPa (kpsi)
- In-place QC/QA links compaction and material performance directly to design requirements while advancing Mechanistic-Empirical Pavement Design
- Enables maximum lift stiffness with minimum compactive effort
- Facilitates uniform stress transmission and distribution from pavement to subgrade resulting in longer pavement life, reduced maintenance costs and longer lasting surface smoothness.
- Enables reduced structural variability in construction
- In-place QC/QA of the strength gain of stabilized materials
- Data base development supporting Mechanistic-Empirical Design and performance specifications
- Portable, fast, simple, reliable, non-invasive
- Other compaction applications include: lime, cement, fly-ash and polymer stabilized materials, cement-treated and rehabilitated bases, large particle aggregate bases, as well as underground utility backfills
- Gauge includes simple, easy-to-use software application, which provides download and storage of test data. Application allows printing of data reports, as well as saving information in other formats (.pdf, .csv and Rich Text) for importing data into other programs

Specifications

Layer Stiffness	17 to 400 klbf/in (3 to 70 MN/m)
Young's Modulus (in-place)	4 to 90 kpsi (26 to 610 MPa)
Measuring Depth	9 to 12 inches (230 to 310 mm)
Measuring Duration	75 seconds
Power	six D-cell batteries (1000 to 1500 measurements)
Dimensions	gauge only: 11" dia. x 10.5" high (280 mm x 270 mm) carrying case: 18.5" x 16.5" x 13" (470 x 420 x 330 mm)
Net Weight	gauge only: 22 lbs. (10 kg) with case: 34 lbs. (15.5 kg)
Shipping Weight	39 lbs. (17.7 kg)



H-4140
Face Detail

Complies with ASTM D6758



H-4140.20

Accessories:

Verifier Mass, 10kg— H-4140.20

Verifies calibration of gauge.

Calibration Platen, 10kg— H-4140.C

Platen used to allow gauge to self-calibrate. Gauge is bolted onto platen with a torque wrench (included).

Infrared Data Cable— H-4140.12

Infrared (IR) serial interface adapter cable with spreadsheet software template



H-4140C



GeoGauge™— H-4140

includes: Gauge and hard carrying case.

**Density Apparatus— H-4245**

Sand density apparatus determines the in-place density of soils. Set includes 1-gal. (3.79L) threaded jar, detachable double cone consisting of a brass cylindrical valve with a 1/2" (12.7mm) dia. orifice. Valve has stops that prevent rotating past completely open or completely closed positions. Bottom cone is 6-1/2" (165mm) dia. with a flanged opening that fits the opening of the H-4246 field density plate (order separately). Complies with ASTM D1556; AASHTO T191. Shipping wt. 10 lbs. (4.5kg)

Density Apparatus— H-4249

Similar to H-4245, but with 4-1/2" (114mm) dia. bottom cone, which has a flanged opening to fit the H-4249P field density plate (order separately). Shipping wt. 8 lbs. (3.6kg)

Field Density Plate— H-4246

Used with H-4245 density apparatus to simplify removal of soil from test mold and act as template to control hole diameter. Cast aluminum alloy. Size 12 x 12" (305 x 305 mm). Meets ASTM D1556; AASHTO T191.

Field Density Plate— H-4249P

Used with H-4249 density apparatus. Same as H-4246 Field Density Plate except with 4-1/2" (114mm) dia. hole.

Replacement Jar— H-4238

1-gal (4L) capacity threaded plastic replacement jar is same as furnished with H-4245 and H-4249.

Sand Density Cone— H-4248

For determining in-place density of gravel and coarse soils. Features two identical cones with a large valve between them and a circular density plate for support on the bottom. A clear plastic cover on the top cone allows for viewing sand flow. The unit also has handles for easier carrying. Flange that fits the lower cone allows apparatus to be used on holes up to 12" (305mm) dia. Complies with U.S. Army Corps of Engineers specifications. Shipping wt. 50 lbs. (22.7kg)

Density Sand— H-3821

Clean, dry, free-flowing uncemented sand has few, if any, particles passing the No. 200 (75mm) or retained on the No. 10 (2.00mm) sieves. The sand's variation in bulk density does not vary greater than 1 percent. Packaged in a box with a heavy reinforced inner bag. Complies with ASTM D1556; AASHTO T191. Shipping wt. 50 lbs. (22.7kg)

In-place Density Accessory Kit— H-4117

Accessory Kit for use with Sand Density Cones and Voluverssels. Includes: 100 Sample Bags and Ties, a pocket dial thermometer, a bristle brush, a stainless steel spoon, a steel chisel and a rubber mallet. Does not include sand.



- Voluversel, 1/20 cu. ft. (1600ml) capacity— H-4166**
- Voluversel, 1/20 cu. ft. (1600ml) capacity— H-4116**
- Voluversel, 1/13 cu. ft. (2230ml) capacity— H-4167**

Voluversels determine the in-place density of compacted or firmly-bonded soils using a rubber balloon apparatus viewed through a graduated, direct-reading clear plastic cylinder. Humboldt offers two distinctly different models; one, where the plastic cylinder screws into the density plate with the pump assembly mounted on top; and, the other, which has a metal casing protecting the plastic cylinder and the pump assembly mounted to the base.

Both designs come with a pressure-vacuum pump assembly, pressure gauge, quick coupler valve, double-graduated cylinder, 10 balloons and a density plate. Both designs comply with ASTM D2167; AASHTO T205.

Voluversels are not suitable for soft soils that will deform under slight pressure or in which the volume of the hole cannot be maintained at a constant value.

Models H-4166 and H-4167 are individually calibrated before leaving the factory to ensure direct readings on the scale are accurate without the need for calculations.

Voluversel Saddleweights— H-4166S
Weights used to ensure uniform and repeatable weight is applied during testing for accurate readings. Can be used with H-4166 and H-4167 Voluversels.

Replacement Balloons, 10pk— H-4168

Replacement Pump Assembly— H-4166.10
Rubber-bulb, pump assembly for H-4166 and H-4167

Replacement Pump Assembly— H-4116.17
Rubber-bulb, pump assembly for H-4116

Clegg Impact Soil Tester

The Clegg Impact Soil Tester can test a full range of soils and soft rocks as encountered in the construction of flexible pavement and earthworks, as well as athletic fields and surfaces. It is useful for quickly checking variations during construction and monitoring changes over time due to seasonal environmental changes or road traffic, as well as testing natural and "as constructed" conditions. The Clegg can test a full range of natural and synthetic athletic surfaces where hardness/impact characteristics need to be controlled for safety or playability. The Clegg offers the convenience of rapidly scanning compaction variations over large areas. The Clegg may be transported and operated by one person, allowing for low cost, rapid field and laboratory testing and direct readout of the test results. In addition moisture measurements can be recorded using the optional H-4191A Moisture Probe with 20cm rods. Complies with ASTM standards D5874, F1702.0.

All units include the H-4198A Control Unit.

Clegg Impact Soil Tester Models

Size	Applications	Model
50mm 2.25 kg	Natural or synthetic soft turf, sand and golf greens turf (football, baseball, soccer fields, playgrounds,	H-4196A
50mm, 4.5 kg	Natural or synthetic turf (football, baseball, soccer fields, playgrounds, horse tracks, golf greens)	H-4190A
50mm 10 kg	Pre-constructed soils, trench reinstatement, bell	H-4193A
130mm 20 kg	Flexible pavement, aggregate road beds, trench reinstatement, bell holes, foundations	H-4194A





H-4219 (includes pelican case)



H-4219



Economy, Dual-Mass DCP— H-4219E

The H-4219E includes a: dual-mass slide hammer assembly, a 1-meter drive rod with disposable cone tip adapter, 25 disposable tips, vertical scale, go, no-go gauge, all necessary wrenches, user manual with spreadsheet software template and a heavy-duty, crush-proof Pelican carrying case. Shipping wt. 65 lbs. (29.5kg)

Additional disposable cones, adapters, and hardened points are available.



Developed by the Army Corps of Engineers, Dynamic Cone Penetrometers (DCPs) provide a low-cost, efficient test method for quickly determining in-situ CBR values of pavement base, subbase and subgrades. They can readily be used for depths up to 30" and up to 6' with optional drive rods and extensions. All Models comply with ASTM D6951 specifications and come with a chart to compute CBR values, as well as an Excel spreadsheet template, which automatically charts the test results. DCPs cover a CBR range from <.05 to 100% and a bearing value range from 430 to 10,800 psf.

Dual-Mass Dynamic Cone Penetrometer— H-4219

The H-4219 is designed in strict adherence to all original design specifications including the overall weight of the unit set forth by the U.S. Army Corps of Engineers and ASTM D6951-03. The H-4219 features the exclusive easy-grip hammer that provides a finger perch machined into the back side of the hammer flange, which provides easy, non-slip lifting when performing a test. It's exclusive coupling system ensures long-life of drive rods and extensions by providing a tight, positive connection every time, which eliminates the loss of hammer blow energy through the connections. While sold as a dual-mass model, the H-4219 can quickly be converted to a single mass unit by removing the hexagonal set screw and removing the outer sleeve from the dual mass hammer. This procedure can be accomplished during a test, since the outer sleeve is designed to slide over the DCP handle. The cone penetration caused by one blow of the 8 kg hammer is essentially twice that caused by one blow of the 4.6 kg hammer. As a result, the 4.6 kg hammer is more suitable for use and yields better test results in weaker soils having CRB of 10% or less. It can also be used for evaluating soils in foundations for residential structures which require bearing value of 2000 PSF (approximate CBR of 6%). The 8 kg hammer is preferable for high-strength soils, which it penetrates more quickly than the 4.6 kg hammer. However, the 4.6 kg hammer can be used on soils up to CBR 80%. The H-4219 includes a: dual-mass slide hammer assembly, a 1-meter drive rod with hardened tip, a 1-meter drive rod with disposable cone tip adapter, 100 disposable tips, vertical scale, go, no-go gauge, all necessary wrenches, user manual with spreadsheet software template and a heavy-duty, crush-proof Pelican carrying case. Shipping wt. 65 lbs. (29.5kg)

Additional disposable cones, adapters, and hardened points are available.

Description	Model
Hardened cone tip w/wrench flats	H-4219.4
Disposable cone tip adapter w/wrench flats	H-4219.5
Disposable cones, pkg. of 100	H-4219.100
Disposable cones, pkg. of 25	H-4219.25
Std., 1 meter, threaded drive rod	H-4219.11
Std., 1 meter, disposable cone drive rod	H-4219.10
2 meter, disposable cone drive rod	H-4219.13
3 meter, disposable cone drive rod	H-4219.14
24" extension rod	H-4219.8
Vertical scale, 48"	H-4219.2
Go, No-Go Gauge	H-4219.3



H-4218C (includes pelican case)



H-4218C



H-4218E



H-4219.2



H-4219.4



H-4218B.800



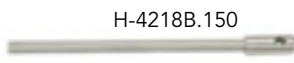
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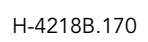
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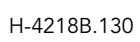
H-4218B.450



H-4218B.150



H-4218B.170



H-4218B.130



H-4218B.135

Dual-Mass Dynamic Cone Penetrometer— H-4218C

The Standard DCP Kit measures the shear strength of soil with a CBR between 0.5-100% and from 430 to 10,800 psf. This single-operator kit is ideal for state/county/city highway departments and geotech firms. CBR and psf can be estimated in the field from tables in the manual and plotted using Corps of Engineers Excel template included on CD. It comes with a stainless steel dual-mass (17.6/10.1 lb) hammer and quick-connect upper rod, 30-inch drive rod (27-1/4 inch penetration), a 40-inch vertical scale, upper and lower scale mounts, a reusable hardened point and a disposable cone adapter with 25 disposable cones for fast and easy extraction of the instrument from hard/cohesive soil. The kit also includes a crush-proof Pelican carrying case with transport wheels and wrench set. Shipping wt. 54 lbs. (24.5kg)

Economy, Single-Mass DCP— H-4218E

This Economy DCP Kit is used to estimate the shear strength of soil with a CBR between 10-100 and psf from 762-7072. Tables in the manual provide correlations to CBR and psf values for the penetration rates at 2 inch, 4 inch and 6 inch intervals. Affordably priced, this single-operator kit comes with a 37.75" drive rod that is marked in 2 inch increments, and a reusable hardened point. The single mass (17.6 lb) structural-steel hammer is standard with this kit. Also included are a manual, two Quick Connect pins and a wrench.

Please Note: The Economy DCP Kit DOES NOT come with a carrying case.

Description	Model
Hardened cone tip w/wrench flats	H-4219.4
Cone adapter with wrench flats (silver)	H-4218B.800
Disposable cones, pkg. of 25	H-4218.9
Disposable cones, pkg. of 500	H-4218.950
Hardened point with wrench flats (gold, Old)	H-4218.7
Cone adapter with wrench flats (gold, Old)	H-4218.8
Drive rod, 12" stainless	H-4218B.150
Drive rod, 30" stainless	H-4218B.130
Drive rod, 37.75" stainless	H-4218B.135
Extension rod, 24" stainless	H-4218B.170
Vertical scale, 48"	H-4219.2
Vertical scale, upper attachment	H-4218.530
Vertical scale, foot	H-4218.510
Quick connect, pin with clip (2 ea.)	H-4218B.450



Dynamic Cone Penetrometer Test Set— H-4202A

The Dynamic Cone Penetrometer (DCP), originally developed by George Sowers, uses a 15 lb steel mass falling 20 in. to strike an anvil to penetrate a 1.5 in. diameter 45° (vertex angle) cone that has been seated in the bottom of a hand-augered hole. The DCP can be used effectively in augered holes in nearly all types of soils to depths of 15 to 20 ft. (4.6 to 6.1m). Components are zinc-plated and cones are heat-treated. The cone can be replaced with a Drive Tube Assembly (H-4202.7A) for collection of 3 x 10 in (7.6 x 25.4 cm) tube samples from hand-augered holes.

The H-4202 set includes; (1) standard hammer assembly (H-4202.1), (1) heat-treated 45° cone penetrometer point with a 1 ft. adapter rod (H-4202.3), (4) 2.5 ft. E drill rod extensions (H-4202.225), (1) auger head (H-4202.6), (1) auger T-handle (H-4202.4), (4) 36" auger extensions (H-4202.5), and (1) ASTM special technical publication #399 (H-4202.9). Shipping wt. 76 lbs. (34kg)

DCP Test Set with Sleeved Drive Hammer— H-4202AS

The 4202 DCP Test Set with a H-4202.1A Sleeved Drive Hammer in place of the standard drive hammer. Provides an easier and safer-to-use hammer. Shipping wt. 80 lbs. (36kg)

Sleeved Drive Hammer— H-4202.1A

Alternate hammer for H-4202 DCP set. Provides an easier and safer-to-use hammer. Shipping wt. 32 lbs. (15kg)

DCP Test Set without Auger Set— H-4202AX

The H-4202X DCP Test Set without the auger set. The H-4202 set includes; (1) standard hammer assembly (H-4202.1), (1) heat-treated 45° cone penetrometer point with a 1 ft. adapter rod (H-4202.3), (4) 2.5 ft. E drill rod extensions (H-4202.225)

Sleeved Hammer DCP Test set w/o Auger Set— H-4202SX

The H-4202SX DCP Test Set without the auger set. The H-4202 set includes; (1) Sleeved Drive Hammer assembly (H-4202.1A), (1) heat-treated 45° cone penetrometer point with a 1 ft. adapter rod (H-4202.3), (4) 2.5 ft. E drill rod extensions (H-4202.225)

Shelby Tube Drive Head— H-4202.7A

Drive Head for Shelby tubes for use with H-4202.1 or H-4202.1A Drive Hammers with 3" "E" rod connection.

Individual Items for H-4202

Description	Model
Standard drive hammer	H-4202.1
Sleeved drive hammer	H-4202.1A
E drill rod extension 1 ft.	H-4202.21
E drill rod extension 2 ft.	H-4202.22
E drill rod extension 2.5 ft.	H-4202.225
E drill rod extension 5 ft.	H-4202.25
Drive point w/1 ft. adapter (45° cone)	H-4202.3
Drive point only (45° cone)	H-4202.3DP
Auger assembly, includes auger head, two connector pins, tee handle and one extension.	H-4202.6A
Auger Tee handle	H-4202.4
Auger Tee handle, stainless steel	H-4202.4SS
Auger extension. 36"	H-4202.5
Auger extension, stainless steel. 36"	H-4202.5SS
Auger head, standard 3-1/4"	H-4202.6
Auger head, stainless steel 3-1/4".	H-4202.6SS
Windowed auger head, standard (heat-treated carbon steel). 3-1/4"	H-4202.6W
Windowed auger head, standard (stainless steel) 3-1/4"	H-4202.6WSS
Shelby Tube Drive Head, 3" E Rod	H-4202.7A
Replacement connector pin.	H-4202.8
Replacement connector pin, stainless steel.	H-4202.8SS
ASTM special technical publication #399	H-4202.9

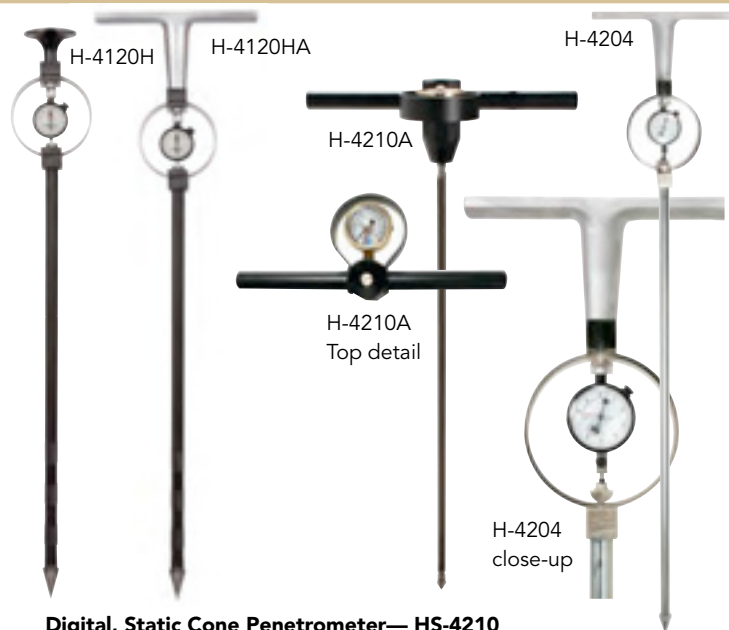
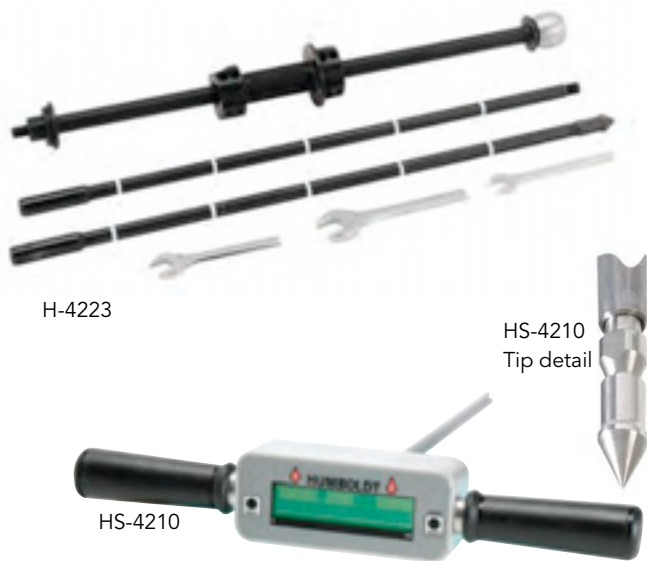
Single-Mass (10.1 lbs) DCP— H-4218F

The H-4218F is used to estimate the shear strength of very weak soil with a CBR less than 20 and psf less than 4000. Tables in the manual provide correlations to CBR and psf values for the penetration rates at 2", 4" and 6" intervals. Affordably priced, this kit comes with a 37-3/4" drive rod that is marked in 2" increments, a single mass structural steel hammer and a reusable, hardened point. Also included are a manual, two quick-connect pins, two wrenches and 3-in-1 oil.

DOES NOT come with a carrying case. Shipping wt. 22.5 lbs. (10kg)

24" Extension Rod— H-4218F.24





Heavy-Duty Dynamic Cone Penetrometer— H-4223

The Heavy Duty DCP permits rapid and economical evaluation of soils while providing information on soil stratification. The DCP is commonly used for footing evaluations and can also be used to evaluate fill when compaction must be verified. This tool consists of a sliding hammer assembly with a 10-pound hammer that is dropped 24 inches. The slide hammer shaft is machined from one piece of alloy steel. Both the hammer shaft and hammer are heat treated to ensure long life. This device uses a 36" Extension Shaft that is .875" diameter, with 6" increments marked along its length. There is a 60-degree, hardened-cone tip that is 1.125" diameter. Having a larger diameter cone than the diameter of the shaft helps reduce side friction along the length of the extension shaft. Extension shafts may be attached end-to-end to achieve a depth of 9 feet. This set consists of: (1) Slide Hammer Assembly; (1) 36" Lower Extension Shaft With Hardened Cone Tip; (1) 36" Lower Extension Shaft With Threaded End for 72" Depth of Test; (1) Heavy duty Pelican carry case with custom inserts. The set also includes all necessary tools for easy assembly and disassembly and a complete User and Maintenance Manual.

We strongly advise hand augering a hole first when going beyond 6 feet. Refer to ASTM Special Publication No. 399 for insight into DCP use and practices

Individual Items for H-4223

Description	Model
Sliding drive hammer assembly	H-4223.1
Extension Shaft, 36 inches	H-4223.2
Extension Shaft, 24 inches	H-4223.4
Cone Tip, 60°, Hardened Steel	H-4223.3

Corps of Engineers Cone Penetrometer— H-4120H

COE Cone Penetrometer w/ T-Handle— H-4120HA

Designed to evaluate soil trafficability and manufactured to Corps of Engineers specifications. The factory calibrated dial indicator reads directly in psi. Includes 30 degree cone with 1/2 sq. in. base area; 150 lb capacity proving ring; a dial indicator calibrated direct 0–300psi in 5psi increments; extension rod 5/8" (15.8mm) dia x 19" (483mm), and the handle. Shipping wt. 15 lbs. (6.8kg)

Digital, Static Cone Penetrometer— HS-4210

The HS-4210 Digital, Static Cone Penetrometer (DSCP), with its large, digital readout, makes testing and recording readings easy. The DSCP can be used to evaluate soil consistency by determining the soil's level of compaction and/or the bearing capacity. The DSCP is especially useful in evaluating shallow foundations and pavement subgrades where fine-grained and soft soils are being used. The DSCP can also be used to aid technicians in quickly selecting sites for testing, as well as correlating with other tests, based on local conditions, such as standard or modified Proctor, CBR or Bearing Capacity. The DSCP uses a dual-rod design, which eliminates the need to correct for soil friction on the rod as the cone is pushed through the material. Penetration resistance is read directly from the cone tip and registered on the digital display. The Unit comes with a 30" starter rod and a 60° cone with a 1.5cm² area. Shipping wt. 9 lbs. (4kg)

Static Cone Penetrometer— H-4210A

Used in fine-grained, soft soils at shallow foundation and pavement subgrades to evaluate for soil consistency, level of compaction and bearing capacity. Unmatched for accuracy, reliability and ease of use. Pressure gauge with 0-70kg/cm is scaled for direct reading of cone stress, eliminating proving ring conversions. Dual rod design eliminates soil friction factor. High strength aluminum and steel construction. Standard model includes a 60° cone with 1.5cm. max. area, a 24" (0.6m) starter rod assembly rated at 250 lbf axial force max., and a pressure gauge. Shipping wt. 8 lb. (3.63kg)

Individual Items for H-4210A

Description	Model
60° Cone with 3cm ² max area	H-4210.3
Extension rod, 24 in. (0.6m)	H-4210E.2A
60° Cone with 1.5cm ² max area	H-4210.1
Starter rod, 24 in. (0.6m)	H-4210.2A
Replacement O-ring	H-4210.9

Proving Ring Penetrometer— H-4204

Used to determine the bearing capacity of subgrades, or to measure soil compaction. Light and easy to handle in the field. A rapid means of determining the penetration resistance of soil in shallow exploration surveys. Includes: 30°, 1 sq. in. (6.45 sq cm) cone; 250 lb. (1.1kN) capacity proving ring; brake type dial indicator, holds final reading until manually released; 3/4" (19mm) dia shaft, graduated at 6", (152mm) intervals; 3/4" (19mm) dia extension rod, graduated at 6" (152mm) intervals; cast aluminum T-handle. Shipping wt. 15 lbs, (6.8kg)

**Probe Rod— H-4188**

Ideal for locating buried pipes, tanks and utility lines. Zinc-plated steel, 36" (914mm) x 1/2" (12.7mm) shaft. Shipping wt. 5 lbs. (2.2kg).

Fiberglass Probe Rod— H-4188F

Ideal for locating buried pipes, tanks and utility lines. Light, non-conductive Fiberglass 48" (1219mm) x 1/2" (12.7mm) shaft.

Spiral Type Auger— H-4250

For use in sampling soils, auger has 1-1/2" dia. x 4" long (38mm x 102mm) spiral-type auger bit. Features graduation marks every 6" (152mm). Overall length is 36" (914mm), including handle. Screw-on handle permits attachment of H-4251 extension for sampling beyond 36" depths. Complies with ASTM D420, D1452; AASHTO T86, T202. Shipping wt. 6 lbs. (2.7kg).

Extension for Spiral Type Auger— H-4251

For use with H-4250 auger, 36" (914mm) long extension allows sampling at greater depths. Shipping wt. 5 lbs. (2kg)

Soil Sampling Tube— H-4362

For use in collecting soft soil samples in 3/4" core sample size. Depth capacity is about 39". Includes sampler tube, one tip, two extension rods, handle and fiberboard case.

Auger Set with Quick-release Handle and Bucket— H-4202.6A

Set includes a 3-1/4" Windowed, Auger Head of zinc-plated steel, Auger Tee Handle, 36" (914mm) Auger Extension and (2) Quick-release Connector Pins.

Auger Extension, 36"— H-4202.5

Auger Extension and Connector Pin for use with H-4202.6A Auger Set.

Iwan-Type, T-Handle Auger, 2" dia (51mm)— H-4252.2**Iwan-Type, T-Handle Auger, 3" dia (76mm)— H-4252.3****Iwan-Type, T-Handle Auger, 4" dia (102mm)— H-4252.4****Iwan-Type, T-Handle Auger, 6" dia (152mm)— H-4252.6**

T-handle augers are also known as post-hole, Iwan-type or non-adjustable augers. Feature 36" (914mm) long steel shaft and hardwood cross handle. Available 2" (51mm) to 6" (152mm) diameter. Overall length 48" (1219mm). Complies with ASTM D420, D1452; AASHTO T86, T202. Shipping wt. 7 lbs. (3.2kg).

Extension for 2" Iwan-Type Auger— H-4252.2E

For use with H-4252.2 T-handle auger only, extension is 36" (914mm) long and includes end coupling. Shipping wt. 9 lbs. (4.1kg).

Extension for 3", 4" and 6" Iwan-Type Auger— H-4252E

For use with H-4252.3, H-4252.4 and H-4252.6 T-handle augers, extension is 36" (914mm) long and includes end coupling.

Soil Sampling Tube Set— H-4269

Tube sets are helpful and functional for agricultural and other soil-testing procedures. Sampling tube will produce 15" (381mm) core of soil. Includes 18" (457mm) long, 7/8" (22mm) ID sampling tube, handle and carrying case.

Soil Sampling Auger Tube Set— H-4268

Set contains auger and sampling tube. Components are plated steel to resist abrasive action of soil. Includes 1-1/4" (25mm) dia. by 12-1/2" (318mm) long auger, 1" (approx. 25mm) OD by 12-1/2" (318mm) long sampling tube, two 12" (305mm) extension rods, handle and a fiberboard carrying case. Shipping wt. 7 lbs. (3.2kg).



Augers, Bucket-Type, Quick-connect

Quick-connect, button-and-hex coupling system allows components to connect and disconnect faster and with less hassle than threaded systems. Quick-connect connections, are not compatible with slide hammers. Bucket augers offer outstanding durability and allow access to deeper depths. The regular auger bit is designed for ordinary soil sampling. The sand auger bit is used for dry, sandy soils. Mud auger bits are designed for sampling heavy, wet soil or clay samples; opening facilitates removal of wet samples. Heat treated, high carbon steel bits with tungsten carbide hard-surfaced edges. Bits are welded to a stainless steel cylinder, topped with a carbon steel ball.

Augers, Bucket-Type, 5/8" Threaded

Threaded connections use standard, national course, threads. 5/8" connections are the most common and least expensive. Augers, core samplers, probes, slide hammers, hammer-head handles, and kits are available with threaded connections. Bucket augers offer outstanding durability and allow access to deeper depths. The regular auger bit is designed for ordinary soil sampling. The sand auger bit is used for dry, sandy soils. Mud auger bits are designed for sampling heavy, wet soil or clay samples; opening facilitates removal of wet samples. Heat treated, high carbon steel bits with tungsten carbide hard-surfaced edges. Bits are welded to a stainless steel cylinder, topped with a carbon steel ball.

Augers, Bucket-Type, Quick-connect

Size	Regular	Sand	Mud
2"	H-4410QC	H-4430QC	H-4420QC
2-1/4"	H-4411QC	H-4431QC	H-4421QC
2-3/4"	H-4412QC	H-4432QC	H-4422QC
3-1/4"	H-4413QC	H-4433QC	H-4423QC
4"	H-4414QC	H-4434QC	H-4424QC

Augers, Bucket-Type, 5/8" Threaded

Size	Regular	Sand	Mud
2"	H-4410TH	H-4430TH	H-4420TH
2-1/4"	H-4411TH	H-4431TH	H-4421TH
2-3/4"	H-4412TH	H-4432TH	H-4422TH
3-1/4"	H-4413TH	H-4433TH	H-4423TH
4"	H-4414TH	H-4434TH	H-4424TH



Auger Extensions, Quick-connect

Description	Model
2 ft. (610mm), Chromoly Extension	H-4442QC
3 ft. (914mm), Chromoly Extension	H-4443QC
4 ft. (1219mm), Chromoly Extension	H-4444QC
5 ft. (1524mm), Chromoly Extension	H-4445QC

Auger Extensions, 5/8" Threaded

Description	Model
2 ft. (610mm), Chromoly Extension	H-4442TH
3 ft. (914mm), Chromoly Extension	H-4443TH
4 ft. (1219mm), Chromoly Extension	H-4444TH
5 ft. (1524mm), Chromoly Extension	H-4445TH



H-4447QC



H-4449QC



H-4447TH



H-4449TH

Auger Cross Handles, Quick-connect

Auger Cross Handle, Padded	H-4447QC
16" Ratcheting Handle	H-4449QC

Auger Cross Handles, 5/8" Threaded

Auger Cross Handle, Padded	H-4447TH
16" Ratcheting Handle	H-4449TH



H-4451



H-4452



H-4449



Basic Soil Sampling Kits

Basic sampling kits provide everything you'll need to auger to a target depth as deep as 12ft and obtain a relatively undisturbed soil core sample. The kits are used worldwide by construction companies, consultants and engineering firms for site investigations. They are available with 5/8" threaded components with either 2-1/4" or 3-1/4" augers. Each kit comes with (1) regular, (1) mud, and (1) sand auger. The kits also include (3) 4' extensions, (1) 18" rubber-coated cross handle, (1) regular slide hammer, (1) core sampler (1-1/2" x 6" or 2" x 6"), (1) plastic liner, (2) plastic end caps, (1) cleaning brush, (1) universal slip wrench, and (2) crescent wrenches. All the components fit securely in a foam-lined, poly-reinforced deluxe carrying case with handles and wheels for added portability.

5/8" Threaded Soil Auger Kits

Description	Model
2 1/4" Basic Soil Sampling Kit (56.0 lb)	H-4416.2
3 1/4" Basic Soil Sampling Kit (60.0 lb)	H-4416.3

Rock Breaker and Slide Hammers

Rock Breaker is made from high-strength alloy steel with chisel tip. Use with Slide hammers for rock breaking and chiseling. Rubber coating on slide hammers makes them easy to hold on to and absorb impact shock. **Slide hammers have 5/8" threaded coupling, order adapter listed below to use with quick-connect rock breaker and extensions.**

Rock Breaker and Slide Hammers

Description	Model
Rock Breaker with Chisel Tip	H-4449
Regular Slide Hammer, 5/8" Threaded	H-4451
Compact Slide Hammer, 5/8" Threaded	H-4452
Universal Slip Wrench	H-4453

Soil Auger Kits

These are complete, compact setups for augering to depths of 12' or 16'. Soil auger kits include (1) regular and (1) mud auger, (4) extensions, an 18" rubber-coated cross handle, and a flexible, poly-canvas carrying case for easy transport and storage. They are available with either 5/8" threaded, or quick-connect connections.

Quick-connect Soil Auger Kits

Description	Model
2 1/4" Augers with (4) 3' Extensions (19.0 lb)	H-4418.23
2 1/4" Augers with (4) 4' Extensions (22.0 lb)	H-4418.24
3 1/4" Augers with (4) 3' Extensions (19.0 lb)	H-4418.33
3 1/4" Augers with (4) 4' Extensions (22.0 lb)	H-4418.34

5/8" Threaded Soil Auger Kits

Description	Model
2 1/4" Augers with (4) 3' Extensions (19.0 lb)	H-4419.23
2 1/4" Augers with (4) 4' Extensions (22.0 lb)	H-4419.24
3 1/4" Augers with (4) 3' Extensions (19.0 lb)	H-4419.33
3 1/4" Augers with (4) 4' Extensions (22.0 lb)	H-4419.34

See Page 21 for Extensions



42 Inch, Snap-On Augers

Description	Model
1-1/2" (38mm) Snap-on auger	H-4052A.1
2" (51mm) Snap-on auger	H-4052A.2
3" (76mm) Snap-on auger	H-4052A.3
4" (102mm) Snap-on auger	H-4052A.4
6" (152mm) Snap-on auger	H-4052A.6

42" augers dig a 36" deep hole.

36 Inch, Full-flighted, Snap-On Extensions

Description	Model
1-1/2" (38mm) Snap-on extension	H-4053.1
2" (51mm) Snap-on extension	H-4053.2
3" (76mm) Snap-on extension	H-4053.3
4" (102mm) Snap-on extension	H-4053.4
6" (152mm) Snap-on extension	H-4053.6

Tube Extensions

Description	Model
36" Tube extension for 3 to 6" Augers	H-4053.7
18" Tube extension for 3 to 6" Augers	H-4053.8

Replacement Points & Blades

Description	Model
1-1/2" (38mm) Screw-on replacement point	H-4055.1
2" (51mm) Screw-on replacement point	H-4055.2
3" (76mm) Screw-on replacement point	H-4055.3
Replacement point, 4" (102mm) or 6" (152mm)	H-4055
Replacement blade, 4" (102mm)	H-4056
Replacement blade, 6" (152mm)	H-4057

Power Mechanical Earth Drill, 5hp— H-4050

Power Mechanical Earth Drill, 8hp— H-4051

For soil sampling, construction and more, earth augers are gasoline powered and portable. Using one operator, they allow fast and easy drilling. They feature snap-on or screw-on augers and extensions. Engine mounted on wheel-base carrier keeps motor noise and fumes away from the operator. Torque tube eliminates counter torque. Features such as the carrier and torque tube offer greater mobility, beneficial in areas inaccessible to large equipment, on slopes and horizontal drilling, various standard sampling methods to obtain material samples. Recoil starter and spring-loaded throttle-in-handle assembly provide fingertip control. Centrifugal clutch, heavy-duty flexible shaft connects to the motor and provides for a smooth operation. Blades and points are tool steel, hard-surfaced and heat treated. Blades are reversible for longer life. Most augers are snap-on design; smaller diameter augers are screw-on. Auger has either 5HP or 8HP, 4-cycle engine with 10:1 gear ratio, complete with wheel kit and torque tube. Order augers and extensions separately. For augers 1-1/2" to 6" dia., maximum depth is 18' (38 to 152mm, 5.5m deep). Shipping wt. 225 lbs. (102kg)

Density Drive Sampler, 3" (76.2mm) Drive Head— H-4203.3

Density Drive Sampler, 4" (101.6mm) Drive Head— H-4203.4

For determining in-place density of soil by driving a thin-walled tube into the soil mass to obtain a relatively undisturbed sample. Typically used to verify compacted fill placement, or to obtain samples from the bottom of shallow excavations. Zinc-plated, steel drive head and sliding weight hammer used with separately ordered drive tubes. Drive head, 10 lb., has shock reducing spring to guard against fatigue failure. Complies with ASTM D2937. Shipping wt. 25 lbs. (11kg)

Drive tube for use with H-4203.3 Drive Sampler— H-4203DT.3

3" (76.2mm) x 2.75" (69.9mm) length, (3" x 0.01 ft³).

Drive tube for use with H-4203.4 Drive Sampler— H-4203DT.4

4" (101.6mm) x 5" (127mm) length, (4" x 0.033 ft³).





Humboldt Soil Penetrometer (Tire Gauge Design)— H-4200

For use by field personnel to check visual classification of soils. Verifies whether excavation side walls require shoring, based on OSHA cohesive soils classifications. Indicates consistency, shear strength, and approximate unconfined shear strength. Direct-reading scale—in tons/sq ft, or kg/sq cm—corresponds to equivalent unconfined compressive strength. Range: 0 to 4.5 tons. High quality construction. Includes belt-loop style carrying case and operating instructions. Should not replace laboratory testing or field analysis, or be used to produce foundation design data. Shipping wt. 1 lb. (.5kg)

Soil Penetrometer, Pocket Type— H-4195

For use by field personnel to check visual classification of soils. Verifies whether excavation side walls require shoring, based on OSHA cohesive soils classifications. Indicates consistency, shear strength, and approximate unconfined shear strength. Direct-reading scale—in tons/sq ft, or kg/sq cm—corresponds to equivalent unconfined compressive strength. Indicator sleeve retains reading after piston is released.

Penetrometer Adapter Foot— H-4200F

Adapter foot is recommended when testing extremely low strength cohesive soils. 1" (25mm) dia. foot, compared to the 1/4" (6.35mm) penetrometer piston, increases the effective area measured by 16 times. Divide by 16 to obtain correct unconfined compressive strength when the reading in tons per square foot or kilograms per square centimeter is on the low-load side. Shipping wt. 1 lb. (.5kg)

Pocket Shear Vane, Metal— H-4212MH

The Humboldt H-4212MH Pocket Shear Vane Tester provides a quick and efficient method for determining shear strength values of cohesionless soils. The Pocket Shear Vane is widely used for taking on-site measurements of excavations, including trenches and test pits. It is also used for taking readings from thin-wall or split core soil samples. It can also be used in the laboratory for evaluations. The device is widely used by Safety and OSHA Inspectors, Back Hoe Operators, Field Testing Technicians, Consulting Engineers, etc.

The Humboldt Shear Vane Device comes with three vanes, which are easily attached or removed from the device with the included L-wrench. We also include a custom, heavy-duty, nylon bag for storage, which can be quickly attached to your belt with its belt clip, as well as a laminated instructions card, so you always have instructions to refer to when doing tests.

The Pocket Shear Vane can be used to gather a large number of readings including those from different failure planes without the need to prepare and trim samples. The device can be used on any reasonably flat surface that is slightly larger than the vane surface being used. The Pocket Shear Vane can be used with fully-saturated, fine-grained soils with an undrained strength independent of normal pressure, including a wide range of clays from soft to stiff consistency. Readings can be made from 0 to 2.5 TSF (1 Kg/cm²). The dial on the unit reads in 0.05 TSF (0.05 Kg/cm²) increments.

Torvane Shear Tester Set, Plastic— H-4212

Similar to H-4212MH, but made of plastic. Comes in plastic case.

Dial Pocket Penetrometer Kit— H-4205

A sophisticated pocket penetrometer offering greater capacity and sensitivity than others. Maximum value is retained on the dial until released via push-button. Inner dial scale 0 to 6.0, with 0.1 divisions in tsf and kg/cm². Outer scale gives load strength over 0 to 11.0 with 0.1 divisions in kg. This reading is used with charts (included) to estimate safe bearing pressures, depending on plunger used and soil type. Values indicated relate to the standard 1/4" dia. plunger. In addition, readings with four other included plungers (10, 15, 20, 25mm) indicate safe bearing pressures for foundations in consolidated soils over a range of sandy to clay-type soils. The 2.5" (63mm) dia. dial can be easily recalibrated using register plates (included) and any readable scale of 10-15 lbs. capacity. Includes data tables, register plates, instructions, and carrying case. Shipping wt. 2 lb. (1kg)

Vane Inspection Set— H-4227

The Vane Inspection Set provides a rapid check of the stability of foundations, excavations and trenches in clay. The total range is 0 to 260kPa (0 to 2.6 ton/sq. ft.). The scale built into the handle holds the peak value until reset. Accuracy is $\pm 10\%$. Three different sizes vanes are included with the set (16 x 32, 20 x 40 and 25.4 x 50.8mm). The effective ranges are 0 to 260, 0 to 130 and 0 to 65kPa (0 to 2.6, 0 to 1.3 and 0 to 0.65 tsf). A "dummy" vane is also included to calibrate the six 0.5 meter long extension rods for effects of soil friction. All items come in a compartmentalized vinyl carrying case with three wrenches. Shipping Weight: 13 lb (6kg).

Extension rod, 0.5 meter— H-4227.1

50.8 x 101.6mm Vane— H-4227.2

Measuring range is 0 to 8.125kPa (0.08 TSF)



H-4221

H-4221.1

H-4221.3A



H-4139



H-4368A



H-4040.150

Geovane Soil Shear Strength Tester— H-4221

The Geovane is a hand-held instrument used for determining soil shear strength providing the reading in kPa. The device is simple to use.

A 19mm vane blade is screwed into the base of the Geovane and the vane is pushed into the soil. Simply rotate the Geovane at a rate of 1 revolution per minute and take a reading off the face when the soil fails. The pointer stays in place when failure occurs allowing you to look up the indicated reading on the supplied calibration chart to get your reading in kPa from zero to 200. Through the use of the optional 33mm vane, readings can be measured between the range of zero to 40 kPa.

Extension rods are available to increase the depth measurement capabilities of the unit. The H-4221.4 Adapter is needed to attach extension rods to the Geovane. The Geovane is supplied complete with a 19mm vane blade, wrenches and a carrying case.

Shipping Weight: 6 lb (3kg).

Vane Blade (33mm)— H-4221.1

Extension Rod 12" (300mm)— H-4221.2A

Extension Rod 19.7" (500mm)— H-4221.3A

Extension Rod Adapter— H-4221.4

Proctor Penetrometer Set— H-4139

Establishes the moisture-penetration resistance relations of fine-grained soils. Includes these interchangeable needles (area in sq. in. or sq. cm): 1 (6.45), 3/4 (4.84), 1/2 (3.22), 1/3 (2.15), 1/5 (1.29), 1/10 (.65), 1/20 (0.32) 1/30 (0.22cm²) and 1/40 (0.16cm²). Replacement needles available. Complies with ASTM D1558. Shipping wt. 17 lbs. (7.7kg).

Penetration Resistance Needles for H-4139

Description	Model
Replacement Resistance Needle Set	H-4143N
1 sq. in. (6.45 cm ²) needle	H-4143.1
3/4 sq. in. (4.84 cm ²) needle	H-4143.75
1/2 sq. in. (3.22 cm ²) needle	H-4143.50
1/3 sq. in. (1.29 cm ²) needle	H-4143.33
1/5 sq. in. (2.15 cm ²) needle	H-4143.20
1/10 sq. in. (0.65 cm ²) needle	H-4143.10
1/20 sq. in. (0.32 cm ²) needle	H-4143.05
1/30 sq. in. (0.22 cm ²) needle	H-4143.033
1/40 sq. in. (0.16 cm ²) needle	H-4143.025

Soil Color Charts— H-4368A

The Munsell Soil Color Charts are an affordable way to evaluate the type of soil that is present within a given area. The book is set up to allow users to make soil color evaluations in the field quickly and easily. Through the use of the Munsell Soil Color Charts, practitioners from a wide range of professions can share reliable and consistent information about the color of soils at a particular site with colleagues anywhere around the world. The new soil book contains all of the colors that have been available in the past plus these additional pages:

- Munsell high value, low chroma 'White' Page, used for describing carbonate, silica, gypsum, and soluble salt precipitates and evaporites common to arid and semi-arid environments and very light-colored parent materials, such as diatomaceous earth and volcanic ash. The White Page shows half steps from 8.5 to 9.5 in value with chromas of 1 and 2 for N, 7.5 YR, 10YR, and 2.5Y
- 10Y and 5GY Soil chart for glauconitic soils
- 5R soil chart for Australia and Southeast Asia

Shipping wt. 1 lb. (.5kg)

Water Level Indicator, 150 ft.— H-4040.150

Water Level Indicator, 300 ft.— H-4040.300

Water Level Indicator, 500 ft.— H-4040.500

Water Level Indicator, 50 meters— H-4040.50M

Water Level Indicator 100 meters— H-4040.100M

Water Level Indicator, 150 meters— H-4040.150M

The Water Level Indicator determines water levels in drainage operations, dams, reservoirs, embankments, wells, bore holes, underground cavities, or any hydrological/geological work. Works well with small openings, holes & shafts that are not always straight. Compact, self-contained units feature a jointed design for easy access to difficult openings. Weighted probe is lowered into the opening via high-strength, flexible cable. Buzzer & light indicate when water level has been reached. Readings taken from marked cable to very tip of probe so less than 1 ml of water is displaced. Probe resists false readings caused by cascading water. Standard models have cables marked in feet, metric models marked in centimeters. Shipping wt. 6-12 lbs. (3-5kg)



Shelby Tubes



H-4202.7A

H-4202.7A mounted to a H-4202.1 Drive Hammer and a 10" Shelby Tube



H-4210.3AW



H-4210W



H-4210.5P
H-4210.25P



H-4210C



H-4210.005C
H-4210.003C

Shelby Tubes, Galvanized—

Shelby tube samplers are thin-walled, hollow steel tubes, which are driven into the ground to extract a relatively undisturbed soil sample for use in laboratory tests used to determine density, permeability, compressibility and strength. Each tube has one end that is chamfered to form a cutting edge and the upper end includes holes for securing the tube to a drive head. Shelby tubes are useful for collecting soils that are particularly sensitive to sampling disturbance, including fine cohesive soils and clays. The tubes can also be used to transport samples back to the lab as well.

Description	Model
2" dia x 30" long, galvanized shelby tube (wt.2.5lbs)	H-4210.230
2" dia x 36" long, galvanized shelby tube (wt.3.2lbs)	H-4210.236
2.5" dia x 30" long, galvanized shelby tube (wt.4.2lbs)	H-4210.253
2.5" dia x 36" long, galvanized shelby tube (wt.5.5lbs)	H-4210.256
3" dia x 10" long, galvanized shelby tube (wt.1.9lbs)	H-4210.10
3" dia x 12" long, galvanized shelby tube (wt.1.9lbs)	H-4210.12
3" dia x 18" long, galvanized shelby tube (wt.3.0lbs)	H-4210.18
3" dia x 24" long, galvanized shelby tube (wt.3.8lbs)	H-4210.24
3" dia x 30" long, galvanized shelby tube (wt.5.1lbs)	H-4210.30
3" dia x 36" long, galvanized shelby tube (wt.6.2lbs)	H-4210.36
3.5" dia x 30" long, galvanized shelby tube (wt.5.5lbs)	H-4210.353
3.5" dia x 36" long, galvanized shelby tube (wt.6.3lbs)	H-4210.356
5" dia x 24" long, galvanized shelby tube (wt.11.8lbs)	H-4210.524
5" dia x 30" long, galvanized shelby tube (wt.17.5lbs)	H-4210.530
5" dia x 36" long, galvanized shelby tube (wt.19.5lbs)	H-4210.536

NOTE: SIZE IS OD.

Shelby Tube Drive Head— H-4202.7A

Drive Head for 3" Shelby tubes for use with H-4202.1 or H-4202.1A Drive Hammers with "E" rod connection, see page 16.

Sealing Wax— H-4210W

Sealing wax to seal ends of Shelby Tube for transport. 10 lb. box. For Melting Pots, please see page 109.

Shelby Tube Drive Heads For Use with Drill Rigs—

These Drive Heads feature internal floats to relieve water pressure while taking samples in submerged applications, but can be used in all applications. Available for use with AW, AWJ and NW drill rods.

Description	Model
2" Drive Head for AW Rod (wt.4lbs)	H-4210.2AW
2" Drive Head for AWJ Rod (wt.5lbs)	H-4210.2AWJ
2.5" Drive Head for AW Rod (wt.6lbs)	H-4210.25AW
3" Drive Head for AW Rod (wt.13lbs)	H-4210.3AW
3" Drive Head for AWJ Rod (wt.11lbs)	H-4210.3AWJ
3" Drive Head for NW Rod (wt.9lbs)	H-4210.3NW
3.5" Drive Head for NW Rod (wt.10lbs)	H-4210.35NW
5" Drive Head for NW Rod (wt.28lbs)	H-4210.5NW

Shelby Tube Caps

Plastic end caps for for protecting tube and sample.

Description	Model
2" Plastic End Cap for Shelby Tube	H-4210.2C
2.5" Plastic End Cap for Shelby Tube	H-4210.25C
3" Plastic End Cap for Shelby Tube	H-4210.3C
3.5" Plastic End Cap for Shelby Tube	H-4210.35C
5" Plastic End Cap for Shelby Tube	H-4210.5C

Expansion Packers—

Expanding plugs to seal samples in Shelby tubes for transport.

Description	Model
2" Expansion Packer	H-4210.2P
2.5" Expansion Packer	H-4210.25P
3" Expansion Packer	H-4210.3P
3.5" Expansion Packer	H-4210.35P
5" Expansion Packer	H-4210.5P

**Shelby Tube Travel Case for (12) 3" Shelby Tubes— H-4210.003C
Shelby Tube Travel Case for (9) 5" Shelby Tubes— H-4210.003C**

High-quality road cases for transporting shelby tubes. Ensures upright storage and shipment for undisturbed soil samples. Please enquire for cases for other size tubes, as well as custom configurations.



H-4967
(includes pelican case)

Speedy® 2000 Moisture Tester (20g)—H-4967
Speedy® 2000 Moisture Tester (6g)—H-4968

The Series 2000 Speedy moisture tester is a portable system for measuring the moisture content of a wide range of materials including soils, aggregates, dust and powders (and liquids). The system consists of a low pressure vessel fitted with a pressure gauge and an electronic scale and test accessories. Moisture measurements are made by mixing a weighed sample of the material with a calcium carbide reagent in the sealed pressure vessel. The reagent reacts chemically with water in the sample, producing acetylene gas that in turn increases the pressure within the vessel. The pressure increase in the vessel is proportional to the amount of water in the sample, the moisture content can be read directly from the calibrated pressure gauge. The tester is supplied complete with heavy-duty plastic carrying case, electronic balance, beaker, cleaning cloth, cap, washer, scoop, steel pulverizing balls and cleaning brushes. Complies with ASTM D4944 and AASHTO T217. Ship wt. 13 lbs. (5.9kg). **See Warning Below.**

- Accuracy:** Within 0.5% on most materials
- Test Speed:** 45 sec. to 3 min., depending on material
- Gauge:** Calibrated from 0-20% moisture based on wet weight
- Balance:** Electronic; 0-7 oz (0-200g) range; battery operated

Calibration Kit, Speedy Tester—H-4965A

A self-contained unit designed to enable an operator to check the accuracy of the Speedy Moisture Tester. The unit is comprised of a master dial, integral air pump, control connections and tools for checking gauge accuracy and pressure leaks, with instructions for simple re-calibrations. Includes case. Shipping wt. 20 lbs. (9kg)

Moisture Tester Reagent—H-4966

Calcium carbide reagent for Speedy® Moisture Testers. Carton of 24-1 lb. (0.5kg) containers. Shipped via motor freight only. **See Warning Below.** Ship wt. 26 lbs. (11.7kg)

HAZARDOUS WARNING:

Danger of explosion/fire may result if Moisture Testing Reagent is allowed contact with moisture. Calcium carbide forms flammable acetylene gas when wet so it must be kept sealed and dry. Provide adequate ventilation and use away from sparks and flame.

U.S. shipping regulations require ground shipment for Speedy Moisture Testers. H-4966 reagent carton must go truck shipment and incur extra charge for hazardous goods handling

International shipping regulations require separate purchase of reagent, which requires "dangerous goods" papers and packing. For this reason, Speedy Moisture Testers for International orders do not contain reagent, order separately.



H-4965A



H-4966



HM-4502



HSM-2100

Guelph Permeameter Kit— HSM-2100

The Guelph Permeameter is an easy to use instrument for quickly and accurately measuring in-situ hydraulic conductivity. Accurate evaluation of soil hydraulic conductivity, soil sorptivity, and matrix flux potential can be made in all types of soils. The equipment can be transported, assembled, and operated easily by one person. Measurements can be made in 1/2 to 2 hours, depending on soil type, and require only about 2.5 liters of water. Measurements can be made in the range of 15 to 75cm below the soil surface. The Guelph Permeameter is a complete kit consisting of the permeameter, field tripod, well auger, well preparation and cleanup tools, collapsible water container, and vacuum test hand pump, all packaged in a durable carrying case. Complies with ASTM D5126. Shipping wt. 33 lbs. (14.9 kg)

Double Ring Infiltrometer— HM-4502

Ideal for field testing, as well as lab use. Two stainless steel rings measure 12 and 24 dia x 20" H (304.8 and 609.6 dia x 508mm). Rings have double thick welded top edge for increased stability when driving into the soil. A marioette tube provides a constant head of water for flow tests. Graduations on the side of the tube used to determine flow rate. Sealed adjusting tube raises or lowers the head inside the infiltrometer ring. Main flow valve in base platform, bleed valve next to adjusting tube seal. Includes: 1/2" thick (12.7mm) aluminum driving cap with centering pins; two 6" square (152.4mm) neoprene splash guards; and two marioette tubes with 3,000 ml and 10,000 ml capacities. Complies with ASTM D3385. Shipping wt. 160 lbs. (72.5kg)



H-4385D



H-4385



H-4388



H-4386



H-4386SM



H-4385.5



H-4388.1

Digital Resistivity Meter— H-4385D

The Digital Resistivity Meter provides soil resistivity readings at the push of a button. It provides a direct read-out of resistance without a need to select ranges or adjust dials. The resistance range is from 0.01Ω to 10MΩ (auto-ranging). The meter provides a high-resolution digital display and is housed in a rugged, hard plastic case— safe for use on wet ground. It provides a Bluetooth interface for optional data logging via a Bluetooth-enabled PC. Resistance measurements are unaffected by any stray interference signals, which may be present in the soil during readings, due to the use of narrow band-pass filters centered at 82.2Hz (the unit's operating frequency). Runs on a set of replaceable D-cell alkaline batteries with no need to periodically recharge the unit or to plug it into a power source. Performs 10,000 single readings on a fresh set of batteries. For data logging capabilities, the meter is supplied with an "over-the pipe" soil resistivity survey program, known as "ProCP Soil Resistivity", based on the 4-Pin Wenner Methodology. Complies with ASTM G187.

Shipping wt. 11 lbs (5kg)

Accuracy:

0.01Ω to 1MΩ range: ±1.6% ±1LS Display Digit ±0.01Ω

1MΩ to 10MΩ range*: ±5% ±1LS Display Digit

Resistivity Meter— H-4385

The resistivity meter can be easily used to measure resistivity of soil in-situ using the 2, 3, or 4 electrode method or with a soil box to measure resistivity of soil or water in the range of distilled to sea water. Resistance measurement range is from 0.01Ω to 1.1MΩ and resistance measurements are unaffected by any stray interference signals that may be present in the earth during measurement, due to use of narrow band-pass filters. It has a rugged, lightweight weatherproof case with an IP67 rating for dust and water intrusion. The lid can be removed to facilitate use and movement of the meter to new locations without removing test leads. Runs on a set of C-cell alkaline batteries eliminating recharging and plugged-in power sources. Complies with ASTM G187. Shipping wt. 11 lbs (5kg)

Soil Box, 280ml capacity— H-4386

8.75" x 1.5" x 1.25" (222 x 38 x 32mm), Shipping wt. 1 lb. (.5kg)

Soil Box, Small, 75ml capacity— H-4386SM

4.375" x 1.125" x 1.5" (111 x 29 x 38mm), Shipping wt. 1 lb. (.5kg)

Soil Cylinder— H-4385.5

The Soil Cylinder can be used to satisfy either of the 2-electrode methods— ASTM G187 or AASHTO T-288 Standards. The body of the Soil Cylinder is made of Plexiglas (allowing easy viewing of sample) with PVC components and the distribution plates (conducting end plates) are stainless steel. Rubber O-rings provide sealing for the two end caps. Accommodates large sample volumes [approximately 2,714 cm³ (2.714 liters) and can accommodate crushed-rock samples, as well as regular soils and liquids. Water can be added in-situ for sample saturation (de-ionized water, simulated rain water etc.) Provides closed, air-tight volume— field-collected samples can be immediately "installed" in the cylinder, as opposed to filling a separate container for transportation. This means that resistance readings taken at a later stage will be representative of the "as-found" condition of the sample.

Resistivity Test Reel with Soil Pins— H-4388

Four pin, test reel set for attaining 1-20 ft. depth measurements. Can be used with any 4-terminal meter. Uses 4-electrode Wenner method. Includes 4 separate, color-coded wires of varying lengths from 5 to 65 ft. Jumper leads (2-foot) are supplied for connection to meter. Shipping wt. 6 lbs. (3kg)

Soil Box Leads, set of 4— H-4387

The soil box is used with the H-4385 resistivity meter for a quick and accurate measurement of resistivity of a soil or water sample in the field or laboratory. Construction is clear plastic with stainless steel current plates and brass potential pins. The dimensions are such that the measured resistivity with the H-4385, when the box is filled level, can be expressed in ohm-centimeter, making calculations unnecessary. The box can also be used with other meters.

Soil Pins (Electrodes)— H-4388.1

Set of four.

Soil-Lab

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Testing Equipment for



Construction Materials

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H-4215

- Rapid Soil Processor, 120V 60Hz— H-4215**
- Rapid Soil Processor, 220V 60Hz— H-4215.2F**
- Rapid Soil Processor, 220V 50Hz— H-4215.5F**

Compact all-metal soil processor allows customer to produce five-point moisture density relationship test results in about 5 hours. Processor also handles samples for rapid compaction of a family of curves test. Processes up to 30 lbs. of lean-to-fat and tough clays at field moisture in fewer than 15 minutes. Automatically separates and retains up to 3/4" rocks from soil to prolong screen life. Processes soil to pass a No. 4 screen. Offset rotating drum is motor driven; pre-set adjustments aren't necessary. Automatic operation frees up technician's time. Order easy-to-install replacement screen separately. Replacement parts are available. Overall dimensions: 32 x 36 x 53" (813 x 915 x 1346mm). Shipping wt. 408 lbs. (184kg)

Replacement Screens	
Replacement Screen, 11-7/8" (302mm) height (for units sold after March, 1995)	H-4215.32
Replacement Screen, 13" (330mm) height (Old Style, for units sold before March, 1995)	H-4215.26

- Soil Grinder, 120V 60Hz— H-4199**
- Soil Grinder, 220V 50Hz— H-4199.5F**

Prepares soil samples to designated particle size for accurate, repeatable test results. Grinds one-pint sample in 15 seconds. Stainless steel construction. Includes a No. 10 perforated stainless plate. Shipping wt. 32 lbs. (15kg)

Accessories	
No. 4 Perforated, Stainless Plate	H-4199.A
No. 10 Perforated, Stainless Plate	H-4199.B
No. 35 Perforated, Stainless Plate	H-4199.C
2mm Perforated, Stainless Plate	H-4199.D
Beater Assembly	H-4199.7



H-4199



H-3843A



H-4261.4



H-4261.10



H-4258



H-4257



H-3841

Soil Mortar— H-4257

Heavy porcelain mortar, glazed outside surface and unglazed inside; for use with H-4258 pestle to break up soil particle aggregates for testing. Mortar is 3.5" (90mm) ID x 2-1/4" (57mm) H. Complies with ASTM D421; AASHTO T87. Shipping wt. 15 lbs. (7kg)

Soil Pestle— H-4258

Rubber-tipped 8" (203mm) long pestle, made for gently grinding soils without breaking individual particles. Shipping wt. 15 lbs. (7kg)

Mortar & Pestle Set, Porcelain 400mL— H-4261.4

Heavy porcelain 6" (15cm) mortar with 6" (15cm) pestle.

Mortar & Pestle Set, Porcelain 1000mL— H-4261.10

Heavy porcelain 7.5" (19cm) mortar with 7" (18cm) pestle.

Sample Mixers—

Used to mix soil samples for compaction and other tests. Mixers are supplied in 5Qt. (4.73L), 12 Qt. (11.35L) and 20 Qt. (18.92L) capacities, see them all on page 160-161 in the Asphalt Section of this catalog.

Laboratory Bench Mixer, 5-Qt. (4.73L), 120V 60Hz— H-3841

Laboratory Bench Mixer, 5-Qt. (4.73L), 230V 60Hz— H-3841.2F

Laboratory Bench Mixer, 5-Qt. (4.73L), 230V 50Hz— H-3841.5F

Shipping wt. 55 lbs. (25kg)

Laboratory Bench Mixer, 12-Qt. (11L), 120V 60Hz— H-3842A

Laboratory Bench Mixer, 12-Qt. (11L), 230V 50/60Hz— H-3842A.4F

Shipping wt. 185 lbs. (85kg)

Laboratory Bench Mixer, 20-Qt. (19L), 120V 60Hz— H-3843A

Laboratory Bench Mixer, 20-Qt. (19L), 230V 50/60Hz— H-3843A.4F

Shipping wt. 265 lbs. (120kg)

See our complete offering of mixers, paddles, bowls and mixer accessories, please see page 160-161.



Compaction Split Mold, 2.8" — H-4142
2.8" ID x 4" H with 2" detachable collar
 Mold volume of .0214 cu. ft., cold-rolled steel tubing, plated for rust resistance. Mold has vertical split in body with 2 quick-acting clamps for easy removal of specimen. Used for permeability testing of remolded samples. Not compatible with H-4169 Compactor.
 Shipping wt. 10 lbs. (4.5kg).

Standard Proctor Density/Moisture, 4"— H-4141
4" ID x 4.584" H with 2-1/2" detachable collar
 Mold volume of 1/30 cu. ft., cold-rolled steel tubing, plated for rust resistance. Includes detachable base plate, studs and wing nuts. Complies with ASTM D558, D698, D1557; AASHTO T99, T134, T180. Compatible with H-4169 Compactor. Shipping wt. 16 lbs. (7.3kg).

Standard Proctor Density/Moisture Split Mold, 4"— H-4225
4" ID x 4.584" H with 2-1/2" detachable collar
 Mold volume of 1/30 cu. ft., cold-rolled steel tubing, plated for rust resistance. Includes detachable base plate, studs and wing nuts. Mold has vertical split in body with 2 quick-acting clamps for easy removal of specimen. Complies with ASTM D558, D698, D1557; AASHTO T99, T134, T180. Not compatible with H-4169 Compactor.
 Shipping wt. 17 lbs. (7.7kg).

CBR w/Perf. Base, 6"— H-4151
6" ID x 7" H with 2" detachable collar
 Mold volume of .1145 cu. ft., cold-rolled steel tubing, plated for rust resistance. Collar extension and perforated base plate can be clamped on either end of cylinder. Compatible with H-4169 Compactor. Complies with ASTM D1883, ASSHTO T193, Shipping wt. 24 lbs. (11kg).

Solid Base, 6"— H-4149
6" ID x 7" H with 2" detachable collar
 Solid base version of the H-4151. Mold volume of .1145 cu. ft., cold-rolled steel tubing, plated for rust resistance. Collar extension and perforated base plate can be clamped on either end of cylinder.

Compatible with H-4169 Compactor. Complies with ASTM D1883, ASSHTO T193. Shipping wt. 22 lbs. (10kg).

Compaction 6"— H-4159
6" ID x 6.1" H with 2" detachable collar
 Mold volume of 1/10 cu. ft., cold-rolled steel tubing, plated for rust resistance. Compatible with H-4169 Compactor. Steel base plate is 8" x 8" x 1/2" thick. Shipping wt. 22 lbs. (10kg).

LBR, 6"— H-4163
6" ID x 6" H with 2-1/2" detachable collar
 Mold volume of 1/13.33 cu. ft., cold-rolled steel tubing, plated for rust resistance. Collar extension and perforated base plate can be clamped on either end of cylinder. Compatible with H-4169 Compactor. **LBR requires H-4147 spacer, sold separately.**
 Shipping wt. 22 lbs. (10kg).

LBR Spacer Disc, 6"— H-4147
5.9375" x 1.416"
 For use with H-4163 LBR Mold. Compatible with H-4169 Compactor. Shipping wt. 3 lbs. (1kg).

Modified Proctor, 6"— H-4162
6" ID x 4.584" H with detachable collar
 6" ID x 4.584" H with detachable collar Mold volume of 1/13.33 cu. ft., cold-rolled steel tubing, plated for rust resistance. Steel base plate is 8" x 8" x 1/2" thick. Complies with ASTM D698, D1557, ASSHTO T99, T180. Compatible with H-4169 Compactor. Shipping wt. 15 lbs. (6.8kg).

Modified Proctor Split Mold, 6"— H-4161A
6" ID x 4.584" H with 2-3/8" detachable collar
 Mold volume of 1/13.33 cu. ft., cold-rolled steel tubing, plated for rust resistance. Mold has vertical split in body with 2 quick-acting clamps for easy removal of specimen. Steel base plate is 8" x 8" x 1/2" thick. Complies with ASTM D698, D1557, ASSHTO T99, T180. Not compatible with H-4169 Compactor.
 Shipping wt. 19 lbs. (9kg).



H-4169.2415



H-4169.2416



Replacement Hammers (do not include weights)	
4" Round Hammer (New Style)	H-4169.2415
6" Pie-Shape Hammer (New Style)	H-4169.2416
4" Round Hammer (Old Style)	H-4169.415
6" Pie-Shape Hammer (Old Style)	H-4169.416

(New Style Hammers are only threaded in the middle of the shaft)

(Old Style Hammers are threaded almost to the end of the shaft)



H-4170A

H-4160A

H-4173

Automatic Mechanical Compactor, 120V 60Hz— H-4169 Compactor, 230V, 50/60 Hz— H-4169.4F

The Mechanical Compactor automatically compacts and rotates mold after each blow while keeping track of the number of hammer blows and shutting off once a preset number of blows is reached. The start/stop function of the compactor is independent of the counter. The unit can be used to perform standard or modified compaction tests using a 5.5 lb. (2.5kg) hammer with 12" (305mm) height of drop or a 10 lb. (4.5kg) hammer with 18" (457mm) drop. Hammer lift compensates the height of the drop for soil thickness in the mold during compaction. Hammer weight is concentrated at the foot, allowing free fall of the hammer. Hammer changes are made from in front of the compactor.

Included with the compactor are: (1) 5.5 lb (2.5kg) hammer; (1) 10 lb. (4.5kg) pie-shaped hammer; (1) hammer surcharge weight to convert hammers to 10lb (4.5kg); (1) hammer safety device; (1) 4" (102mm) mold, and (1) 6" (152mm) mold.

Overall dimensions: 56"H x 16-1/2"W x 30"D (1422 x 419 x 762mm). Max. height in operation: 66" (1677mm). Complies with ASTM D558, D559, D560, D698, D1557; AASHTO T99, T134, T135, T180.

Shipping wt. 384 lbs. (174.0kg)

California Modified Automatic Compactor, 120V 60Hz— H-4169.CA

Model complies with California Method 216 and is supplied with a 2" round 10 lb hammer and corresponding piston and rod. Required Split Mold is available upon request. Shipping wt. 384 lbs. (174.0kg)

Calibration Kit— H-4169CK

For use with H-4169 Automatic Mechanical Compactor. Calibration kit includes lead deformation apparatus, micrometer and 50 lead calibration cylinders. Complies with ASTM D2168.

Manual Compaction Hammer— H-4160A

Manual, Moisture/Density Hammer meets ASTM and AASHTO Specs. It incorporates a 5.5 lb (2.54kg) weight and a drop of 12" (305mm) with a 2" (51) face. Guide sleeve has four vent holes in each end of sleeve to release built-up air pressure. Machined Steel, plated for rust resistance. Features resilient rubber ball handle. Complies with ASTM D558, D698, AASHTO T99. Shipping wt. 12 lbs. (5.4kg)

Manual Compaction Hammer— H-4170A

Manual, Moisture/Density Hammer meets AASHTO Specs. It incorporates a 10 lb (4.5kg) weight and a drop of 18" (457mm) with a 2" (51) face. Guide sleeve has four vent holes in each end of sleeve to release built-up air pressure. Machined Steel, plated for rust resistance. Features resilient rubber ball handle. Complies with AASHTO T180. Shipping wt. 18 lbs. (8.3kg)

Army Corps of Engineers Hammer— H-4173

Manual, Moisture/Density Hammer meets EM1110-1-1804 Spec. It incorporates a 5.5 lb (2.54kg) weight and a drop of 12" (305mm) with a 2" (51) face. Hammer is guided on shaft. Length of drop is slightly adjustable. Foot assembly has recoil mechanism to reduce impact fatigue on parts. Tamping face is removable and replaceable. Shipping wt. 15 lbs. (6.8kg)

Army COE 10 lb. Hammer— H-4171

Manual, Moisture/Density Hammer, which incorporates a 10 lb (4.5kg) weight and a drop of 12" (305mm) with a 2" (51) face. Shipping wt. 18 lbs. (8.3kg)

Manual Compaction Hammers		
Weight	Drop	Model
5.5 lb (2.54kg)	12" (305mm)	H-4160A
10 lb (4.5kg)	18" (457mm)	H-4170A
5.5 lb (2.54kg)	12" (305mm)	H-4173
10 lb (5.08kg)	12" (305mm)	H-4171





Relative Density of Cohesionless Soils Apparatus—
230V 60Hz, 12 amps 1ph AC— H-3750.2F
230V 50Hz, 12 amps 1ph AC— H-3750.5F
 Apparatus determines the relative density of cohesionless, free-draining soils and provides well-defined results on soils that do not respond well to conventional moisture-density impact compaction testing. Soils for which this method is appropriate may contain up to 12 percent of soil particles passing a No. 200 (75µm) sieve, depending on the distribution of particle sizes, which causes them to have free-draining characteristics. Relative density of cohesion less soils uses vibratory compaction to obtain maximum density and pouring to obtain minimum density. Complete set includes: Vibrating table H-3756.2F, relative density mold sets H-3757 and H-3758 and relative density gauge set H-3759. Complies with ASTM D4253, D4254. Shipping wt. 925 lbs. (420kg)

Individual Components	
Vibrating Table, 230V 60Hz 12 amps 1ph	H-3756.2F
Vibrating Table, 230V 50Hz 12 amps 1ph	H-3756.5F
0.1 cu. ft., Relative Density Mold Set	H-3757
0.5 cu. ft., Relative Density Mold Set	H-3758
Relative Density Gauge Set	H-3759

Vibrating Table w/ Controller, 230V 60Hz,— H-3756.2F
Vibrating Table w/ Controller, 230V 50Hz— H-3756.5F
 Vibrating Tables for use with the relative density mold sets or other processes requiring vibratory compaction. Tables are 30 x 30" (762 x 762mm), which are vibrated using an electromagnetic vibrator rated above 100lbs (45.5kg) Capacity for tables is 750 lbs (341kg) and height is 21" (533mm). Shipping wt. 605 lbs. (275kg)

Relative Density Mold Set, 0.1 cu. ft.— H-3757
 0.1 cu. ft. capacity Mold Set for use with Relative Density Apparatus. Mold set comes with detachable guide sleeve and clamp assembly. Includes surcharge base plate with removable handle and surcharge weight with handle. Mold is 6" (152.4mm) ID x 6.112" (155.2mm) IH. Shipping wt. 106 lbs. (48kg)

Relative Density Mold Set, 0.5 cu. ft.— H-3758
 0.5 cu. ft. capacity Mold Set for use with Relative Density Apparatus. Mold set comes with detachable guide sleeve and clamp assembly. Includes surcharge base plate with removable handle and surcharge weight with handle. Mold is 11" (279.4mm) ID x 9.092" (230.9mm) IH. Shipping wt. 250 lbs. (113kg)

Pouring Funnel Set— H-3750FS
 Used for filling loose 3/8" (9.5mm) or finer soils into relative density mold. Includes two 6" (152mm) dia. x 12" (305mm) long metal cylinders, each with a integral funnel at the end. Orifices are 1" (25.4mm and 1/2" (12.7mm). Shipping wt. 30 lbs. (14kg)

Relative Density Gauge Set— H-3759
 Gauge set for use with Relative Density Molds. Designed to fit guide brackets of either the H-3757 or H-3758 Mold Sets. Set includes a 2" (50.8mm) dia., 2.0 x 0.001" Mechanical dial gauge. A metal, 3 x 12 x 1/8" (76 x 305 x 3.2mm), calibration bar is also included. Shipping wt. 8 lbs. (4kg)

Vibration Indicator, Tachometer Type— H-3753
 Precision tachometer is pen size to allow accurate readings even on hard-to-reach equipment. Scale gives readings from 2,000 to 21,000.

Vibration Compaction Hammer Set— H-4115
 Vibration compaction set used to compact soil samples for use in tests referencing ASTM D7382-08 methods. This method refers to the determination of the maximum dry unit weight and water content range for the effective compaction of granular soils using a vibrating hammer. The test set includes a heavy-duty frame designed specifically for easily mounting a vibration hammer. A vibration hammer, which includes a 5.75" tamper and a 12" long mounting shank. The set also includes an 11" split, compaction mold. The vibrating hammer test method may be performed in the field or in the laboratory.

Frame for Vibration Compaction Hammer— H-4115.2
 Frame Only (does not include hammer or mold)

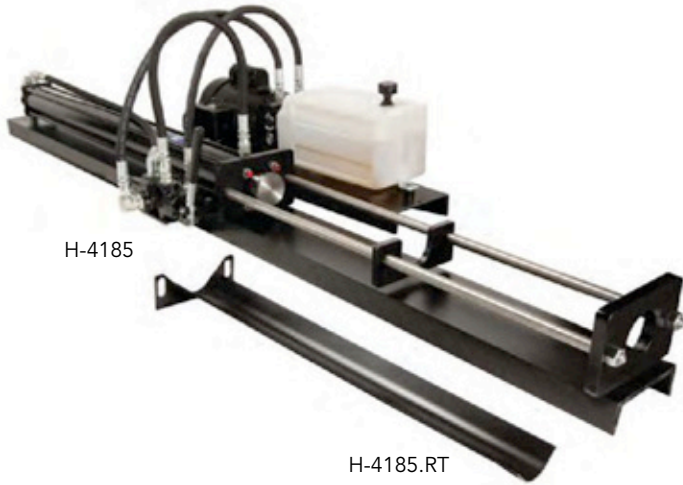
Vibration Compaction Hammer with Tamper, 120V 60Hz— H-4115.3
 Includes Hammer, 5.75" (146mm) Tamper and 12" (305mm) long Mounting Shank. Hammer provides 170-340 No-load RPM and 1,700 to 3,300 No-load BPM. Impact energy is 6.2 ft. lbs (86 kg cm) Normal and 7.4 ft. lbs (102 kg cm) Turbo. Complies with ASTM D7382.

11-Inch, Split Compaction Mold— H-4115.4
 For use with Vibration Compaction Mold Set

6-Inch, Split Compaction Mold— H-4161A
 For use with Vibration Compaction Mold Set, Shipping wt. 19 lbs. (9kg)

Replacement Tamper (Foot and Shank)— H-4115.5
 For use with Vibration Compaction Mold Set





Horizontal Sample Ejector, 120V 60Hz— H-4185

Horizontal Sample Ejector, 220 60Hz— H-4185.2F

Horizontal Sample Ejector, 220 50Hz— H-4185.5F

Hydraulically driven horizontal sample ejector designed for rapid ejection of 3" (76.2mm) x 30" (762mm) thin-wall sample tubes (Shelby Tubes). The Horizontal Sample Ejector provides a smooth and easily controlled piston stroke providing easy and rapid handling of ejected samples. The unit's hydraulic system accurately controls the horizontal piston's 5600lbf (24.9kN) force to eject samples smoothly. Ejector uses 1.7gpm hydraulic pump powered by a 1hp electric motor. Hydraulic oil reservoir provides 2.5gal (9.5L) capacity.

This ejector can also be used with 2 or 2.5" Shelby Tube samples using the corresponding conversion kit, see chart below. Ejector comes with (1) sample trough to support ejected samples.

Overall dimensions w/o sample trough are: 84" (2134mm) L x 23" (584mm) W x 18" (457mm) H. Shipping wt. 340 lbs (154kg)

Hand-operated Sample Ejector— H-4155A

Designed for lab and field use to extract soil samples from 4" and 6" compaction molds, as well as 2" and 2.8" tube samples. The ejection force is generated by means of a 3-ton (27.7kN) capacity, hand-operated hydraulic jack. The cast-aluminum ejector head assembly can be positioned at different heights through the use of quick release pins. This enables the operator to easily match the ejection travel to the height of the mold being used. Piston stroke is 9.25" (235mm). Overall dimensions 13"W x 6"D x 27"H (330 x 152 x 686mm). Shipping wt. 65 lbs. (29.5kg)

Motorized Sample Ejector, 120V 60Hz— H-4150

Motorized Sample Ejector, 220V 50/60Hz— H-4150.4F

Similar in design and construction to the H-4155A series sample ejector, this model features the use of a 5-ton capacity, motorized hydraulic pump and ram assembly. The unit incorporates extended upright rods in order to accommodate standard 4" and 6" compaction molds, as well as 2" and 2.8" sample tubes. Piston stroke is 7.25" (184mm). Overall dimensions, excluding pump, 13"W x 6"D x 29"H (330 x 152 x 737mm). Shipping wt. 80 lbs. (36kg)

Individual Components

Sample Trough, Round Bottom	H-4185.RT
Conversion Kit for 2" Sample Tube	H-4185.2
Conversion Kit for 2-1/2" Sample Tube	H-4185.3



Horizontal Sample Ejector Stand— H-4185.100

Sturdy, mobile stand accommodates H-4185 Horizontal Sample Ejector. Complete with shelf for pneumatic pump and reservoir. Large wheels provide easy maneuverability. Wooden top allows Sample Ejector to be bolted to it for added stability. Requires longer hoses (included) to reach pump and reservoir.



Harvard Miniature Compaction Apparatus— H-4165

Used for moisture density tests using small samples, its compaction action duplicates the kneading action of a sheepsfoot roller. Mold is 1-5/16" (33mm) ID by 2.816" (71mm) H. Unit is designed so collar remover and specimen ejector are consolidated into one piece.

Set includes specimen ejector, collar remover with spacer plate, mold holder, 1/454 cu. ft. (129m³) volume mold and collar, compaction tamper with 20 lb. (9.07kg), 37.5 lb. (17kg), and 40 lb. (18.2kg) spring and operating instructions. Mold is machined from seamless tubing. Unit weight in pounds per cu. ft. m³ and the net weight of a compacted specimen in grams are figuratively equal. Shipping wt. 28 lbs. (12.6kg).

H-4165 Individual Components	
Mold assembly	H-4165.15
Tamper assembly	H-4165.16
20 lb. spring	H-4165.20
37.5 lb. spring	H-4165.375
40 lb. spring	H-4165.40

Soil Strength Classifier, 125lbf / 55kgf Capacity— H-4180.125

Soil Strength Classifier, 250lbf / 110kgf Capacity— H-4180.250

Soil Strength Classifier, 350lbf / 160kgf Capacity— H-4180.350

Hand-lever operated, soil strength classifier provides fast manual approximations of unconfined compressive strength on many soil types in the field or lab. Platen accepts up to 2" (51mm) sample diameters and up to 4-1/2" (114mm) lengths. Reads loads on 4-1/4" (108mm) dial face with ±1% of dial capacity as held with second maximum-reading pointer. Dial has 1 lbf divisions on outer scale, 1 kgf divisions on inner. Unit has cast aluminum housing. Base dimensions are: 5-3/4" x 10-1/4" (146 x 260mm), drilled for optional bench mounting. Calibration spring confirms proper operation; order separately. Shipping wt. 18 lbs. (8.2kg)

Soil Strength Classifier, 125lbf / 55kgf Capacity— H-4186.125

Soil Strength Classifier, 250lbf / 110kgf Capacity— H-4186.250

Soil Strength Classifier, 350lbf / 160kgf Capacity— H-4186.350

The H-4186 Series Soil Classifiers are identical to the H-4180 Series except they feature a geared hand-wheel loading system. This unique system provides a more uniform rate of load and easier loading and recording of peak values by a single operator.

Calibration Spring, 350lbf / 160 kgf Capacity— H-4180S

Plastic Limit Set— H-4253

Includes all apparatus recommended to perform plastic limit test in accordance with specifications.

Set includes the following:

- (1) H-4253.1 Plastic Limit Plate, 12 x 12 x 3/8" thick;
- (1) H-4930.250 Mixing Dish;
- (1) H-4904 Spatula;
- (1) H-4915.025 Graduated Cylinder, and
- (1) H-1350.3A Pkg. of 48 Sample Cans

All components are also available individually.

Complies with ASTM D4318; AASHTO T90. Shipping wt. 11 lbs. (5kg).

Plastic Limit Plate— H-4253.1

12 x 12 x 3/8"-thick (305 x 305 x 9.5mm) glass plate with ground finish on one side and seamed edges. Complies with ASTM D4318; AASHTO T90. Shipping wt. 2 lbs. (1kg)

Plastic Limit Roller— H-4262

Easily repeatable mechanical technique produces consistent test results and saves time. Includes integral top plate/handle, one pad of 50 sheets of special adhesive backed paper to cover contact surfaces (paper will not introduce fibers into soil samples), and instructions. Rigid acrylic 8 x 4-1/2 x 1-1/4" (203 x 114 x 32mm).

Complies with ASTM D4318; AASHTO T90, TX DOT 105-E.

Shipping wt. 4 lbs. (2kg)

Adhesive Paper— H-4262P

Pad of 50 sheets of special adhesive backed paper for Plastic Limit.

Shipping wt. 1 lbs. (.5kg)

Shrinkage Limit Set— H-4254

Apparatus recommended to perform shrinkage limit test in accordance with specifications. Complies with ASTM D427; AASHTO T92.

Set includes:

- (1) H-4256 Monel Shrinkage Dish;
- (1) H-4930.250 Mixing Dish;
- (1) H-4254C Crystallizing Dish;
- (1) H-4255 Shrinkage Prong Plate, and
- (1) H-4915.025 Graduated Cylinder

All components are also available individually. Shipping wt. 4 lbs. (2kg)



H-4234



H-4230

Atterberg Limits (Liquid Limit Testing)

Liquid Limit Testing determines the water content at which soil changes from a liquid to a plastic state. It is determined using the devices on this page. To perform a soil sample is placed into the cup of the liquid limit machine and separated into two halves using a grooving tool. The crank on the machine is then rotated so that the cup holding the sample strikes the base of the test machine. The number of blows is recorded until the two halves flow together and close the groove.

ASTM Liquid Limit Test Set— H-4234

Recommended for performing liquid limit test in accordance with ASTM specifications. Includes 1 ea. of: H-4230 ASTM Liquid Limit Machine, Mixing Dish, Spatula, Graduated Cylinder and set of 48 sample cans. Complies with ASTM D4318; AASHTO T89, T90. Shipping wt. 13 lbs. (6kg)

ASTM Liquid Limit Test Set— H-4235

Same set as above except it has machine with counter. Includes 1 ea. of: H-4228 ASTM Liquid Limit Machine, Mixing Dish, Spatula, Graduated Cylinder and set of 48 sample cans. Complies with ASTM D4318; AASHTO T89, T90. Shipping wt. 15 lbs. (7kg)

ASTM Liquid Limit Machine— H-4230

Unit consists of brass cup, cam mechanism, carriage and crank mounted on a hard rubber base. Includes H-4229 ASTM grooving tool and gauge block. Crank can be shifted to right- or left-hand operation. Complies with ASTM D4318; AASHTO T89, T90. Shipping wt. 8 lbs. (3.6kg)

Liquid Limit Machine with Counter— H-4228

Hand-operated liquid limit machine features mechanical revolution counter attached to the shaft to register the number of drops in the liquid limit cup. Includes H-4229 ASTM grooving tool and gauge block. Crank can be shifted for left or right-handed operation. Complies with ASTM D4318; AASHTO T89, T90. Shipping wt. 9 lbs. (4.1kg)

Motorized Liquid Limit Machine, 120V 60Hz— H-4226

Motorized Liquid Limit Machine, 220V 60Hz— H-4226.2F

Motorized Liquid Limit Machine, 220V 50Hz— H-4226.5F

Motorized liquid limit machine gives uniform testing with greater degree of accuracy. Unit is comprised of H-4230 ASTM liquid limit machine with geared motor to give proper operating speed and automatic counter. Machine is attached to metal plate with rubber feet. Includes H-4229 ASTM grooving tool and gauge block. Complies with ASTM D4318; AASHTO T89, T90.

Shipping wt. 14 lbs. (6.4kg)



H-4228

Accessories

ASTM Metal Grooving Tool and Gauge Block	H-4229
ASTM Plastic Grooving Tools (10 pk)	H-4229P
AASHTO Liquid Limit Metal Grooving Tool	H-4232
Mixing Dish	H-4930.250
Spatula	H-4904
Graduated Cylinder (25ml)	H-4915.025
Sample Cans, 2.5 oz. (48 pk.)	H-1350.3A

Replacement Parts

Brass Cup w/ Screws for Liquid Limit Machines	H-4231
Brass Cup w/ Screws and Cam Follower	H-4231.1
Stainless Steel Cup w/ Screws (non ASTM)	H-4231.2
Base	H-4230.1



Resiliency Tester— H-4233

Use to test resiliency of hard rubber base of liquid limit machines, which should be done at 90-day intervals to ensure base is in compliance with ASTM D4318 Standard. Device consists of clear acrylic tube and cap, a 5/16" dia steel ball, and a small bar magnet. Test procedure is simple and quick to perform. As natural aging occurs, base loses resiliency, eventually going out of spec. and necessitating replacement. Shipping wt. 1 lbs. (.5kg)

Durometer (D Scale)— H-4222D

As required by ASTM D4318, a durometer is used to test the hardness of the base of a Liquid Limit Machine. Precision construction delivers lifetime accuracy. Sealed springs maintain load deflection rate to a tolerance of .0004". Other models are also available, see page 263. Complies with ASTM D4318, D2240.

Cone Penetrometer (Liquid Limit Testing)

The Cone Penetrometer test method for Liquid Limit is based on the relationship between the moisture content and the penetration of a cone into a soil sample. This method eliminates test results dependent upon operator skills and provides a visual measurement of penetration. Two Cone Penetrometer models are available. One, a manual operation model, and the other an automatic model, which releases the cone for a set amount of time and then locks the movement of the cone, registering the result. BS 1337-2, NF P94-052,1

Manual Operation Cone Penetrometer, 120V 60Hz— H-4236A

Manual Cone Penetrometer, 220-240V 50Hz— H-4236A.5F

The H-4236A consists of the penetrometer device mounted to a sturdy, micro-adjusting vertical post mounted to a solid aluminum base with adjustable feet and visual leveling device. Penetrometer includes a HM-4469.10 Digital Indicator with a 1.0-inch range and a resolution of .0001. The Indicator will run on battery, but also comes with an AC adapter for a constant power source. Also included are a 35mm long, 30°-angle stainless steel cone, (1) 55mm stainless steel Sample Cup and (1) 75mm stainless steel Sample Cup. Shipping wt. 20 lbs. (9kg)

Semi-Automatic, Cone Penetrometer, 120V 60Hz— H-4237A

Semi-Auto, Cone Penetrometer, 220-240V 50Hz— H-4237A.5F

The H-4237A incorporates the H-4236A penetrometer with a digital, 99-second timer, which can be set to the standard 5-second free-fall time or to some other setting for customized tests. When engaged the timer will allow the needle to free fall into the sample for the specific time interval and then lock the needle from advancing while providing a direct reading of the test results. Penetrometer includes a HM-4469.10 Digital Indicator with a 1.0-inch range and a resolution of .0001. The Indicator will run on battery, but also comes with an AC adapter for a constant power source. Also included are a 35mm long, 30°-angle stainless steel cone, (1) 55mm stainless steel Sample Cup and (1) 75mm stainless steel Sample Cup. Shipping wt. 32 lbs. (15kg)



H-4236A & H-4237A Accessories / Replacement Parts	
Test Cone, 35mm long, 30° angle	H-4236.1
Sample Cup, 55mm Stainless Steel	H-4236A.3
Sample Cup, 75mm Stainless Steel	H-4236A.4
Test Gauge, Checks cone tip condition	H-4236G



H-4340



H-4378



H-4374



H-4342



H-4342.2



HM-4501



HM-3930

Sand Equivalent

Sand equivalent tests serve as rapid field-correlation tests to show relative proportions of clay-like or plastic fines and dusts in granular soils and fine aggregates. The test separates sand and clay, a comparative reading is determined between the suspended clay and the settled sand in the measuring cylinder. Tests may be done in the laboratory or the field.

Sand Equivalent Test Set with Case— H-4340

Sand Equivalent Test Set without Case— H-4341

Set meets ASTM D2419; AASHTO T176. Shipping wt. 43 lbs (20kg)
Set includes the following items:

- (4) Graduated, Plastic, Measuring Cylinders—H-4340.1
- (2) Solid Rubber Stopper—H-4340.5
- (1) Irrigator Tube—H-4340.2.6
- (1) Weighted Foot Assembly—H-4340.3
- (1) Standard Stock Solution, 8oz. Plastic Bottle—H-4342
- (1) Siphon Assembly—H-4340.2 (tube and hose, bow tube and hose, stopper)
- (1) Clamp—H-8630
- (1) Wide-Mouth Funnel—H-4340A
- (1) Measuring Can, 3 oz.—H-1350.3SP

Individual items above can be ordered separately.

Manually Operated Sand Equivalent Shaker— H-4378

Manually operated sand equivalent shaker is ideal for use on job site to give more uniform shaking action. Shaker consists of mounting bracket with cylinder holder and two spring steel straps, stroke indicator and counter mounted on one end. Uniform shaking action is accomplished by pushing the top frame by a simple stroke of the hand. Portable unit features removable wooden carrying case. Dimensions: 21 x 6-1/2 x 26-3/8" (53 x 17 x 67cm). Complies with ASTM D2419; AASHTO T176. Shipping wt. 29 lbs. (13kg)

Sand Equivalent Shaker, 120V 60Hz— H-4374

Sand Equivalent Shaker, 230V 50Hz— H-4374.5F

Motorized sand equivalent shaker features two separate electronic timers (one preset at 45 seconds and the other preset at 10 minutes) to increase accuracy and ease of operation compared to a spring-type timer. It is recommended for samples in the laboratory. The consistent, repeatable oscillation of the apparatus eliminates operator-caused variation. Shaking operation delivers an 8" (203mm) stroke at a speed of 175 ±2 strokes per minute.

Dimensions: 12 x 24 x 24" H (31 x 61 x 61cm).

Complies with ASTM D2419;

AASHTO T176. Shipping wt. 80 lbs. (36.3kg)

Sand Equivalent Stock Solution— H-4342

8 oz. (.24L) Plastic Bottle of Standard Stock Solution, made from anhydrous calcium chloride, glycerine and formaldehyde. Use diluted with distilled water in ratio of 85ml solution per/gal. distilled water.

Sand Equivalent Stock Solution— H-4342.2

Same as above except 1 gallon (3.8L) Plastic Jug.

Pin Hole Dispersion Apparatus— HM-3930

This test is used for evaluating clay soils for erodibility by flowing water through a small hole that is drilled through the compacted specimen. The test chamber has a unique clamping ring for holding the stainless steel mold to the base while compacting the sample. Included with the chamber are screens, base stand, constant head reservoir, tubing, connections, pipet and a tool for drilling the pinhole. The end cap has a pilot hole for drilling the 1.0mm (.040") hole through the sample. All aluminum parts are anodized for corrosion resistance. Complies with ASTM D4647.

Calcium Carbonate Content Chamber— HM-4501

This test method covers the quantitative determination of the calcium carbonate (CaCO₃) content of soils. This test complies with ASTM D4373. It is a gasometric method that utilizes a simple portable apparatus. The test method is quickly performed for soils containing calcium carbonate. The acrylic chamber is 2.5" ID x 5.5" long and sealed with anodized end caps. The unit comes complete with 10psi test gauge, bleed valve and a 20ml cup with handle. Complies with ASTM D4373. Shipping wt. 8 lbs. (4kg)



Hydrometer Jar Bath, 120V 60Hz—H-4239A

Hydrometer Jar Bath, 220V 50/60Hz—H-4239A.4F

The Humboldt Hydrometer Water Bath is designed to provide a 68°F (20°C) ambient temperature throughout the unit by using a microprocessor-based temperature control with integral heater and chiller. The control processor in the H-4239A provides a consistent bath temperature of 68°F (20°C) accurate to within 0.1% of input span ±1°F. Temperature range can be set between 50°F (10°C) and 120°F (49°C).

The H-4239A water bath is fully-insulated and includes a circulating pump, which ensures a constant water temperature throughout bath. While the Humboldt Hydrometer Jar Water Bath can be used for many uses within labs, it was designed specifically for use in providing a consistent temperature bath for storing hydrometer jars in accordance with ASTM D422, AASHTO T88 and UNE 103.102 to determine the particle size distribution of very fine materials, such as silt and clay. The H-4239A can accommodate (8) hydrometer jars at a time. All models include a stainless steel shelf, which supports specimens while allowing 2" of free circulating water above and below specimens.

Tank Volume: 20.5 gallons (77.6 Liters)
 Dimensions: ID: 37" L x 8" W x 16" D (940 x 203 x 406 mm)
 Overall dimensions: 48" L x 11" W x 19" D (1220 x 280 x 483 mm)
 Complies with ASTM D422; AASHTO T88.
 Shipping wt. 155 lbs. (70kg)

Hydrometer Analysis Set, 120V 60Hz—H-4263A

Hydrometer Analysis Set, 220V 50/60Hz—H-4263A.4F

Determines the distribution of soil particles smaller than No. 200 (0.075mm). Complies with ASTM D422; AASHTO T88.
 Shipping wt. 180 lbs. (79.4kg)

Set includes: (1) H-4247 Sodium Hexametaphosphate, 1 lb. (0.5kg)
 (1) H-4239A Hydrometer Jar Bath (6) H-4244 Hydrometer Jars
 (1) H-4241 Soil Hydrometer A (1) H-4242 Soil Hydrometer B
 (1) H-4260 Soil Dispersion Mixer

Soil Hydrometer A—H-4241

Seamless, symmetrical stem and bulb do not vary in diameter. One-piece ballast is secured to lower part of the body. Guaranteed calibration accuracy eliminates errors due to variable dilution. H-4241 uses ASTM 152 H scale, graduated to read in grams per liter (g/L) of suspension and has a range of -5 to +60g/L in 1g/L divisions at 68°F (20°C). Total length: 11" (280mm). Complies with ASTM D422; AASHTO T88.

Soil Hydrometer B—H-4242

Seamless, symmetrical stem and bulb do not vary in diameter. One-piece ballast is secured to lower part of the body. Guaranteed calibration accuracy eliminates errors due to variable dilution. H-4242 uses ASTM 151 H scale, graduated to read specific gravity with a range of 0.995 to 1.038 in 0.001 divisions at 68°F (20°C). Total length: 11" (280mm). Complies with ASTM D422; AASHTO T88.

Hydrometer Jar—H-4244

Graduated glass cylinder used in determining amount of soil in dispersed suspensions contains 1000ml at 20°C (68°F). Open end is fire-polished without pourout. Dimensions: 18" (457mm) x 2-1/2" OD (64mm). Base is 4-1/3" (107mm). Shipping wt. 2 lbs. (1kg)

Soil Dispersion Mixer, 120V 60Hz—H-4260A

Soil Dispersion Mixer, 230V 50/60Hz—H-4260A.4F

For dispersing soil suspensions used in hydrometer method of testing subgrade soils, heavy-duty mixer operates at a speed above 10,000 RPM (no load). Includes stirring apparatus with H-4266 stainless steel paddle and H-4265 chrome-plated dispersion cup with 4 sets of permanent interior baffles. Rounded cup bottom prevents soil accumulation. Furnished with 5' cord and 3-prong plug. Dimensions: 20 x 6-1/2 x 7" (508 x 165 x 178mm). Complies with ASTM D422; AASHTO T88. Shipping wt. 15 lbs. (6.8kg)

Dispersion Cup—H-4265

Chrome-plated Dispersion Cup for use with H-4260 Mixer. Shipping wt. 3 lbs. (1kg)

Stirring Paddle—H-4266

Stirring Paddle with 3 blade surfaces, 3/4" (19mm) dia. for H-4260 Mixer. Shaft threads onto mixer.

Sodium Hexametaphosphate—H-4247

Dispersing agent used in combination with gradation analysis of soils. 1 lb. (0.5kg) container. Complies with ASTM D422, AASHTO T88. Shipping wt. 2 lbs. (1kg)

Sodium Hexametaphosphate—H-4247.10

Same as above except 10 lb. (4.5kg) container.



Humboldt CBR/LBR Solutions

The California Bearing Ratio (CBR) Test was developed by The California State Highway Department and is widely used to determine the resistance strength of subgrade and subbase materials. The test is basically a simple penetration test using a load frame and a standard, compacted CBR test mold of the material to be tested. The results of the test are then compared and evaluated to known standards already established for the material being tested. Meets ASTM D1883; AASHTO T193; BS 1377 Part 4.

LBR or Limerock Bearing Ratio is a variation of the CBR test. Developed primarily in Florida, it is used with materials with high lime content. Humboldt offers several CBR/LBR testing solutions based on your overall testing needs and budget, from the advanced HM-3000.3F Load Frame with computer interface using our HMTS software to a simple, hand-operated H-4156 Load Frame suitable for lab or field use.

CBR Setup using the HM-3000.3F Load Frame

Pictured is the HM-3000.3F Load frame with a typical CBR setup. See the chart below for items to order for the setup shown. See page 14 for more information on the HM-3000.3F Load Frame.

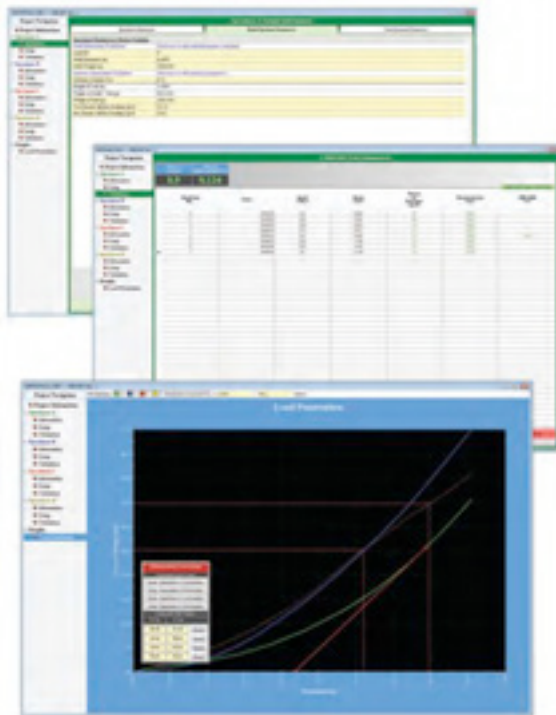
Typical CBR Setup using HM-3000.3F

Part #	Qty	Description
HM-3000.3F	1	Digital MasterLoader, 110/220V 50/60Hz
HM-2300.100	1	S-Type Load Cell, 10,000lbf (50kN)
HM-2310.10	1	Strain Transducer 1" (25mm)
H-4178	1	Penetration Piston with Stud
HM-4178BRT	1	Displacement Transducer Bracket
HM-3001SW	1	CBR/LBR Reporting Software

Typical LBR Setup

For LBR setups, substitute H-4178F.4 for the H-4178 penetration piston and HM-2300.100P for the HM-2300.100 S-type load cell.

HM-3000.3F



HMTS Reporting Software, CBR/LBR Module— HM-3001SW

Humboldt Material Testing Software (HMTS) provides a complete solution for the acquisition, recording and presentation of test data, as well as controlling testing operations when used in conjunction with compatible Humboldt testing equipment. HMTS works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel.

The CBR/LBR Module provides a simple, test-specific interface to control CBR/LBR test operations and automatically record data while also displaying it in real-time tables and graphs. Technicians can be freed-up for other duties with the assurance that all test data is being collected and saved.

- Test Information is stored, and all calculations are performed automatically
- Live tests and live graphing capabilities (real-time)
- Complete test report including all calculations and graphs required for testing
- Review and export tests using Microsoft Excel

See page 84 and 85 for more information on Humboldt's HMTS software.



HM-4156



H-4156M



HM-2800

CBR/LBR Specific Load Frame, 120V 60Hz— HM-4156

CBR/LBR Specific Load Frame, 220 50/60Hz— HM-4156.4F

The HM-4156 is a fully automatic, single-speed Load Frame, (0.05 inches/minute), (1.27mm/minute), designed for those who want a high-quality, application-specific Load Frame that provides simple operation with built-in data acquisition capabilities. The HM-4156 provides two channels with integral data acquisition to accommodate a load cell and transducer for CBR/LBR testing. (Includes load cell, displacement transducer, transducer bracket and penetration piston) The machine's digital display provides the ability to monitor test data in real-time, as well as the ability to see a test's peak value at a glance. Features include:

- 8" platen provides roomy, stable base for test equipment
 - Provides two channels with real-time data acquisition
 - Backlit LCD display for viewing test data and break values.
 - Battery-backed, real-time clock
 - RS232 interface for computer control and/or downloading data. (optional USB Cable is available, order HM-000379)
 - Provides Chart recorder output port.
 - Nonvolatile test data storage and instrument calibration
 - Auto conversion of instrument calibration between English and Imperial units and SI or metric units
 - User-selectable between CBR/LBR or Soil Cement tests
 - User-selectable time intervals for recording test data
 - Unit Auto-reverses to home position at the end of test
 - Automatic triggering of test logging data
 - Includes Humboldt's HMTS CBR/LBR Software Module HM-3005SW
- Shipping wt. 265 lbs. (120kg)

NOTE for 220 50/60Hz operation

When HM-4156.4F is operated at 60Hz, the machine complies with ASTM D1883, .05" (1.27mm) per minute. When it is operated at 50Hz this machine complies with BS 1377: Part 4, .04" (1.00mm) per minute.

CBR-Specific Load Frame, 120V 60Hz— H-4156M

The H-4156M Load Frame has been designed as a low-cost solution to doing CBR testing. It features one-speed operation with a preset speed specifically for CBR tests. The CBR speed is set at 0.050 inches/minute (1.27 mm/minute), ASTM D1883. Maximum piston travel is 3-1/2" (88mm). H-4156M is sold as a set with items in above chart included with load frame. Overall dimensions are: 18 x 18 x 38-1/2" H (457 x 457 x 978mm). Shipping wt. 265 lbs. (120kg)

CBR-Specific Load Frame, 220 50/60Hz— H-4156M.4F

Same specifications as the H-4156M, except 220 50/60Hz. When operated at 60Hz the machine complies with ASTM D1883, .05" (1.27mm) per minute. When it is operated at 50Hz this machine complies with BS 1377: Part 4, .04" (1.00mm) per minute. Shipping wt. 266 lbs. (121kg)

CBR Setup included with HM-4156M

Part #	Qty	Description
HM-4156M	1	CBR-Specific Load Frame
H-4454.100	1	Load Ring, 10,000lbf (50kN)
H-4158.1	1	Dial Gauge 1.000" x .001"
H-4178	1	Penetration Piston with Stud
H-4178BR	1	Dial Indicator Bracket

Multi-Speed Load Frame, 120V 60Hz— HM-2800

Multi-Speed Load Frame, 220 50/60Hz— HM-2800.4F

The HM-2800 provides a simpler, less advanced solution for doing CBR testing than the HM-3000, while retaining the ability to assign a speed of operation between 0.008 and 2.000 inches/minute for doing the multitude of tests required by today's labs, beyond CBR. The HM-2800 pictured above shows a typical CBR setup. The HM-2800 is sold as a load frame only, order setup items separately. See page 72 for more information on the HM-2800 Load Frame. Shipping wt. 300 lbs. (136kg)

Typical CBR setup using HM-2800

Part #	Qty	Description
HM-2800	1	Load Frame
H-4454.100	1	Load Ring, 10,000lbf (50kN)
H-4158.1	1	Dial Gauge 1.000" x .001"
H-4178	1	Penetration Piston with Stud
H-4178BR	1	Dial Indicator Bracket





H-4156

CBR Mechanical, Loading Press— H-4156

The CBR loading press (load frame) uses a two-position mechanical jack to provide steady test speeds, as well as rapid travel of the platen for positioning of the sample. The Press, includes a H-4454.100, 11,000lbf (48.8kN) calibrated load ring, a H-4178, 1.95" (49.5mm) dia. (3 in² area) penetration piston, a H-4158.1, 1.000" x .001, dial indicator and a H-4178BR dial indicator bracket, Overall dimensions: 18" x 12" x 34" (45.8 x 30.5 x 86.4cm). Complies with ASTM D1883, AASHTO T193.

Two-speed Mechanical Replacement Jack— H-4156J

CBR Testing Set with H-4156 Loading Press— H-4152

H-4152 CBR Testing Set, includes:

Part #	Qty	Description
H-4156	1	Mechanical Loading Press
H-4151	4	Mold
H-4153	1	Spacer Disk
H-4154	4	Filter Screens
H-4172	2	Swell Plates
H-4158	1	Tripod Attachment
H-4158.1	1	Dial Indicator
H-4175	4	Surcharge Weights
H-4176	4	Slotted Surcharge Weights
H-4170A	1	Density Hammer
H-4144	1	Straight Edge
H-4174	1	Cutting Edge



H-4152F

CBR Field Test Set— H-4152F

The CBR field test set is designed for making CBR determinations in the field and is built around a modified H-4156 Load Frame. CBR field testing can quickly yield a relative strength determination without having to rely on lab tests. Field tests involve forcing a piston into the soil and comparing the depth of penetration in relation to the load placed on the piston. Typically, the reaction load used for field testing is a heavy piece of equipment, such as a loaded dump truck. Gear Box is 2-speed model with a 10,000lbf (45kN) capacity and 3.5 inches of lift. The use of the extension and connector set provides sufficient flexibility for almost any type of height requirement. Complies with ASTM D4429.

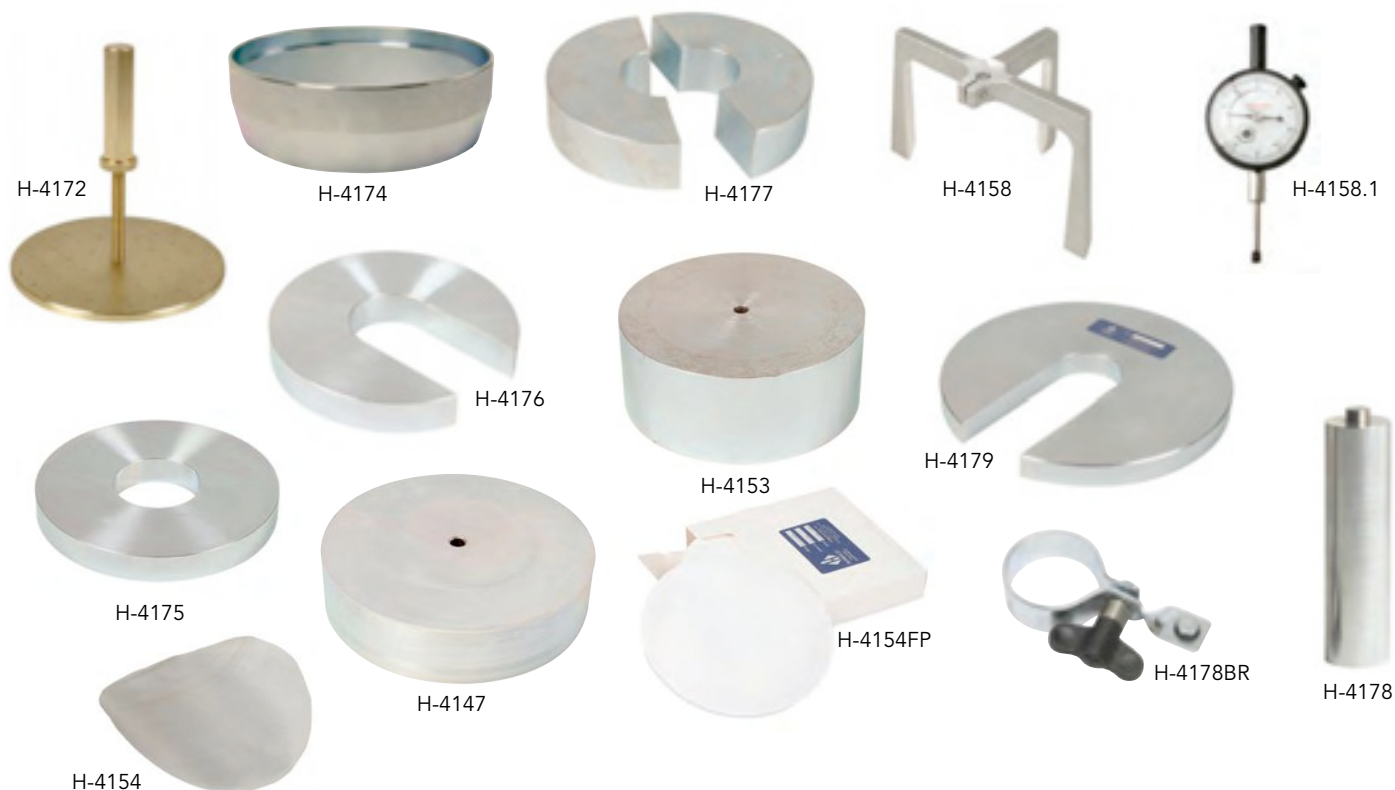
CBR Field Test Set— H-4152FM

Metric version of the H-4152F with metric-reading dial indicators.

Below is a list of the components of the Field CBR Test Kit, which can also be purchased individually.

H-4152F CBR Field Test Set, includes:

Part #	Qty	Description
H-4156J	1	2-sp. Gear Box, Handle and Platen
H-4156SB	1	Swivel Base
H-4454.020	1	2200 lbf Load Ring
H-4454.050	1	5500 lbf Load Ring
H-4152F.1	1	CBR Extension Set
H-4152F.2	1	CBR Connector Set
H-4158.1	1	Dial Indicator, 1.000" x 0.001"
H-4466.10	1	Extension Point Set of 2, 1" Length
H-4152F.8	1	Steel Bridge Support
H-4197F.10	1	Surcharge Weight, 10lb, 10" dia.
H-4179	2	Slotted Surcharge Weight, 10lb
H-4179F.20	2	Surcharge Weight, 20lb, 8.5" dia.
H-4470	1	Magnetic Indicator Mount
H-4178F.4	1	Penetration Piston, 4"



Swell Plate— H-4172

Perforated 5-7/8" (149mm) dia. base with adjustable stem. Contact end of the stem is easily locked in place with a knurled nut. Shipping wt. 5 lbs. (2.3kg)

Cutting Edge— H-4174

Machined from seamless tubing with a sharpened edge to enable undisturbed samples to be taken in the field, cutting edge is plated for rust resistance. Cutting edge has 6" (152mm) ID and is 2" (51mm) high. Recess in upper section allows edge to be mounted at either end of the H-4149 or H-4151 mold to facilitate sample removal in the field. Shipping wt. 4 lbs. (2kg)

10 lb. Surcharge Weight— H-4177

10 lb. (4.5kg) Field surcharge weight, made in two parts; 5-7/8" (149mm) OD; 2-1/8" (54mm) ID Shipping wt. 11 lbs. (5.0kg)

Swell Tripod Attachment— H-4158

Metal tripod supports dial gauge for measuring the amount of swell during soaking. Attachment is used with H-4172 swell plate. Order dial indicator separately. Shipping wt. 4 lbs. (2kg)

Dial Indicator— H-4158.1

Dial indicator has 1.000" operating range, graduated in 0.001" divisions, clockwise movement and revolution counter. Recommended for use with H-4158 tripod attachment. Shipping wt. 1 lb. (.5kg)

5 lb. Surcharge Weight— H-4175

Used in the application of surcharged loads on the soil's surface during soaking and penetration. Rust-resistant, plated annular disc weighs 5 lbs. (2.3kg), 5-7/8" (149mm) OD with a 2-1/8" (54mm) ID hole in center. Shipping wt. 6 lbs. (3kg)

5 lb. Slotted Surcharge Weight— H-4176

Same as H-4175 above, except with a 2-1/8" (54mm) slot. Shipping wt. 6 lbs. (3kg)

Spacer Disc— H-4153

Disc is used as a false bottom in a soil mold during the compaction process. Plated rust-resistant steel disc is 2.416" (61mm) high, 5-15/16" (150.8mm) dia. Shipping wt. 18 lbs. (8kg)

10 lb. Slotted Surcharge Weight— H-4179

10 lb. (4.5kg) Slotted, Field surcharge weight, 8-1/2" (216mm) dia. Shipping wt. 11 lbs. (5kg)

Spacer Disc. LBR— H-4147

Disc is used as a false bottom in a soil mold during the compaction process. Plated rust-resistant steel disc is 1.416" (36mm) high, 5-15/16" (152mm) dia. Shipping wt. 3 lbs. (1kg)

Filter Paper— H-4154FP

100 pack of coarse grade paper filter, used to separate spacer disc and soil in the CBR mold during compaction operation or over the top surface of the soil when the compaction operation is completed.

Filter Screen— H-4154

100 mesh brass screen is 5-15/16" (152mm) dia. Shipping wt. 8 lbs. (4kg)

Dial Indicator Bracket— H-4178BR

Bracket used to attach a dial indicator to the penetration piston. Shipping wt. 2 lbs. (1kg)

Penetration Piston— H-4178

CBR Penetration Piston has 3 sq. in. (19.35cm²) base area and is about 7-1/2" (191mm) long. Designed for use in conjunction with weights H-4175 and H-4176 to apply penetration surcharge loads. Shipping wt. 8 lbs. (4kg)



HM-3804



HM-3880



HM-3701



HM-3861

HM-3861 Detail

Constant Head Permeameter Cells

Use to determine the coefficient of permeability by the constant head method for laminar flow of water through granular soils. Two manometer ports are grooved & screened on the inside. Distance between ports is always equal to diameter. 100 mesh screens used to prevent migration of material through valves & tubing during test. Acrylic chamber permits viewing sample. Spring incorporated into top cap to apply 5-10 lbs. force against top stone or screen to prevent soil density changes. End caps & clamping ring of anodized aluminum. Each chamber complete with: valves; porous stones or perforated screens, depending on the diameter of sample; tubing for connection to water source and manometer tubes. Permeameters without manometer outlets available. Complies with ASTM D2434; BS 1377 Part 5. Shipping wt. 7 to 12 lbs. (3.2 to 5.4kg)

Permeameter Cells	Model
2.5" (63mm) Permeameter Cell	HM-3801
3.0" (76mm) Permeameter Cell	HM-3802
4.5" (114mm) Permeameter Cell	HM-3803
6" (152mm) Permeameter Cell	HM-3804
9" (229mm) Permeameter Cell	HM-3805

Manometer Tube Stand, Wall Mount— HM-3860

Manometer Tube Stand, Free Standing— HM-3861

Economical manometer tube setup for use with many permeameters. Two acrylic tubes with valves mounted on aluminum rail, with scale for monitoring flow volumes. Scale is 100cm long with cm and mm graduations. Each tube has its own valve to allow running two tests. Choose wall mount or free standing. Complies with ASTM D2434. Shipping wt. 8 lbs. (3.7kg)

Constant Head Tank, 1000cc— HM-3880

Constant Head Tank, 4000cc— HM-3881

Acrylic tank with regulating valve for flow control of water and a porous media on bottom to filter out air bubbles. Maintains constant water head via an overflow port. Includes: saddle valve for connection to either de-aired or tap water source; rails for wall mounting with easy height adjustment and tubing for hook-up to test chamber. Shipping wt. 8 lbs. (3.7kg)

Compacting Hammer— HM-3701

Rod with sliding weights on a 2" (51mm) dia foot. Stop allows adjusting height of drop up to 8" (203mm). Includes one 1/4 lb. (100g) and one 2-1/4 lb. (1kg) weight. Shipping wt. 6 lbs. (2.72kg)



HM-3892



HM-3892 Detail



H-4146



H-4145



HM-3915

Constant/Falling Head Permeameters

For use with granular soils in determining the coefficient of permeability via the constant or falling-head method for laminar flow of water. Compact and portable unit includes manometer tube, scale and permeameter base attached to a platform. Funnel provides adjustable constant head reservoir. Spring incorporated into top cap to apply 5-10 lbs. force against top stone or screen to prevent soil density changes. End caps and clamping ring of anodized aluminum. Each set complete with: permeameter; manometer tube; two funnels; either porous stones or perforated screens depending on diameter, and tubing for connection to water source. Shipping wt. 13 lbs. (5.9kg)

Permeameter Sets	Model
2.5" (63mm) Permeameter Set	HM-3891
3.0" (76mm) Permeameter Set	HM-3892
4.5" (114mm) Permeameter Set	HM-3893
6" (152mm) Permeameter Set	HM-3894
9" (229mm) Permeameter Set	HM-3895

Compaction Permeameter, 4" — H-4145

Compaction Permeameter, 6" — H-4146

For determining permeability of clay, sand, and gravel soils. Uses Proctor plasticity compaction method. Two-piece cylindrical mold includes: upper plate with valve; water inlet/outlet; filter base plate; and filter stones. 6"W x 6"D x 12"H. Complies with ASTM D5856. Shipping wt. 18 lbs. (8.16kg)

Compaction Permeameter Parts	Model
Filter Stone for H-4146	H-4148X
Porous Stone for H-4146	H-4148.6
Spring for H-4146 and H-4145	H-4145.8
Filter Stone for H-4145	H-4148
Porous Stone for H-4145	H-4184.100

Shelby Tube Permeameter, 2" — HM-3913

Shelby Tube Permeameter, 2.5" — HM-3914

Shelby Tube Permeameter, 3" — HM-3915

Allows you to perform permeability tests within a Shelby tube without removing the sample. Ideal for cohesionless materials and sands. It is suggested that the specimen be ejected at test conclusion and examined for voids or large aggregate, which possibly could affect the test results. Two sets of end caps fit over a Shelby tube liner up to 6" long. End caps each contain valve to control flow of permeants through the specimen, along with a porous stone to prevent material from flowing into and clogging the valve. End caps are anodized aluminum. Includes o-rings, connecting rods, clamping knobs, and tubing. Shelby tube not included. Shipping wt. 6 lbs. (2.72kg)

Permeability/Hydraulic Conductivity

Permeability testing measures the rate of discharge of water under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and standard (20°C) temperature conditions. In permeability testing, soil is subjected to water under a known pressure, and the flow is measured. The coefficient of permeability (k), or simply permeability, expresses the ability of water to flow through the particular medium. The "Constant Head" test method is applicable to coarse granular soils such as sands and gravels. The "Falling Head" test method is applicable to fine grain soils. Either method may be used to test clay soils.

Humboldt FlexPanels

Humboldt FlexPanels provide a simple and highly efficient distribution system for providing air, water and de-aired water for use in permeability and triaxial testing applications. The FlexPanel's simple, straight-forward configuration, with its integral burettes provides a condensed/compact design that takes up less counter space than competing systems with air/water bladders.

The long, narrow burette design of Humboldt's FlexPanels provide faster test processing times when compared to larger, shorter burette systems, while providing the same volume. This is due to the reduced amount of meniscus formation in the narrower burettes, which allows the water level to drop faster, resulting in faster readings. In addition, the use of longer/narrower burettes and a scale graduation of 0.02ml, also provides an easier-to-read and more accurate scale.

FlexPanels also feature a bias regulator and bridge. The bias regulator maintains the differential pressure when confining and back pressures are increased. The bridge delivers simultaneous control of base and top pressures through the use of just one regulator. This feature minimizes operator time and reduces the margin of error in opening and adjusting regulators during a test. The Humboldt Flexpanel System is comprised of 5 separate panel configurations, which can be grouped together to accommodate from 1 to 5 cell setups.

Fast and Easy Setup and Operation

Humboldt FlexPanels make setup fast and easy with clearly labeled ports and quick-connect hookups. Operation is just as easy with clearly labeled controls, large gauges and easy-to-read burette markings.

All Humboldt FlexPanels use no-volume change Swagelock valves and Fairchild constant-bleed type precision regulators for accurate control. All inlets and outlets utilize quick-connects to ensure fast, accurate setup to permeater cells, as well as air, water and drain hook ups. Fittings, tubing and connectors are supplied with each unit. All FlexPanels are designed to handle air pressures up to 150 psi. For testing contaminated samples, Humboldt offers an optional Toxic Interface Unit, which prevents toxic fluids and vapors from entering the FlexPanel.

Humboldt FlexPanels Features:

Humboldt FlexPanels provide an accurate and easy-to-operate solution for controlling compressed air, water, de-aired water and vacuum without the need for air/water bladder interfaces to produce the pressures necessary for permeability and triaxial testing. FlexPanels utilize a set of three burettes to control cell, top cap and base pedestal pressures. This extremely versatile pressure system controls the pressure, water, de-airing tank and vacuum from a single panel. The three burettes allow for the control of the cell pressure and the back pressure for each cell. They can monitor volume change in the sample and can be used to measure the flow of water through the sample for permeability testing.



HM-4150



HM-4140



HM-4150A



HM-4160



HM-4160A

FlexPanels can manually measure volume change or permeability in a triaxial test sample without the use of a volume change apparatus, a distinct benefit when compared to air/water bladder systems.

- Bias pressure regulator allows simultaneous control of confining & back pressures, while maintaining a constant differential
- Longer Burette and 0.02ml graduation give more accurate results, better productivity, and faster turnaround
- Uses no-volume-change Swagelock valves
- Bridge feature delivers simultaneous control of base and top pressures by adjusting one pressure regulator simplifying testing
- Quick-connect hookups for fast and reliable set up.
- Master control panel houses digital pressure readout for the controlling pressure, inlet vacuum regulator & gauge, inlet pressure regulators & gauge, de-aired water tank controls, tap & de-aired water supply outlets, and pressure & vacuum outlets
- Comply with ASTM D5084; BS 1377 Part 6 1990.

Control Panels

The HM-4140 stand-alone control panel or the integral control panels on the HM-4150 and HM-4160 provide pressure controls and readouts for permeability and triaxial applications. All three controllers provide identical controls, which include: a digital, readout pressure meter, a pressure supply gauge, a master pressure regulator, a vacuum supply gauge, a master vacuum regulator, de-aired water tank controls, tap and de-aired water supply outlets and pressure and vacuum outlets.

Auxiliary Panels

The HM-4150A and HM-4160A auxiliary panels provide additional sets of burettes, which can be used to expand the capacity of a system. Each set of three (3) burettes provide the controls necessary for another cell to be used. The HM-4150A provides one (1) set of burettes and the HM-4160A provides two (2) sets. Humboldt recommends any combination of up to five (5) burettes sets can be used with each control panel.



Rear of panel showing quick-connect hookups and plumbing.

Humboldt FlexPanels

	HM-4140.3F	HM-4140M.3F	HM-4150.3F	HM-4150M.3F	HM-4160.3F	HM-4160M.3F	HM-4150A	HM-4160A
Pressure/Resolution	2-150 psi (0.1 psi)	14-1000 kPa (1 kpa)	2-150 psi (0.1 psi)	14-1000 kPa (1 kpa)	2-150 psi (0.1 psi)	14-1000 kPa (1 kpa)	NA	
Vacuum	0-14.7 psi or 30 Hg	(0-100kPa) or 30 Hg	0-14.7 psi or 30 Hg	(0-100kPa) or 30 Hg	0-14.7 psi or 30 Hg	(0-100kPa) or 30 Hg		
Inner Burette								
Cell	50cc x 0.1 cc (ml)							
Top	10cc x 0.02 cc (ml)							
Base	10cc x 0.02 cc (ml)							
Outer Burette								
Cell	400cc (ml)							
Top	460cc (ml)							
Base	460cc (ml)							
Voltage	110/220VAC 50/60Hz						NA	
Power	6 watts							
Operating Temperature	14 to 158°F (-10 to 70°C)							
Dimensions	8 x 8 x 37.5" (203 x 203 x 952mm)		8 x 25.5 x 37.5" (203 x 648 x 952mm)		8 x 43.5 x 37.5" (203 x 1105 x 952mm)		8 x 19.5 x 37.5" (203 x 495 x 952)	8 x 37.5 x 37.5" (203 x 952 x 952)
Shipping Weight	35lb (16kg)		95lb (43kg)		145lb (66kg)		107lb (49kg)	157lb (71kg)



Toxic Interface Unit— HM-4190

Safe and convenient means of performing permeability tests of corrosive or toxic permeants. Flexible Viton bladder accumulator interfaces between control panel and sample drains on permeameter. Serves as a fluid separator to prevent permeant from entering control panel. Also prevents contact of air with permeant, thus no toxic or corrosive vapors can escape into lab. Handles any fluid compatible with stainless steel, Teflon, and the Viton bladder. Unit measure 8" H x 5" dia. Two units are required for each cell. Shipping wt. 6 lbs. (2.72kg)



HM-4190





HM-4188B

Permeability Cells

HM-4188B permeability cells are constructed of high-quality materials throughout for long-lasting performance. The cell top and base are precision machined from 6061 T6 aluminum and then hard-coated and Teflon-impregnated for a durable finish. To facilitate sample setup, the chamber and cell top can be quickly and easily removed by loosening the three knobs that hold the upper assembly to the base. The clear acrylic chamber provides a working pressure of 150 psi (1,000 kPa) and is tested to 250 psi (1,700 kPa).

The cell has five, no-volume-change, valves aligned along the front of the cell for maximum convenience. Two valves handle top drainage, two valves handle bottom drainage, and one valve handles filling/emptying and providing confining pressure to the cell.



Triaxial Cells— HM-4199

For those who plan to do triaxial tests in addition to permeability testing, consider using HM-4199B and HM-4199SS Triaxial Cells for the added convenience of using one cell for both tests.

The removable base pedestal accommodates various sample diameters from 35mm to 4 inch, see charts below for model numbers corresponding to the size needed. Cells are available with black-anodized aluminum or stainless steel top caps and base pedestals, refer to chart below.

Brass valves are standard with these cells, but stainless steel valves (stainless steel is typically used with hazardous materials) are an option, please inquire. Cell dimensions are: 13-3/4" H x 8-3/4" dia. (349.2 x 222.3mm). Overall dia. is: 11" (279.4mm). Complies with ASTM D5084.



HM-4188.28

To order individual Top Caps or Pedestal Bases, use the part number for the set of the desired size indicated at left and add a "T" suffix for a Top and a "B" suffix for a base, i.e. HM-4188.20B would be the part number for a 2" Base Pedestal.

Permeability Cells and Top Cap/Base Pedestal Sets				
Size	Standard Cell	Stainless Cell*	Anodized Aluminum**	Stainless Steel*
35mm	HM-4188B	HM-4188SS	HM-4188.35	HM-4188.35SS
1.4"			HM-4188.14	HM-4188.14SS
1.5"			HM-4188.15	HM-4188.15SS
50mm			HM-4188.50	HM-4188.50SS
2.0"			HM-4188.20	HM-4188.20SS
70mm			HM-4188.70	HM-4188.70SS
2.8"			HM-4188.28	HM-4188.28SS
100mm			HM-4188.100	HM-4188.100SS
4.0"			HM-4188.40	HM-4188.40SS

**Expansion Index Consolidometer— HM-2405**

Self-contained unit for conducting expansion tests on cured soil specimens. After compaction in stainless steel ring, specimen is placed in the consolidometer with air-dried porous stones, and loaded with a stainless steel weight. Specimen is allowed to consolidate for 10 minutes, after which it is immersed in distilled water for up to 24 hrs. During this time, height of specimen is recorded to determine maximum swell. Corrosion resistant, durable anodized aluminum and stainless steel construction. Includes anodized aluminum base & collar, stainless steel specimen ring and weight, 12.6 lb. (5.7kg) loading weight, and 3.99" dia. x 1/2" (101.4 x 12.5mm) porous stones. **Order dial indicator below.** 6" dia x 11" H (152 x 279 mm). Complies with ASTM D4829, California Test Method UBC 29-2.

Shipping wt. 20 lbs. (9 kg)

Dial Indicator, for HM-2405 Consolidometer— H-4471

0.5 x 0.0001" dial indicator.

Replacement Porous Stones— HM-4184.399T

Porous stones for use with HM-2405 consolidometer, 3.99" x 0.5".

Accessories	Model
Dial Indicator, 0.2" range x 0.0001"	H-4460
Dial Indicator, 0.5" range x 0.0001"	H-4471
Dial Indicator, 1.0" range x 0.001"	H-4158.1
Compaction Hammer	HM-3701

Soil Volume Change Meter (PVC)— HM-2415

Use to evaluate potentially dangerous swelling/shrinking conditions found in clay soils in commercial/residential development sites. PVC (potential volume change) refers to maximum possible volume change a soil could undergo when submitted to changing moisture conditions. It features fast and simple operation, measuring both shrinkage and swelling of soils and is ideal for gauging swelling of clay soils. Includes: H-4454.010, 1,000 lb. (4.5 kN) capacity proving ring, mold assembly, loading cap, porous stones, loading pistons, 2-3/4" (70 mm) dia. specimen ring (HM-1220.70), and conversion charts. 7-1/4" (184 mm) dia. base x 15-1/2" (394 mm) height. Shipping wt. 30 lbs. (13.6 kg)

Compaction Base and Collar, 2.440"— HM-1975-D**Compaction Base and Collar, 2.500"— HM-1975-E**

The compaction base and collar is used to produce a soil sample for use with the basic swell/expansion consolidometers. Use HM-3701 compaction hammer. Shipping wt. 7 lbs. (3kg)

Basic Swell/Expansion Consolidometers—**2.440"— HM-1972-1D****2.500"— HM-1972-1E**

A self-contained consolidometer used to conduct swell expansion tests on soil specimens. Set includes: stainless steel base/acrylic ring device with adjustable, dial indicator standard and bracket, a compaction specimen ring, top and bottom porous stones and a 60 psf stainless steel loading weight. Consolidometer can also be used with cutting ring, listed below, instead of supplied compaction ring for use in acquiring samples from undisturbed Shelby tube samples. Dial indicator necessary for test, choose from those listed below. Alternative loading weights are available, please enquire. Shipping wt. 8 lbs. (4kg)

Components	HM-1972-1D
Stainless steel Cutting Ring	HM-1220.24.8
Stainless steel Compaction Ring	HM-1972-3D
60 PSF Stainless steel Loading Weight	HM-1972-6D
Stainless steel Compaction Ring	HM-1972-3D
Top Porous Stone	HM-4184.240
Base Porous Stone, 3.31" dia. x 1/4" thick	HM-4184.331

Components	HM-1972-1E
Stainless steel Cutting Ring	HM-1220.25.8
Stainless steel Compaction Ring	HM-1972-3E
60 PSF Stainless steel Loading Weight	HM-1972-6E
Stainless steel Compaction Ring	HM-1972-3E
Top Porous Stone	HM-4184.2485
Base Porous Stone, 3.31" dia. x 1/4" thick	HM-4184.331

The Humboldt Geotechnical Lab

The unique concept behind the design of Humboldt's geotechnical lab equipment is accentuated by our dedication to modular design and data acquisition. All of Humboldt's primary geotechnical machines feature an integral 4-channel data logger, which allows our equipment to function as stand-alone work stations, part of a lab-wide computerized system, or anything in-between. Coupled with this is our dedication to the development of our own test-specific software, which allows you to control, collect data and run reports for all the machines in your lab.

Stand-Alone Solution

As a stand-alone solution, our geotechnical testing machines provide a simple, efficient method of obtaining test results, regardless of the size of your testing operation. No more tracking dial or digital gauge readings and making notes, our machines independently record, store and print test data. What this means for you is, if you simply want to record your test data and print it out to a printer or chart recorder, you can do that without the need for a computer. This also provides you with a great deal of versatility in setting up a lab, as well as dealing with setting up satellite labs, on-site, field locations and experimental processes; allowing you to quickly set up an independent station without having to deal with computers, loggers and networks. This stand-alone feature can also be very advantageous in a lab where you are utilizing computer-controlled machines and your computer crashes. In this scenario, because your data is being recorded and stored independently of the computer, your data is not lost and you can continue to run your tests and record your data without any downtime.

Computerized Control and Data Acquisition

In a computerized system with data acquisition, Humboldt's unique design concept for geotechnical testing equipment really reveals its strengths. In this type of setup, the same machines, which we used in the stand-alone solution can be connected to a computer running our HMTS software, which now allows you to control the actual test operations, monitor test data in real-time, capture and store test data, as well as view actual test data curves in real-time with our test-specific software modules.

Stand-Alone

The HM-3000 Load Frame used in a stand-alone mode provides you with excellent control and data-logging capabilities, while it provides you with a load frame capable of almost any type of testing you may encounter.



Computerized Control

Humboldt's design concept lets you daisy-chain our geotechnical testing equipment together, allowing you to control and collect data from all the testing machines in your lab from an individual computer station, simultaneously, in real-time.



HM-2470A.3F

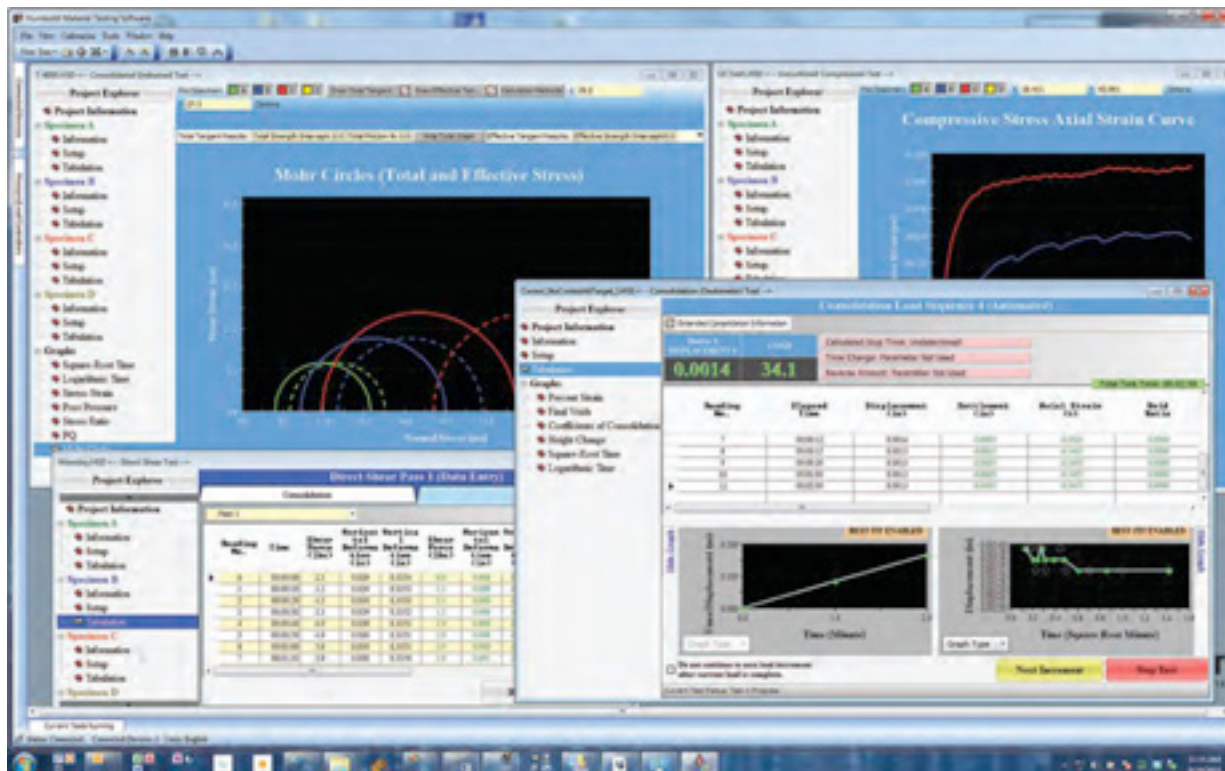
HM-2750A.3F



HM-2560A.3F



HM-4155



In a computer-controlled lab you can run myriad tests at the same time all from one computer or a number of computers, if you choose. Our highly flexible system allows you to run a bank of consolidation test machines or several triaxial tests, several direct shear tests and some consolidation tests at the same time, from the same computer, all in real-time; so you can monitor the data collection of all your tests as they run simultaneously.

Flexibility

Because our test equipment include integral data loggers, adding to a system is plug and play. You can quickly add machines to your computerized system or leave them as stand-alone stations, while still being able to export test data to computers. Our internal data loggers also make it extremely easy to move testing equipment from lab to lab quickly and easily. If you have a special project and want to move a machine to a field location, just pack it up and ship it. When it gets there you'll have the same data logging and control functions you enjoyed in your primary lab.

And, with the use of our MiniLoggers, you can also utilize existing equipment, even from other manufacturers as part of your system with full data logging capabilities. Also, our integral data loggers

HMTS software provides you the ability to control all your tests from a single computer simultaneously. You can monitor all your tests in real-time, watching the data as it is recorded and graphed.

HMTS Software

HMTS Software

From a single operation to controlling a complete geotechnical lab, Humboldt Material Testing Software (HMTS), in conjunction with compatible Humboldt testing equipment, provides a complete solution for the acquisition, recording and presentation of testing data. HMTS works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel.



HM-2900.3F



HM-2450A.3F



HM-2325A.3F

www.humboldtmfg.com • 1.800.544.7220 • 708.468.6300





HM-2470A.3F
with HM-1220.25

ConMatic IPC includes:

Description	Qty	Part #
S-type Load Cell 2,000 lbs (10kN) with 3/4" adapter	1	HM-2300.020
Linear Strain Transducer, 1.0" (25mm)	1	HM-2310.10
Linear Strain Transducer Bracket	1	HM-2310BR
HMTS Consolidation Software Module	1	HM-1100SW
Ball 5/8" 440 Stainless Steel	1	HM-001076

Order Consolidation cells: page 56

**ConMatic IPC,
Automated Consolidation System,
120/220V 50/60Hz— HM-2470A.3F**

The ConMatic IPC is a fully-automated, incremental pressure controller for performing incremental consolidation and one-dimensional swell tests. The ConMatic IPC allows consolidation and constant load and volume swell tests to be run automatically, freeing up technicians for other tasks and reducing the duration of the testing procedures by more than half—effectively saving time and manpower and increasing lab profitability. One ConMatic automated system can replace the production of several manual machines—running incremental consolidation tests according to ASTM D2435 Method B, where successive load increments are applied after 100% primary consolidation.

Once a sample has been placed onto the test platform and the test conditions set, the ConMatic IPC, used in conjunction with a computer and Humboldt's HMTS software, performs all consolidation tests, including moving to the next stress level, without operator assistance. The system automatically moves through the different test parameters specified by the user with incremental consolidation tests typically being completed in 24 to 48 hours. The HMTS software records readings from the force and displacement transducers to control the unit's exceptionally accurate stepper motor. Test results are recorded and rendered in real-time on the computer screen while test data is stored and calculations are performed automatically. The HMTS software provides:

- Live tests and live graphing capabilities (real-time)
- Complete test reporting including all calculations and graphs required for testing
- Review and exporting of tests using Microsoft Excel
- Smart Test Function: automatically picks up where it left off if the test was not finished due to unexpected events within your computer

The unique design of the ConMatic IPC system enables the user to choose from multiple tests and run them independently and simultaneously.

Applicable Test Standards

ASTM: D2435, D4546, AASHTO: T216, BS: 1377:5

The ConMatic IPC system requires a supply of clean, dry compressed air and a computer, please contact Humboldt for system requirements.

Specifications	
Sample Size	up to 4" (100mm)
Maximum Load	2200lbf (10kN)
Vertical Clearance	8.25" (210mm)
Horizontal Clearance	7.75" (197mm)
Maximum Piston Travel	0.5" (12.7mm)
Dimension (L x W x H)	12 x 12 x 30 inches (305 x 305 x 762mm)
Weight	42 lbs. (19Kg)

Replacement Ball, 5/8" 440 Stainless Steel— HM-001076

**ConMatic Consolidation Machine,
120/220V 50/60Hz— HM-2432A.3F**

Compact and easy-to-use, the HM-2432A.3F pneumatic consolidation load frame is used to estimate the rate and amount of settlement anticipated for a proposed structure. The unit applies loads instantly without impact for stress-controlled consolidation testing; and, maintains the load regardless of sample compression. Its small footprint saves valuable lab counter space while maintaining its versatility by supporting fixed ring, floating ring, or permeability cells. Available with standard mechanical dial gauge, digital indicators or with strain transducers (LSC) coupled to one of our data loggers. Complies with ASTM D2435, D4546; AASHTO T216; BS 1377 part 5. Shipping wt. 49 lbs. (22kg)

TSF Model

Con-Matic 32 TSF, 110/220V 50/60Hz— HM-2432A.3F

kg/cm² Model

Con-Matic 32 kg/cm², 110/220V 50/60Hz— HM-2432AM.3F

Consolidation (Pneumatic) Typical Setups:

Part #	Qty	Description
Pneumatic Consolidation		
HM-2432A.3F	1	ConMatic 32 TSF, 110/220 50-60Hz
HM-1220.XX	1	Fixed Ring Consolidation Cell
H-4471CC	1	Dial Gauge, 0.5" X .0001" CC
Pneumatic Consolidation w/ Analog Transducer Data Acquisition		
HM-2432A.3F	1	ConMatic 32 TSF, 110/220 50-60Hz
HM-1220.XX	1	Fixed Ring Consolidation Cell
HM-2310.04	1	Strain Transducer 0.4" (10mm)
HM-2310BR	1	Strain Transducer Bracket
HM-2325A.3F	1	MiniLogger 4 CH Analog Data Acquisition
HM-1100SW	1	HMTS Consolidation Reporting Software
Pneumatic Consolidation w/ Digital Indicator Data Acquisition		
HM-2432A.3F	1	ConMatic 32 TSF, 110/220 50-60Hz
HM-1220.XX	1	Fixed Ring Consolidation Cell
HM-4469.10	1	Digital Indicator 1" x .0001" (25 x 0.002 mm)
HM-4469C	1	Data Cable for Indicator
HM-2330D.3F	1	MiniLogger 4 CH Digital Data Acquisition
HM-1100SW	1	HMTS Consolidation Reporting Software

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested.

For Consolidation samples, sizes are: .20 = 2.0"; .242 = 2.42"; .25 = 2.5"; .30 = 3.0"; .40 = 4.0"; .50 = 50mm; .70 = 70mm; .75 = 75mm, and .100 = 100mm.

HM-1100SW HMTS Reporting Software and the ConMatic

The ConMatic includes the Advanced, Module level of the Humboldt Material Testing Software (HMTS), which provides a complete solution for the acquisition, recording and presentation of test data, as well as controlling testing operations when used in conjunction with compatible Humboldt testing equipment. Using the HM-1100SW Advanced Module of the HMTS software in conjunction with the ConMatic provides a complete automatic solution for consolidation testing. The HMTS controls the test functions and automatically records data while also displaying it in real-time tables and graphs. Technicians can be freed-up for other duties with the assurance that all test data is being collected and saved.



HM-2432A.3F

Features include:

- Highly sensitive and accurate in lower load ranges
- Integral digital readout simplifies checking applied load and setup of predetermined load
- Adjustable upper cross beam
- Instantaneous loading without impact
- Flexible load choice
- Not sensitive to shock
- Choice of English or Metric models



HM-2432A.3F with HM-1220.25, HM-2310.10, HM-2310BR and HM-2325A.3F



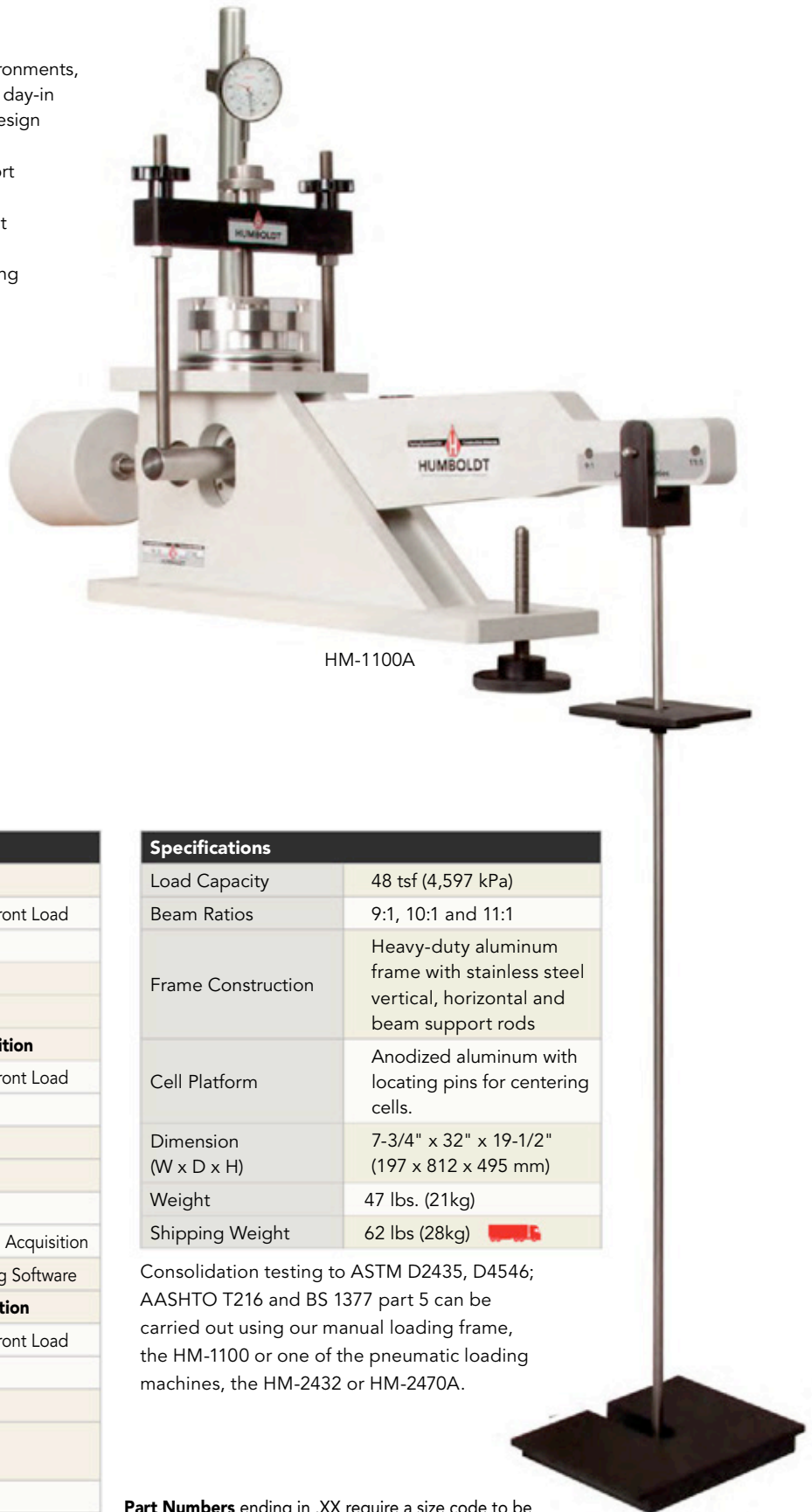
HM-2432A.3F with HM-1220.25, HM-4469C, HM-4469.10 and HM-2330D.3F

Dead-Weight Consolidation Frame— HM-1100A

Able to survive in even the harshest laboratory environments, the HM-1100A will provide you with reliable service day-in and day-out. The design features a rugged frame design manufactured from aluminum with stainless steel vertical rods, horizontal cross arms and beam support rods. The load arm incorporates 9:1, 10:1, and 11:1 beam ratios for greater flexibility and loading weight requirements. Using the 10:1 ratio on 2.5" (63 mm) diameter samples, the system is capable of producing load up to 48 tsf (4,597 kPa).

Features include:

- Triple beam ratios minimize loading weight requirements
- 48 tsf (5,148 kPa) maximum load capacity
- Aluminum and stainless steel construction for corrosion resistance and long life
- Wide range of consolidation cells available in fixed ring, floating ring, permeability and backpressure designs
- Loading weights available in both, tsf and kg versions
- Available with standard mechanical dial gauges, digital indicators or with strain transducers (LSCT) coupled to one of our data loggers



HM-1100A

Consolidation (Dead Weight) Typical Setups:

Part #	Qty	Description
Dead Weight Consolidation		
HM-1100A	1	Dead Weight Consol Frame-Front Load
HM-1120*	1	Weight Set, 16 TSF
HM-1220.XX	1	Fixed Ring Consolidation Cell
H-4471CC	1	Dial Gauge, 0.5" X .0001" CC
Dead Weight Consolidation w/ Analog Data Acquisition		
HM-1100A	1	Dead Weight Consol Frame-Front Load
HM-1120*	1	Weight Set, 16 TSF
HM-1220.XX	1	Fixed Ring Consolidation Cell
HM-2310.04	1	Strain Transducer 0.4" (10mm)
HM-2310BR	1	Strain Transducer Bracket
HM-2325A.3F	1	MiniLogger 4 CH Analog Data Acquisition
HM-1100SW	1	HMTS Consolidation Reporting Software
Dead Weight Consolidation w/ Digital Data Acquisition		
HM-1100A	1	Dead Weight Consol Frame-Front Load
HM-1120*	1	Weight Set, 16 TSF
HM-1220.XX	1	Fixed Ring Consolidation Cell
HM-4469.10	1	Digital Indicator 1" x .0001" (25 x 0.002 mm)
HM-4469C	1	Data Cable for Indicator
HM-2330D.3F	1	MiniLogger 4 CH Digital Data Acquisition
HM-1100SW	1	HMTS Consolidation Reporting Software

Specifications

Load Capacity	48 tsf (4,597 kPa)
Beam Ratios	9:1, 10:1 and 11:1
Frame Construction	Heavy-duty aluminum frame with stainless steel vertical, horizontal and beam support rods
Cell Platform	Anodized aluminum with locating pins for centering cells.
Dimension (W x D x H)	7-3/4" x 32" x 19-1/2" (197 x 812 x 495 mm)
Weight	47 lbs. (21kg)
Shipping Weight	62 lbs (28kg)

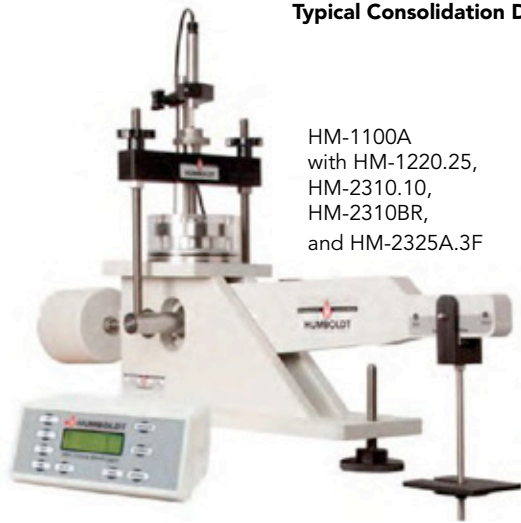
Consolidation testing to ASTM D2435, D4546; AASHTO T216 and BS 1377 part 5 can be carried out using our manual loading frame, the HM-1100 or one of the pneumatic loading machines, the HM-2432 or HM-2470A.

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested.

For Consolidation samples, sizes are: .20 = 2.0"; .242 = 2.42"; .25 = 2.5"; .30 = 3.0"; .40 = 4.0"; .50 = 50mm; .70 = 70mm; .75 = 75mm, and .100 = 100mm.

*For Metric applications, use HM-1122, Weight Set, 32kg.

Typical Consolidation Data Acquisition Setups Using Humboldt MiniLoggers



HM-1100A
with HM-1220.25,
HM-2310.10,
HM-2310BR,
and HM-2325A.3F



HM-1100A
with HM-1220.25,
HM-4469C, HM-4469.10
and HM-2330D.3F

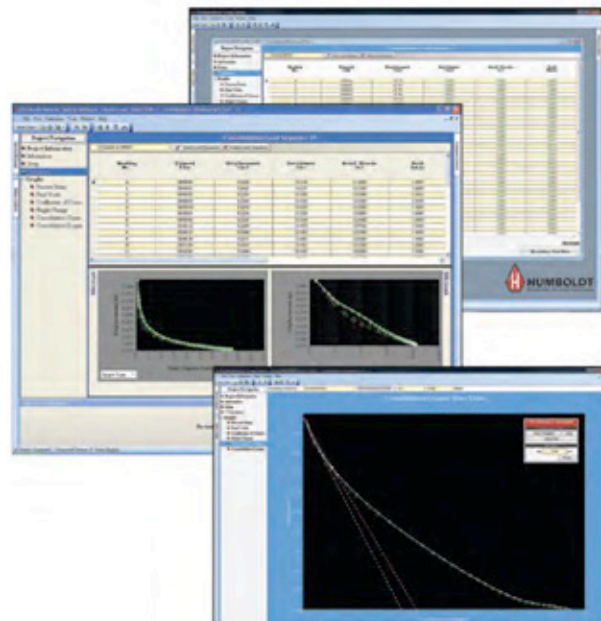
HMTS Reporting Software, Consolidation Module— HM-1100SW

Humboldt Material Testing Software (HMTS) provides a complete solution for the acquisition, recording and presentation of test data, as well as controlling testing operations when used in conjunction with compatible Humboldt testing equipment. HMTS works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel.

The Consolidation Module provides a simple, test-specific interface to control Consolidation test operations and automatically record data while also displaying it in real-time tables and graphs. Technicians can be freed-up for other duties with the assurance that all test data is being collected and saved.

- Test Information is stored, and all calculations are performed automatically
- Live tests and live graphing capabilities (real-time)
- Complete test report including all calculations and graphs required for testing
- Review and export tests using Microsoft Excel

See page 84 and 85 for more information on HMTS software.



Single-Station Frame Stand— HM-1100.1
Triple-Station Frame Stand— HM-1100.3

Butcher Block Table-top with heavy-duty, steel frame designed to provide stable mounting platform for HM-1100A Consolidation frames. Consolidation frames can be bolted to table top and table can be bolted to floor for increased stability.

Single: Shipping wt. 50 lbs. (23kg)

Triple: Shipping wt. 75 lbs. (34kg)

Fixed Ring Consolidation Cell—

Complete cell assembly features stainless steel construction and self-trimming cutter ring. Cutter ring rests inside clamping ring on lower porous stone, which is larger than the sample. The top porous stone and loading pad rest on the sample. The assembly is fixed on the cell base and enclosed within an acrylic cylinder open to the atmosphere, which permits saturation of the sample. The cell comes complete with all the parts illustrated in the drawing below.



Fixed Ring Consolidation Cell	
2.0"	HM-1220.20
2.42"	HM-1220.242
2.5"	HM-1220.25
3.0"	HM-1220.30
4.0"	HM-1220.40
50mm	HM-1220.50
70mm	HM-1220.70
75mm	HM-1220.75
100mm	HM-1220.100

Floating Ring Consolidation Cell—

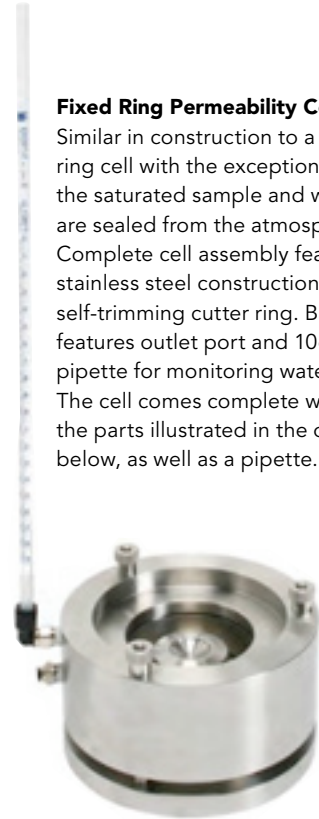
Complete cell assembly features stainless steel construction with self-trimming cutter ring. Similar in construction to a fixed ring cell with the exception that the lower porous stone fits inside the cutter ring and can move vertically within it. The sample ring is also free to move vertically. The cell comes complete with all the parts illustrated in the drawing below.



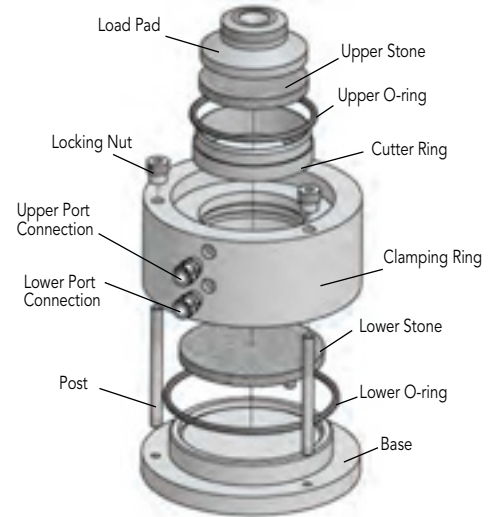
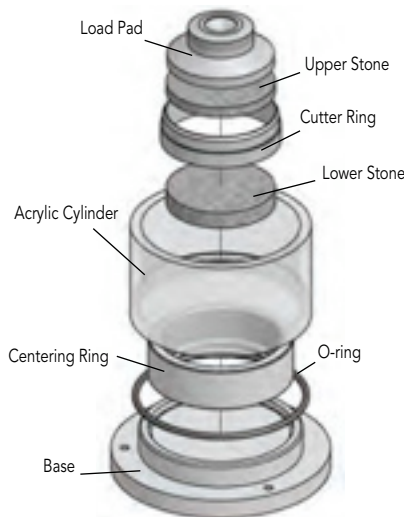
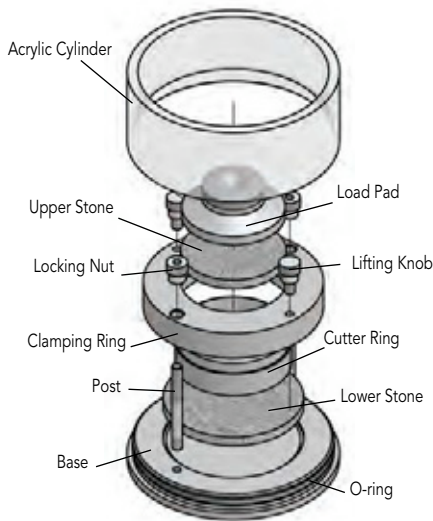
Floating Ring Consolidation Cell	
2.0"	HM-1210.20
2.42"	HM-1210.242
2.5"	HM-1210.25
3.0"	HM-1210.30
4.0"	HM-1210.40
50mm	HM-1210.50
70mm	HM-1210.70
75mm	HM-1210.75
100mm	HM-1210.100

Fixed Ring Permeability Cell—

Similar in construction to a fixed ring cell with the exception that the saturated sample and water are sealed from the atmosphere. Complete cell assembly features stainless steel construction and self-trimming cutter ring. Base features outlet port and 10cc pipette for monitoring water level. The cell comes complete with all the parts illustrated in the drawing below, as well as a pipette.



Fixed Ring Permeability Cell	
2.0"	HM-1230.20
2.42"	HM-1230.242
2.5"	HM-1230.25
3.0"	HM-1230.30
4.0"	HM-1230.40
50mm	HM-1230.50
70mm	HM-1230.70
75mm	HM-1230.75
100mm	HM-1230.100



Consolidation Cell Components

	2.0"	2.42"	2.5"	3.0"	4.0"	50mm	70mm	75mm	100mm
Load Pad (All)	HM-1220.20.10	HM-1220.24.10	HM-1220.25.10	HM-1220.30.10	HM-1220.40.10	HM-1220.50.10	HM-1220.70.10	HM-1220.75.10	HM-1220.100.10
Upper Stone (All)	HM-4184.1985	HM-4184.240	HM-1220.25.11* HM-4184.2485	HM-4184.2985	HM-4184.3985	HM-4184.1955	HM-4184.274	HM-4184.2940	HM-4184.3925
Lower Stone (Floating)	HM-4184.1985	HM-4184.240	HM-4184.2485	HM-4184.2985	HM-4184.3985	HM-4184.1955	HM-4184.274	HM-4184.2940	HM-4184.3925
Lower Stone (Fixed & Permability)	HM-4184.331	HM-4184.331	HM-4184.331	HM-4184.331	HM-4184.4375T	HM-4184.331	HM-4184.331	HM-4184.331	HM-4184.4375T
Acrylic Cylinder (Fixed)	HM-1220.25.2	HM-1220.25.2	HM-1220.25.2	HM-1220.25.2	HM-1220.40.2	HM-1220.25.2	HM-1220.25.2	HM-1220.25.2	HM-1220.40.2
Acrylic Cylinder (Floating)	HM-1210.25.2	HM-1210.25.2	HM-1210.25.2	HM-1210.25.2	HM-1210.40.2	HM-1210.25.2	HM-1210.25.2	HM-1210.25.2	HM-1210.40.2
Centering Ring (Floating)	HM-1210.20.12	HM-1210.24.12	HM-1210.25.12	HM-1210.30.12	HM-1210.40.12	HM-1210.50.12	HM-1210.70.12	HM-1210.75.12	HM-1210.100.12
Clamping Ring (Permability)	HM-1230.20.9	HM-1230.24.9	HM-1230.25.9	HM-1230.30.9	HM-1230.40.9	HM-1230.50.9	HM-1230.70.9	HM-1230.75.9	HM-1230.100.9
Clamping Ring (Fixed)	HM-1220.20.9	HM-1220.24.9	HM-1220.25.9	HM-1220.30.9	HM-1220.40.9	HM-1220.50.9	HM-1220.70.9	HM-1220.75.9	HM-1220.100.9
Base (Floating & Permability)	HM-1230.25.1	HM-1230.25.1	HM-1230.25.1	HM-1230.25.1	HM-1230.40.1	HM-1230.25.1	HM-1230.25.1	HM-1230.25.1	HM-1230.40.1
Base (Fixed)	HM-1220.25.1	HM-1220.25.1	HM-1220.25.1	HM-1220.25.1	HM-1220.40.1	HM-1220.25.16	HM-1220.25.1	HM-1220.25.1	HM-1220.40.1
Cutter Ring (All)	HM-1220.20.8	HM-1220.24.8	HM-1220.25.8	HM-1220.30.8	HM-1220.40.8	HM-1220.50.8	HM-1220.70.8	HM-1220.75.8	HM-1220.100.8
Lower O-ring (Floating & Permability)	HM-003053	HM-003053	HM-003053	HM-003053	HM-003056	HM-003053	HM-003053	HM-003053	HM-003056
Lower O-ring (Fixed)	HM-003052	HM-003052	HM-003052	HM-003052	HM-003024	HM-003052	HM-003052	HM-003052	HM-003024
Upper O-ring (Permability)	HM-003057	HM-003058	HM-003054	HM-003059	HM-003060	HM-003057	HM-003061	HM-003062	HM-003063
Post (All)	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3	HM-1220.25.3
Locking Nut (All)	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5	HM-1220.25.5
Lifting Knob (All)	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6	HM-1220.25.6
Port Connection Upper (Permability)	HM-003027	HM-003027	HM-003027	HM-003027	HM-003027	HM-003027	HM-003027	HM-003027	HM-003027
Port Connection Lower (Permability)	HM-003055	HM-003055	HM-003055	HM-003055	HM-003055	HM-003055	HM-003055	HM-003055	HM-003055
Filter Paper	HM-4189.20	HM-4189.25	HM-4189.25	HM-4189.30	HM-4189.40	HM-4189.20	HM-4189.28	HM-4189.30	HM-4189.40
Calibration Disk	HM-1220.20.4	HM-1220.24.4	HM-1220.25.4	HM-1220.30.4	HM-1220.40.4	HM-1220.50.4	HM-1220.70.4	HM-1220.75.4	HM-1220.100.4

*this stone has a threaded stud; order HM-4184.2485 if no stud is desired.

Individual Weights and Sets—							
TSF Weight	0.125 (1/8)	0.25 (1/4)	0.50 (1/2)	1.0	2.0	4.0	
Model No.	HM-1120.125	HM-1120.250	HM-1120.500	HM-1120.1	HM-1120.2	HM-1120.4	
KGF Weight	0.5 kg	1.0 kg	2.0 kg	4.0 kg	5.0 kg	8.0 kg	10.0 kg
Model No.	HM-1122.05	HM-1122.1	HM-1122.2	HM-1122.4	HM-1122.5	HM-1122.8	HM-1122.10



Weight Set	Set Includes	Model No.	Shpg. Wt.
16 TSF Set	includes: (2) .125 TSF, (1) .25 TSF, (1) .50 TSF, (1) 1.0 TSF, (1) 2.0 TSF, (3) 4.0 TSF weights	HM-1120	Shipping wt. 140 lbs. (64kg)
32 TSF Set	includes: (2) .125 TSF, (1) .25 TSF, (1) .50 TSF, (1) 1.0 TSF, (1) 2.0 TSF, (7) 4.0 TSF weights	HM-1121	Shipping wt. 275 lbs. (125kg)
32 kgf Set	includes: (4) 1 kg, (3) 4 kg, (2) 8 kg weights	HM-1122	Shipping wt. 130 lbs. (59kg)
50 kgf Set	includes: (3) 1 kg, (1) 2 kg, (1) 5 kg, (4) 10 kg weights	HM-1125	Shipping wt. 110 lbs. (50kg)
64 kgf Set	includes: (4) 1 kg, (5) 4 kg, (5) 8 kg weights	HM-1123	Shipping wt. 110 lbs. (50kg)
88 kgf Set	includes: (4) 1 kg, (5) 4 kg, (8) 8 kg weights	HM-1124	Shipping wt. 130 lbs. (59kg)

NEW!

Counter-balance device for ASTM D3080 compliance. Not available anywhere else. Also available as a retrofit kit. HM-2560A.1



HM-2560A.3F

Features include:

- Four channels with real-time data acquisition
- Backlit LCD display
- RS232 interface for computer or printer.
- Nonvolatile test data storage and instrument calibration
- Can be programmed to complete up to 99 shearing cycles automatically using HM-2700SW Software.
- Battery-backed real-time clock
- Auto conversation of instrument calibration between English or Imperial units and SI or metric units
- Test setup and selection via keypad
- Automatic triggering of test logging data
- View logged test data via the LCD display
- Logging rate as fast as 0.1 second/reading
- Humboldt HMTS, Basic, User-Defined Level software included for data acquisition

**Pneumatic Direct/Residual Shear Apparatus,
110/220 VAC 50/60Hz— HM-2560A.3F**

The Humboldt 25Sixty Shear, Direct/Residual Shear Apparatus, utilizes the pneumatic loading concept for applying the vertical load to the sample. In doing so, this self-contained model eliminates the need for cumbersome loading weights used in dead weight-type systems.

The microprocessor-based system features a stepper motor drive system, large display, touch-sensitive keypad and forward/reverse travel limit switches. Through the use of a built-in 4-channel data acquisition system, the operator can preset the logging condition for the test.

Built to last in the harshest laboratory environments, the vertical/horizontal loading mechanism and shear box assembly are mounted on a 1.25" (30mm) thick solid aluminum base and heavy-gage enamel painted steel cabinet. The strain rods are manufactured from stainless steel and the shearbox carriage (water chamber) is constructed of anodized cast aluminum for corrosion resistance and long service life. The shearbox is constructed of anodized aluminum for light weight.

The HM-2560A is supplied complete with a 2,000 lbf (10kN) capacity load cell, 1" (25.4mm) horizontal strain transducer, 0.4" (10.2mm) vertical strain transducer and a built-in 4-channel analog data acquisition system. Shearbox assemblies and related accessories are not included and must be ordered separately. Complies with ASTM D3080, AASHTO T236 and BS1377:7 standards.

Replacement Ball, 5/8" 440 Stainless Steel— HM-001076

Specifications

Horiz. Movement	2" (50mm) maximum
Horiz. Shear Force	2,000 lbf (10kN)
Vertical Load	2,000 lbf (10kN)
Speed Range	0.00001 to 0.49999 in/min. (0.00001 to 12.99999 mm/min.)
Voltage	110/220 VAC 50/60HZ
Current	6.5 Amps
Analog to Digital	16 bit
Data Storage	4000 Readings
Data Collection Rate	100 ms
Computer Port	RS232
Dimension (W x D x H)	30 x 15.5 x 22" (L x D x H) (760 x 394 x 558mm)
Weight	140 lb (64 kg)
Shipping Weight	168 lb (76 kg)

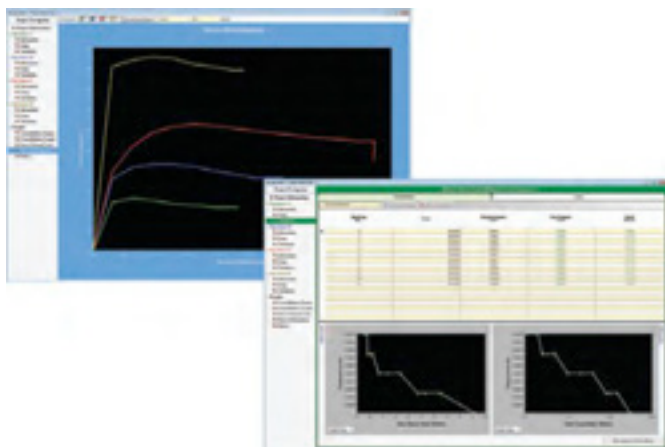
Pneumatic Direct/Residual Shear Typical Setup:

Part #	Qty	Description
Pneumatic, Computer Control w/ Analog Instrumentation		
HM-2560A.3F	1	25Sixty Shear w/ Analog Inputs
HM-2701.XX(S/D)	1	Shearbox Assembly
HM-2702.XX(S/D)	1	Shearbox Cutter
HM-2703.XX(S/D)	1	Dolly/Tamper
HM-2700SW	1	HMTS Direct Shear Reporting Software

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested.

For Direct/Residual Shear samples, sizes are: .20 = 2.0"; .242 = 2.42"; .25 = 2.5"; .40 = 4.0"; .50 = 50mm; .60 = 60mm, and .100 = 100mm.

NOTE: For Direct/Residual Shear, also, use "S" for square and "D" for round samples.



HM-2703.60S



HM-2704.60S

Accessory	Model
Cutter	HM-2702.XXS/D
Dolly Tamper	HM-2703.XXS/D
Porous Plate	HM-2704.XXS/D
Calibration Disk, Square	HM-2705.XXS
Calibration Disk, Round	HM-1220.XX.4

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested.

For Direct/Residual Shear samples, sizes are: .20 = 2.0"; .24 = 2.42"; .25 = 2.5"; .40 = 4.0"; .50 = 50mm; .60 = 60mm, and .100 = 100mm.

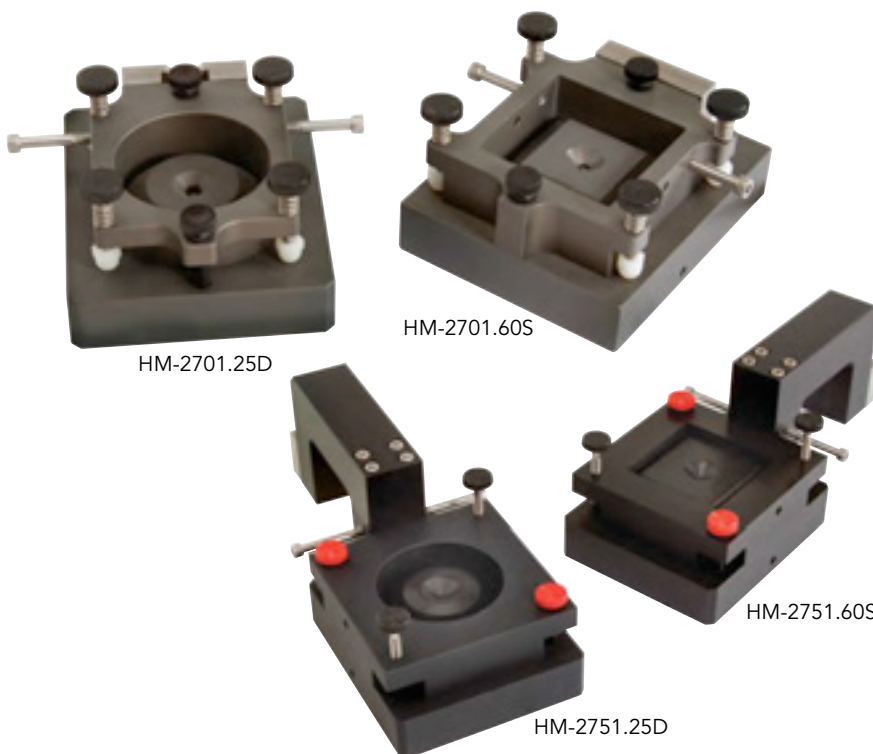
NOTE: For Direct/Residual Shear, also, use "S" for square and "D" for round samples.

HMTS Reporting Software, Direct/Residual Shear Module— HM-2700SW

Humboldt Material Testing Software (HMTS) provides a complete solution for the acquisition, recording and presentation of test data, as well as controlling testing operations when used in conjunction with compatible Humboldt testing equipment. HMTS works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel. The Direct/Residual Shear Module provides a simple, test-specific interface to control Shear test operations and automatically record data while also displaying it in real-time tables and graphs. Technicians can be freed-up for other duties with the assurance that all test data is being collected and saved.

- Test Information is stored, and all calculations are performed automatically
- Live tests and live graphing capabilities (real-time)
- Complete test report including all calculations and graphs required for testing
- Review and export tests using Microsoft Excel

See page 84 and 85 for more information on HMTS software.



HM-2701.25D

HM-2701.60S

HM-2751.60S

HM-2751.25D

Shearbox Assemblies for use with HM-2560A.3F and HM-2750.3F Direct Shear Machines

Round Shearbox Assemblies		
Use with:	HM-2560A.3F	HM-2750.3F
Size	Model	Model
2.0"	HM-2701.20D	HM-2751.20D
2.42"	HM-2701.24D	HM-2751.24D
2.5"	HM-2701.25D	HM-2751.25D
4.0"	HM-2701.40D	HM-2751.40D
50mm	HM-2701.50D	HM-2751.50D
60mm	HM-2701.60D	HM-2751.60D
100mm	HM-2701.100D	HM-2751.100D

Square Shearbox Assemblies		
Use with:	HM-2560A.3F	HM-2750.3F
Size	Model	Model
2.0"	HM-2701.20S	HM-2751.20S
2.42"	HM-2701.24S	HM-2751.24S
2.5"	HM-2701.25S	HM-2751.25S
4.0"	HM-2701.40S	HM-2751.40S
50mm	HM-2701.50S	HM-2751.50S
60mm	HM-2701.60S	HM-2751.60S
100mm	HM-2701.100S	HM-2751.100S

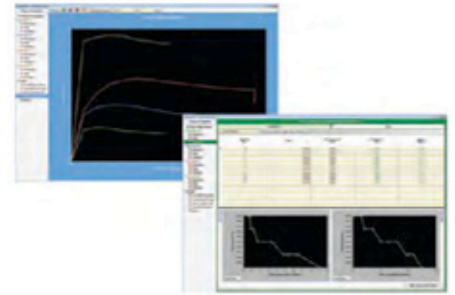
Shearbox Assemblies include: Sample Box, (2) Porous Plates, (1) Loading Pad, and (1) Grid Plate. All Shearboxes feature mounting screws for use with the HM-2750 ASTM D3080-compliant counter-balance device.



HM-2750A.3F

NEW!

Counter-balance device for ASTM D3080 compliance. Not available anywhere else. Also available as a retrofit kit. HM-2560A.1


HMTS Reporting Software, Direct/Residual Shear Module— HM-2700SW

The Direct/Residual Shear Module provides a simple, test-specific interface to control Shear test operations and automatically record data while also displaying it in real-time tables and graphs. See page 84 and 85 for more information.

Models A and D Feature:

- Backlit LCD display
- Nonvolatile test data storage and instrument calibration
- Battery-backed real-time clock
- Auto conversation of instrument calibration between English or Imperial units and SI or metric units
- Test setup and selection via keypad
- Automatic triggering of test logging data
- View logged test data via the LCD display
- Logging rate as fast as 0.1 second/reading
- Four channels with real-time data acquisition
- RS-232 interface for computer or printer.
- Humboldt HMTS, Basic, User-Defined Level software included for data acquisition

Direct/Residual Shear, Standard Controller, 120/220V 50/60Hz— HM-2750.3F**Metric, Direct/Residual Shear, Standard Controller, 120/220V 50/60Hz— HM-2750M.3F****Direct/Residual Shear, Analog Controller, 120/220V 50/60Hz— HM-2750A.3F****Direct/Residual Shear, Digital Controller, 120/220V 50/60Hz— HM-2750D.3F**

The Humboldt HM-2750 Series Direct/Residual Shear Machines are an economical choice for performing direct/residual shear tests utilizing the deadweight method. The HM-2750s come in three different configurations: a standard controller model with load rings and dial gauges; a controller with four analog instrumentation channel inputs, an RS-232 Port and RS-485 Input and Output, including the necessary analog transducers; and, a controller with four Digital instrumentation channel inputs, an RS-232 Port and RS-485 Input and Output, including the necessary digital indicators.

All models include the carriage, stand, vertical load hanger and a balanced lever loading arm with a 10:1 ratio that reduces the weight required to perform tests. The microprocessor-based system features a stepper motor drive system, large display, touch-sensitive keypad and forward/reverse travel limit switches.

All models allow for rapid and easy manual adjustment of shearing force speed rates. The maximum shear force is 2000 lbf (10kN), and, the maximum consolidation force is 2000 lbf (10kN). The carriage accepts shear box squares up to 4.0" (100mm) internal dimension. Forward and reverse measurements permit residual shear testing as standard. A built-in safety feature prevents the overloading of the load measuring system. Complies with ASTM D3080, AASHTO T236 and BS1377:7 standards.

Specifications

Horiz. Movement	2" (50.mm) maximum
Horiz. Shear Force	2,000 lbf (10kN)
Vertical Load	2,000 lbf (10kN)
Speed Range	0.00001 to 0.49999 in/min. (0.00001 to 12.99999 mm/min.)
Voltage	110/220 VAC 50/60HZ
Current	6.5 Amps
Analog to Digital	16 bit
Data Storage	4000 Readings
Data Collection Rate	100 ms
Computer Port	RS232
Dimension (W x D x H)	40 x 10 x 45" (L x D x H) (1016 x 254 x 1143mm)
Weight	230 lbs.
Shipping Weight	288lb (131kg)

Model Configurations

Dead Weight with Manual Control		
Description	Qty	Part #
Direct Residual Shear Apparatus 10:1	1	HM-2750.3F
Shearbox Assembly	1	HM-2751.XX (S/D)
Shearbox Cutter	1	HM-2702.XX (S/D)
Dolly/Tamper	1	HM-2703.XX (S/D)
Weight Set, 16 TSF	1	HM-1120*

Typical setup for HM-2750.3F for Metric version
HM-2750M.3F the dial indicators are in mm



HM-2750.3F
HM-2750M.3F

Dead Weight w/ Analog Transducer Data Acquisition		
Description	Qty	Part #
Direct Shear w/ Analog Inputs	1	HM-2750A.3F
Shearbox Assembly	1	HM-2751.XX(S/D)
Shearbox Cutter	1	HM-2702.XX(S/D)
Dolly/Tamper	1	HM-2703.XX(S/D)
Weight Set, 16 TSF	1	HM-1120*
HMTS Direct Shear Reporting Software	1	HM-2700SW



HM-2750A.3F

Dead Weight, w/ Digital Gauge Data Acquisition		
Description	Qty	Part #
Direct Shear w/ Digital Inputs	1	HM-2750D.3F
Shearbox Assembly	1	HM-2751.XX (S/D)
Shearbox Cutter	1	HM-2702.XX (S/D)
Dolly/Tamper	1	HM-2703.XX (S/D)
Weight Set, 16 TSF	1	HM-1120*
HMTS Direct Shear Reporting Software	1	HM-2700SW



HM-2750D.3F

Replacement Ball, 5/8" 440 Stainless Steel— HM-001076

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested.

For Direct/Residual Shear samples, sizes are: .20 = 2.0"; .242 = 2.42"; .25 = 2.5"; .40 = 4.0"; .50 = 50mm; .60 = 60mm, and .100 = 100mm.

NOTE: For Direct/Residual Shear, also, use "S" for square and "D" for round samples.

*For Metric applications, use HM-1122, Weight Set, 32kg.

Individual Weights and Sets—

TSF Weight	0.125 (1/8)	0.25 (1/4)	0.50 (1/2)	1.0	2.0	4.0	
Model No.	HM-1120.125	HM-1120.250	HM-1120.500	HM-1120.1	HM-1120.2	HM-1120.4	
KGF Weight	0.5 kg	1.0 kg	2.0 kg	4.0 kg	5.0 kg	8.0 kg	10.0 kg
Model No.	HM-1122.05	HM-1122.1	HM-1122.2	HM-1122.4	HM-1122.5	HM-1122.8	HM-1122.10

Weight Set	Set Includes	Model No.
16 TSF Set	includes: (2) .125 TSF, (1) .25 TSF, (1) .50 TSF, (1) 1.0 TSF, (1) 2.0 TSF, (3) 4.0 TSF weights	HM-1120
32 TSF Set	includes: (2) .125 TSF, (1) .25 TSF, (1) .50 TSF, (1) 1.0 TSF, (1) 2.0 TSF, (7) 4.0 TSF weights	HM-1121
32 kgf Set	includes: (4) 1 kg, (3) 4 kg, (2) 8 kg weights	HM-1122
50 kgf Set	includes: (3) 1 kg, (1) 2 kg, (1) 5 kg, (4) 10 kg weights	HM-1125
64 kgf Set	includes: (4) 1 kg, (5) 4 kg, (5) 8 kg weights	HM-1123
88 kgf Set	includes: (4) 1 kg, (5) 4 kg, (8) 8 kg weights	HM-1124



Humboldt Triaxial Testing Systems—

Humboldt provides an extensive line of triaxial testing equipment solutions for today's soil labs. At the heart of our triaxial testing equipment is the Humboldt Concept of providing a modular system of interchangeable, stand-alone components that when combined create highly-versatile systems. This modular concept allows you to easily create a custom solution for your needs, as well as having the ability of taking advantage of upgrades and new technology, while not being locked into an obsolete proprietary system.

Presented below and on the following pages are three triaxial systems based around our HM-3000 and HM-2900 load frames, our HMTS software with triaxial-specific software modules and three different pressure control solutions.

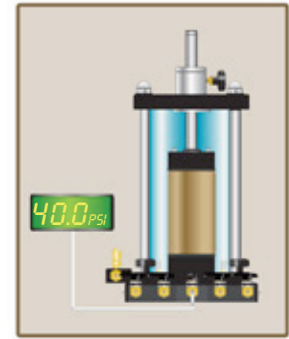
Automated Pressure Control Triaxial System—

Designed for those who want the ultimate in control of their triaxial testing, Humboldt's Automated Pressure Control Triaxial System is a computer-controlled system specifically designed for soil testing laboratories conducting UU, CU and CD Triaxial tests, as well as Unconfined Compression.

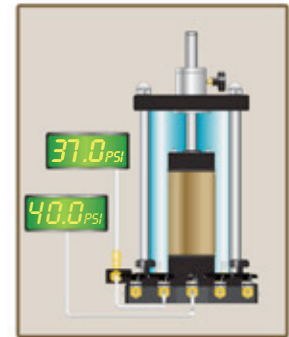
It is perfect for large, high-volume labs, as well as those who want to utilize technology to increase staff efficiencies and testing accuracy. This system provides complete control of the testing process including data acquisition.

Available in one or three-cell configurations, our automated control panels can handle your testing needs in stride. And, if you want to increase the number of simultaneous tests you can run, Humboldt's HMTS software can easily handle a multitude of tests. All you need to do is add cells and the other appropriate equipment to handle your needs. With the HMTS you will be able to monitor up to 64 sensor signals from a single computer.

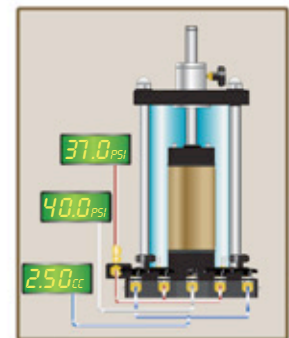
Humboldt's Automated Pressure Control Triaxial System is built around the HM-2450A Stand-alone Pressure Controller, our HMTS test-specific software, which monitors, controls and reports the test data, and, the highly-regarded HM-3000 Load Frame, with its built-in, 4-channel data acquisition for stress, strain, pore water pressure and volume change measurement. The system can



UU-Triaxial Test
Typical Cell Setup



CU-Triaxial Test
Typical Cell Setup



CD-Triaxial Test
Typical Cell Setup



also be configured for use with our Triaxial-specific Load Frame, the HM-2900. While Humboldt's Automated Pressure Control Triaxial System has been designed to work as a complete system, its make-up provides for the ultimate in versatility and expanded possibilities.

See pages 64-65 for a complete component list for the Automated Pressure Control Triaxial System

Manual Pressure Control Triaxial System—

Humboldt's Manual Pressure Control Triaxial System provides a manually-controlled alternative to our automated system. The manual system eliminates the HM-2450A.3F pressure controller from the system and replaces its function with a control panel that allows for manual control of the confining and back pressures.

Like the automated system, our manually-controlled system can run UU, CU and CD Triaxial tests, as well as Unconfined Compression. Manual control panels are available in one or three-cell configurations and can be used in multiple configurations. All you need to do is add cells and the other appropriate equipment to handle your needs. With the HMTS you will be able to accommodate up to 64 incoming signals from your computer.

Humboldt's Manual Pressure Control Triaxial System is built around our HMTS test-specific software, which monitors, controls and reports the test data, and, the highly-regarded HM-3000 Load Frame, with its built-in, 4-channel data acquisition for stress, strain, pore water pressure and volume change measurement. The system can also be configured for use with our Triaxial-specific

Load Frame, the HM-2900. While Humboldt's Manual Pressure Control Triaxial System has been designed to work as a complete system, its make-up provides for the ultimate in versatility and expanded possibilities.

See pages 66-67 for a complete component list for the Manual Pressure Control Triaxial System

FlexPanel Pressure Control Triaxial System—

Humboldt's FlexPanel pressure control option eliminates the use of the air/water bladder interface concept of pressure control in lieu of its highly-accurate burette system. FlexPanels have a set of three burettes for each triaxial cell. The three burettes connect to the cell, top cap and base pedestal. This extremely versatile pressure system controls the pressure, water, de-airing tank and vacuum from a single panel. The three burettes allow the control of the cell pressure and the back pressure for a single cell. They can monitor volume change in the sample and can be used to measure the flow of water through the sample for permeability testing.

The three-burette design can manually measure volume change or permeability in a triaxial test sample without the use of a volume change apparatus. This is a benefit of this pressure distribution panel over the air/water bladder system.

See pages 68-69 for a complete component list for the FlexPanel Pressure Control Triaxial System



Automatic Pressure Control

Component List for 1 and 3-Cell Triaxial System with Automatic Pressure Control

Automatic Pressure Control System, 1-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4154	1
Air/Water Bladder	HM-4151A	2
Pressure Controller	HM-2450A.3F	1
DeAiring System	HM-4187A.3F	1
Vacuum Pump	H-1763A.4F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	1
Strain Transducer, 1" (25mm)	HM-2310.10	1
LSCT/LVDT Mounting Bracket	HM-2310BR	1
Triaxial Cell (choose 1 below)		
3" / 75mm dia. capacity	HM-4199B	1
4" / 100mm dia. capacity	HM-4199B-4	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	1
Installation Kit	HM-4167	1

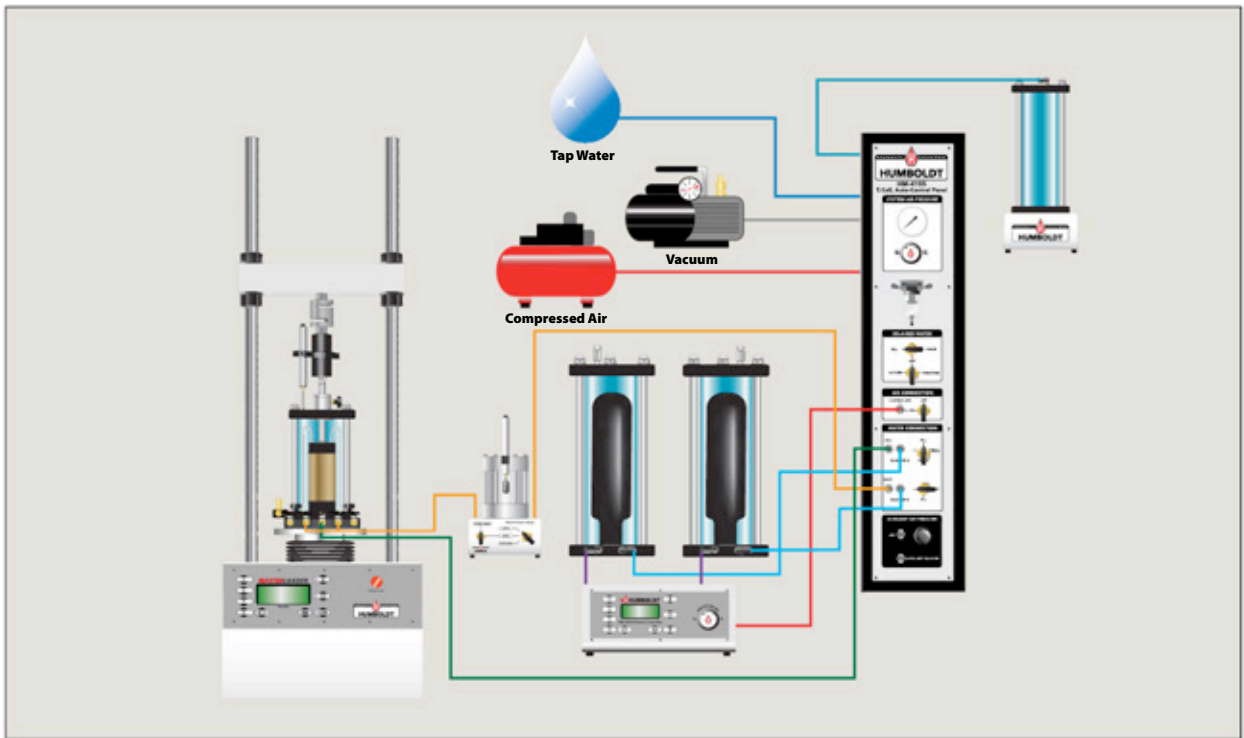
Automatic Pressure Control System, 3-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN(11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	3
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4155	1
Air/Water Bladder	HM-4151A	6
Pressure Controller	HM-2450A.3F	3
DeAiring System	HM-4187A.3F	1
Vacuum Pump	H-1763A.4F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	3
Strain Transducer, 1" (25mm)	HM-2310.10	3
LSCT/LVDT Mounting Bracket	HM-2310BR	3
Triaxial Cell (choose 1 below)		
3" / 75mm dia. capacity	HM-4199B	3
4" / 100mm dia. capacity	HM-4199B-4	3
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	3
Installation Kit	HM-4167	1

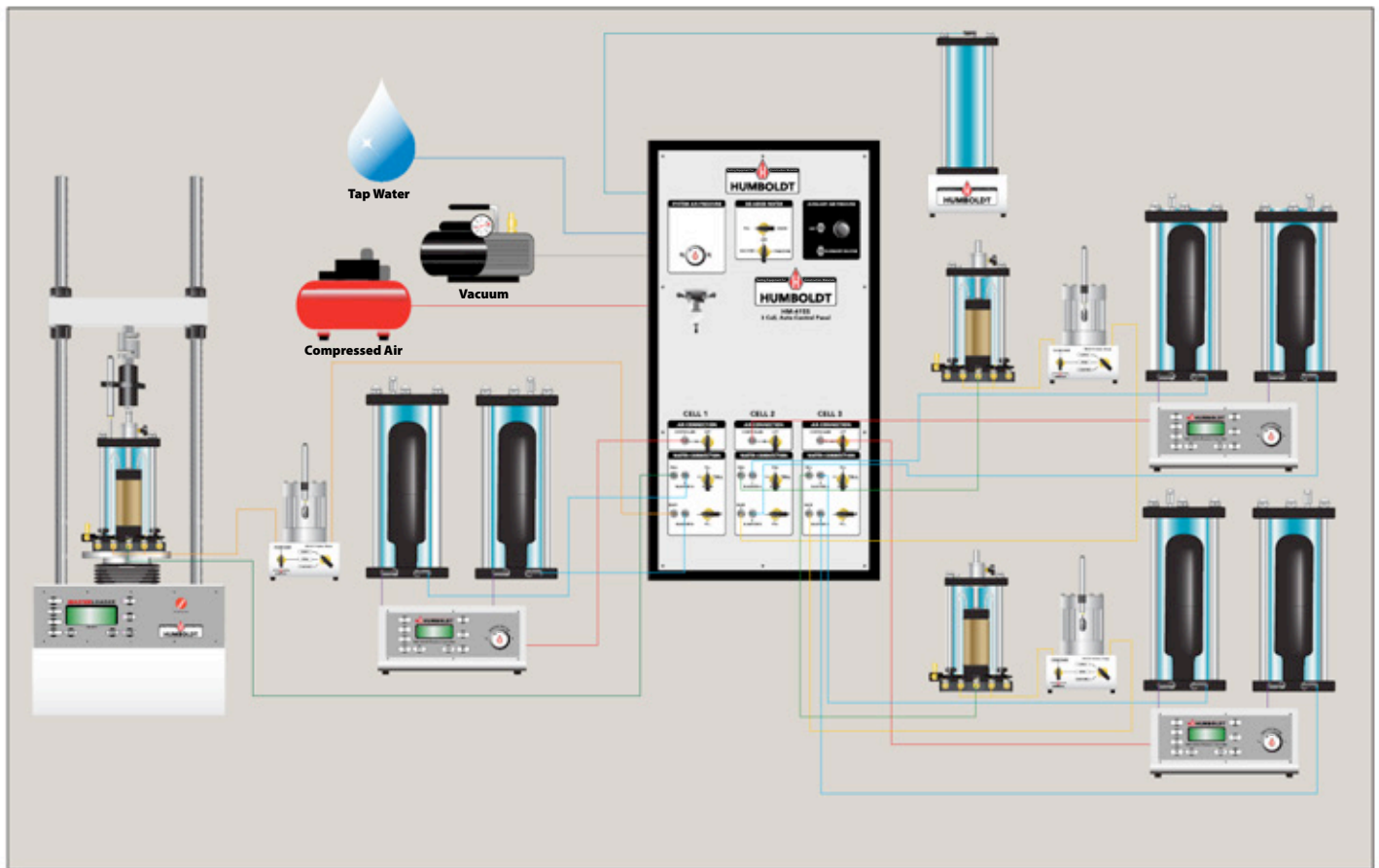
Standard Triaxial Sample Prep Accessories:

(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1	High Vacuum Grease	HM-4198	1



Automatic Pressure Control System, 1-Cell Setup



Automatic Pressure Control System, 3-Cell Setup

Manual Pressure Control

Component List for 1 and 3-Cell Triaxial System with Manual Pressure Control

Manual Pressure Control System, 1-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4164.3F	1
Air/Water Bladder	HM-4151A	2
DeAiring System	HM-4187A.3F	1
Pore Pressure Transducer	HM-4170	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	1
Strain Transducer, 1" (25mm)	HM-2310.10	1
LSCT/LVDT Mounting Bracket	HM-2310BR	1
Triaxial Cell (choose 1 below)		
3" / 75mm dia. capacity	HM-4199B	1
4" / 100mm dia. capacity	HM-4199B-4	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	1
Installation Kit	HM-4167	1

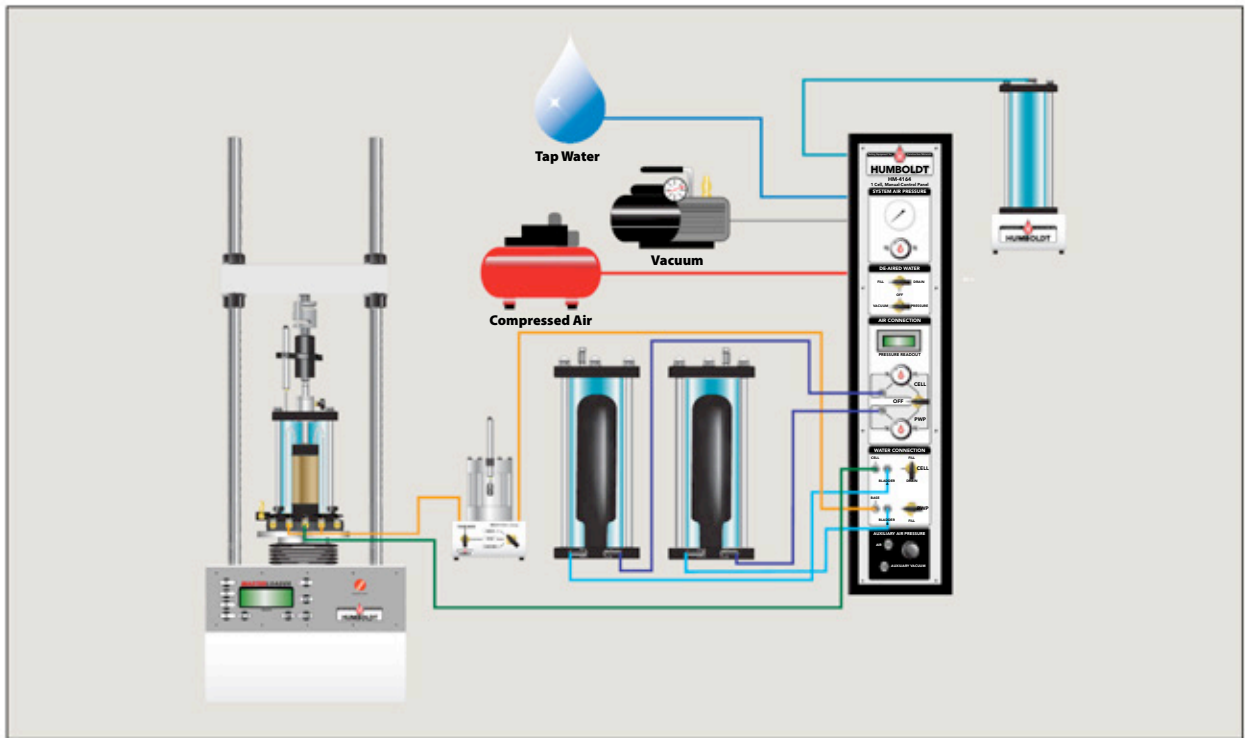
Manual Pressure Control System, 3-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
MiniLogger	HM-2325A.3F	1
Pressure		
Pressure Distribution Panel	HM-4165.3F	1
Air/Water Bladder	HM-4151A	6
DeAiring System	HM-4187A.3F	1
Pore Pressure Transducer	HM-4170	3
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	3
Strain Transducer, 1" (25mm)	HM-2310.10	3
LSCT/LVDT Mounting Bracket	HM-2310BR	3
Triaxial Cell (choose 1 below)		
3" / 75mm dia. capacity	HM-4199B	3
4" / 100mm dia. capacity	HM-4199B-4	3
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	3
Installation Kit	HM-4167	1

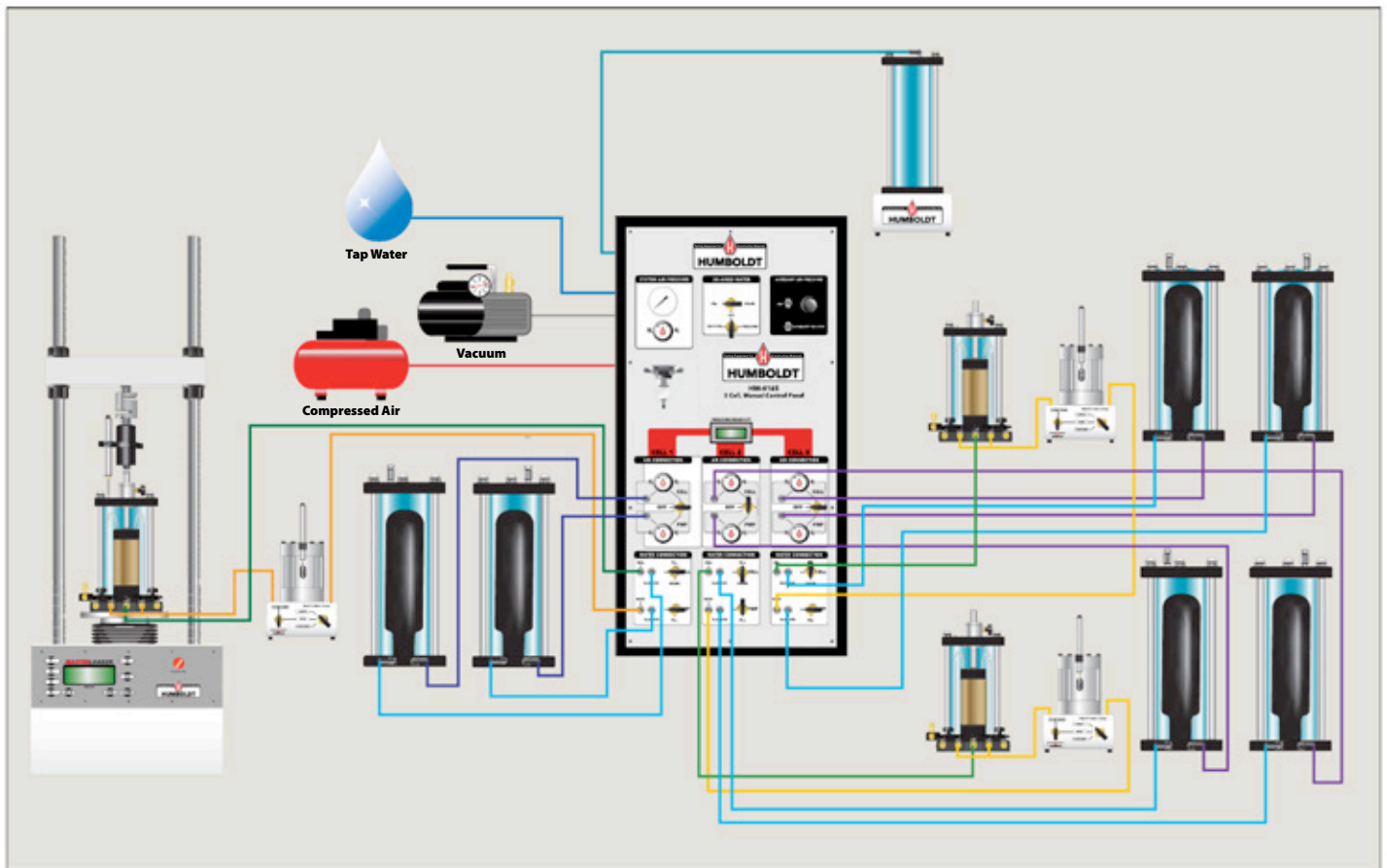
Standard Triaxial Sample Prep Accessories:

(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1	High Vacuum Grease	HM-4198	1



Manual Pressure Control System, 1-Cell Setup



Manual Pressure Control System, 3-Cell Setup

FlexPanels Pressure Control

Component List for 1 and 3-Cell Triaxial System with FlexPanel Pressure Control

FlexPanel Pressure Control System, 1-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4150.3F	1
DeAiring System	HM-4187A.3F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CD Triaxial)	HM-2315	1
Strain Transducer, 1" (25mm)	HM-2310.10	1
LSCT/LVDT Mounting Bracket	HM-2310BR	1
Triaxial Cell (choose 1 below)		
3" / 75mm dia. capacity	HM-4199B	1
4" / 100mm dia. capacity	HM-4199B-4	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	1
Installation Kit	HM-4167	1

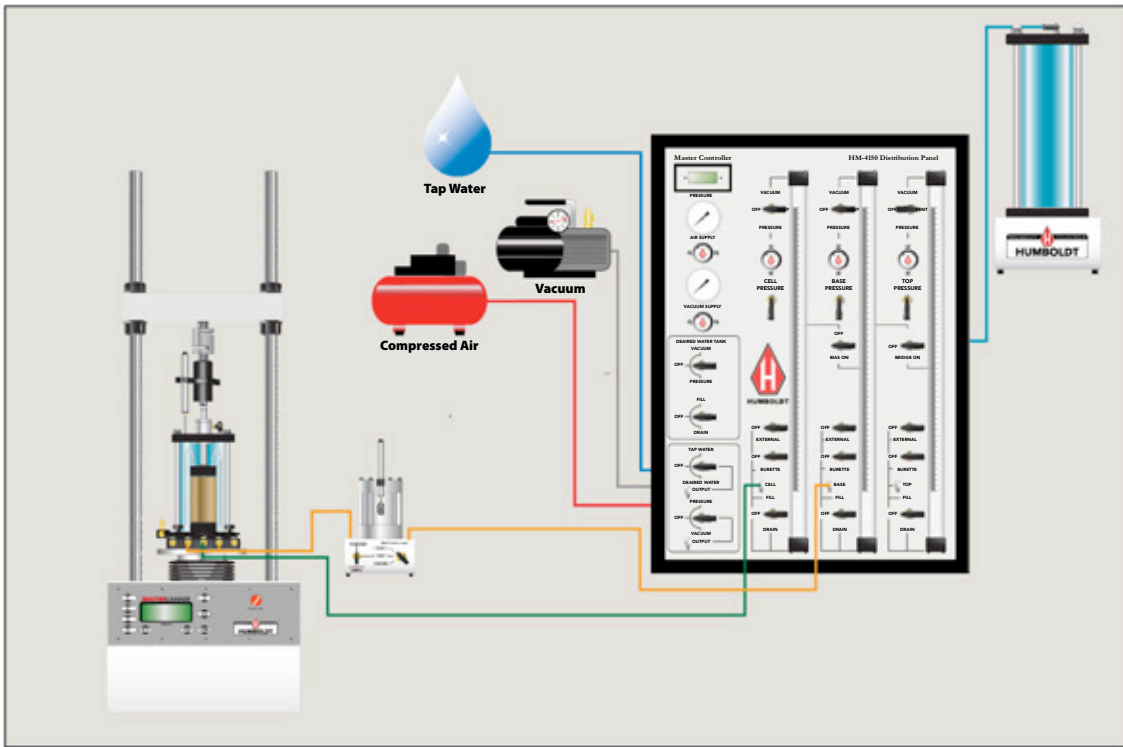
FlexPanel Pressure Control System, 3-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	3
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
MiniLogger	HM-2325A.3F	1
Pressure		
Pressure Distribution Panel	HM-4150.3F	1
Pressure Distribution Panel	HM-4160A	1
DeAiring System	HM-4187A.3F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CD Triaxial)	HM-2315	3
Strain Transducer, 1" (25mm)	HM-2310.10	3
LSCT/LVDT Mounting Bracket	HM-2310BR	3
Triaxial Cell (choose 1 below)		
3" / 75mm dia. capacity	HM-4199B	3
4" / 100mm dia. capacity	HM-4199B-4	3
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	3
Installation Kit	HM-4167	1

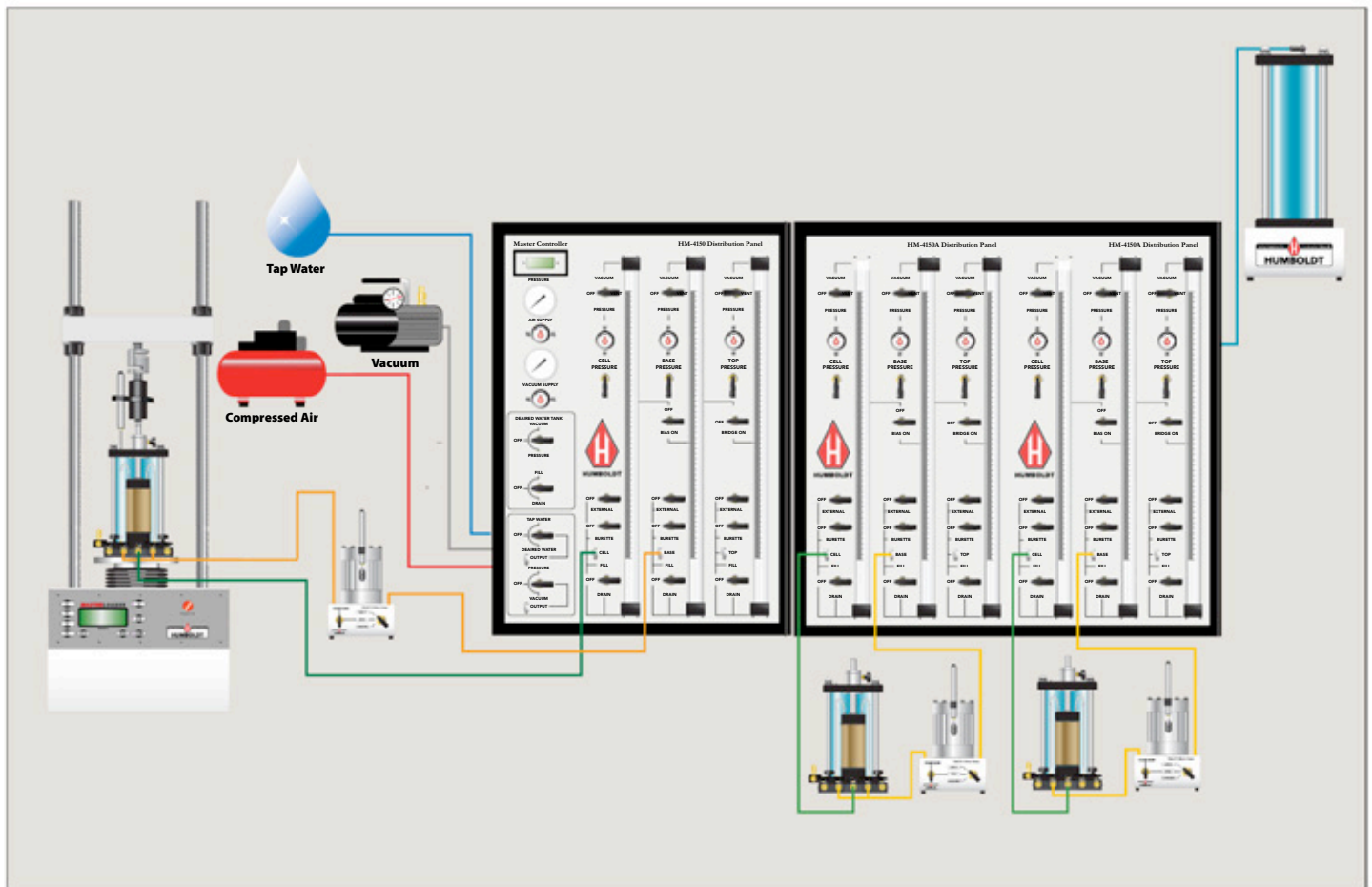
Standard Triaxial Sample Prep Accessories:

(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1	High Vacuum Grease	HM-4198	1



FlexPanel Pressure Control System, 1-Cell Setup



FlexPanel Pressure Control System, 3-Cell Setup



HM-3000.3F

Designed for applications requiring multi-purpose loading systems, such as road construction projects in either mobile or fixed labs, educational institutions and consulting firms, the HM-3000 MasterLoader is ideal for just about any application from road construction to high-volume commercial and educational laboratories.

While the HM-3000 has been specifically designed for soil testing labs conducting multiple testing operations including: UU, CU and CD triaxials, UC, CBR and LBR, it is also perfect for running Marshall and Hveem asphalt tests as well. With its built-in four-channel data logger, the HM-3000 can acquire data from load, strain, pore pressure and volume transducers. The data acquisition can be automated by setting trigger conditions to start and stop logging. Tests can be initiated or terminated automatically increasing lab productivity.

The MasterLoader is the most versatile load frame available today. As the flagship product in the Humboldt Concept, the HM-3000 provides an internal 4-channel data logger, which allows it to be used as a standalone device capable of full test control and datalogging. It also can be quickly integrated into a complete, computer-controlled lab system incorporating its internal data logger as a component of the complete system. Its heavy-duty design and precise stepper-motor control provides a stable platform for years of reliable service allowing it to perform any tests required up to its load capacity of 11000 lbf (50 kN).


Whether as standalone unit or as part of a computer-controlled system, the MasterLoader provides the user with fully-automatic test performance allowing unattended operation while controlling motor start/stop, speed selection and test data acquisition. Its modular design and its technical specifications allow the machine to be custom configured to handle almost any test your lab may require. In addition to its ability to link to a computer, the HM-3000 also provides the ability to daisy-chain multiple machines together as part of the system. Any Humboldt Concept test equipment, from other Load Frames to Consolidation and Shear Apparatus can use this linking feature to access the computer system and related software. Unused data ports on the MasterLoader's data logger can also be used to utilize other load cells or transducers to gain access to data logging capabilities. In addition, the HM-3000 also provides an analog output port, which can be used for output to an XYt chart recorder or similar items.

Features include:

- Four channels for real-time data acquisition
- Backlit LCD display
- RS232 interface for computer or printer.
- Nonvolatile test data and instrument calibration storage
- Battery-backed real-time clock
- Auto conversation of instrument calibration between English or Imperial units and SI or metric units
- Test setup and selection via keypad
- Automatic triggering of test logging data
- View logged test data via the LCD display
- Logging rate as fast as 0.1 second/reading
- Humboldt HMTS, Basic, User-Defined Level software included for data acquisition
- Capable of Stress and Strain Control

Covers: CBR, UU, CU, CD, UC, Marshall and Hveem Tests
 ASTM: D1883, D2850, D2166, D4767, and D1559
 AASHTO: T193, T296, T297, T208, T245, and T246
 BS 1377: Part 4: 1990, BS 1377: Part 7: 1990,
 BS 1377: Part 8: 1990, BS 598: Part 107

Specifications

Dimensions (l x w x h)	17 x 19 x 59 inch (430 x 480 x 1500mm)	Horizontal Clearance	15 inch (380mm)
Platen Size	10 inches (254mm)	Voltage	110/220 VAC 50/60Hz
Platen Travel	4 inches (100mm) Max.	Current	8.5 Amps
Net Weight	240 lbs. (110Kg)	Analog to Digital Converter	16 Bit
Shipping Weight	285 lbs. (130Kg) 	Data Storage	4000 Readings
Speed Range	0 - 3.0000 inch/min (0 - 75.0000 mm/min)	Data Collection Rate	100 ms
Load Capacity	11000 lbf (50 kN)	Computer Port	RS232
Vertical Clearance	40 inch (1000mm) Max.		

HM-2900.3F

Designed specifically for triaxial applications, the HM-2900 ProLoader takes the proven concept of the HM-3000 MasterLoader, downsizes it, and provides a triaxial-specific load frame on a smaller footprint without giving up any of the MasterLoader's versatility, accuracy or its internal four-channel data logger.

The HM-2900 ProLoader has been specifically designed to handle triaxial testing applications, including: UU, CU and CD triaxials and UC. From educational institutions and consulting firms to high-volume commercial labs and construction projects, the ProLoader can handle any application with ease. With its 3,000 lb. load capacity, the HM-2900 can handle all basic triaxial tests with ease.

With its built-in 4-channel data logger, the HM-2900 can acquire data from load, strain, pore pressure and volume transducers. The data acquisition can be automated by setting trigger conditions to start and stop logging. Tests can be initiated or terminated automatically increasing lab productivity.

The ProLoader is a very versatile load frame providing an internal 4-channel data logger, which allows it to be used as a standalone device capable of full test control and data logging. It also can be quickly integrated into a complete, computer-controlled lab system incorporating its internal data logger as a component of the complete system. Its heavy-duty design and precise stepper-motor control provides a stable platform for years of reliable service allowing it to perform any tests required up to its load capacity of 3000 lbf (15 kN). Whether as standalone unit or as part of a computer-controlled system, the ProLoader provides the user with fully-automatic test performance allowing unattended operation while controlling motor start/stop, speed selection and test data acquisition. Its modular design and its technical specifications allow the machine to be handle any triaxial test with ease.

In addition to its ability to link to a computer, the HM-2900 also provides the ability to daisy-chain multiple machines together as part of the system. Any Humboldt Concept test equipment, from other Load Frames to Consolidation and Shear Apparatus can use this linking feature to access the computer system and related software. Unused data ports on the ProLoader's data logger can also be used to utilize other load cells or transducers to gain access to data logging capabilities. In addition, the HM-2900 also provides an analog output port, which can be used for output to an XYt chart recorder or similar items.

Features include:

- Four channels for real-time data acquisition
- Backlit LCD display
- RS232 interface for computer or printer.
- Nonvolatile test data and instrument calibration storage
- Battery-backed real-time clock
- Auto conversation of instrument calibration between English or Imperial units and SI or metric units
- Test setup and selection via keypad
- Automatic triggering of test logging data
- View logged test data via the LCD display
- Logging rate as fast as 0.1 second/reading
- Humboldt HMTS, Basic, User-Defined Level software included for data acquisition
- Capable of Stress and Strain Control

Specifications			
Dimensions (l x w x h)	12 x 13.5 x 43.5 inch (305 x 343 x 1105mm)	Horizontal Clearance	11.25 inch (286mm)
Platen Size	10 inches (254mm)	Voltage	110/220 VAC 50/60Hz
Platen Travel	3 inches (76mm) Max.	Current	8.5 Amps
Net Weight	77 lbs. (35Kg)	Analog to Digital Converter	16 Bit
Shipping Weight	120 lbs. (54Kg)	Data Storage	4000 Readings
Speed Range	0 - 3.0000 inch/min (0 - 75.0000 mm/min)	Data Collection Rate	100 ms
Load Capacity	3000 lbf (15 kN)	Computer Port	RS232
Vertical Clearance	27 inch (686mm) Max.		

Covers: UU, CU, CD, and UC
 ASTM: D2850, D2166,
 D4767, and D1559
 AASHTO: T193, T296, T297, T208
 BS 1377: Part 4: 1990, BS 1377:
 Part 7: 1990,
 BS 1377: Part 8: 1990





HM-2800

The HM-2800 Multi-speed Load Frame is designed for those who want a high-quality but simple, multi-purpose load frame without built-in data acquisition capabilities. The HM-2800 is ideal for applications where the operator either is not concerned with data acquisition; or, already has an existing data acquisition system or plans on constructing one. With its digital display, the HM-2800 also provides the operator with the ability to select any speed with three decimal accuracy within the load frame's speed range.

The HM-2800 features a quiet, direct-drive DC motor that provides a loading speed range from .008 to 1.999 in/min., controlled through the use of edit keys and a digital display. It also incorporates a separate, dedicated control to accommodate 2.00 in/min. for use in Marshall and TSR Testing for asphalt. The controls also accommodate a rapid travel speed of 2.25 in/min for moving the platen into position quickly.

Features include:

- 10" platen provides roomy, stable base for test equipment
- Backlit LCD display
- Test speeds adjustable from .008 to 1.999 in/min. via keypad
- User selectable unit change between U.S. Standard and Metric from keypad
- Preset Marshall/TSR Test Option

Multi-Speed Load Frame, 120V 60Hz— HM-2800

Multi-Speed Load Frame, 220 50/60Hz— HM-2800.4F

HM-2000.56— Step-down transformer for electric conversion

Covers: CBR, UU, CU, CD, UC, Marshall and Hveem Tests
 ASTM: D1883, D2850, D2166, D4767, D5581 and D6927
 AASHTO: T193, T296, T297, T208, T245, and T246
 BS 1377: Part 4: 1990, BS 1377: Part 7: 1990,
 BS 1377: Part 8: 1990, BS 598: Part 107

Specifications			
Dimensions (l x w x h)	17 x 22 x 51 inch (432 x 559 x 1295mm)	Horizontal Clearance	11 inch (279mm)
Platen Travel	3 inches (76mm) Max.	Speed Range	0 - 1.99 inch/min (0 - 50.5 mm/min)
Net Weight	206 lbs. (94kg)	Voltage	120 VAC 50/60HZ 220 VAC 50/60HZ
Vertical Clearance	32 inch (812mm) Max.	Current	9 Amps @ 125V 4.5 Amps @250V
Load Capacity	11000 lbf (50 kN)	Shipping Weight	300 lbs. (660kg)

Typical CU/UU Triaxial Setup

COMPONENTS		Item #	CU Triaxial	UU Triaxial
Load				
Load Frame (choose 1 below)				
50kN (11240 lbf) capacity	HM-2800		1	1
	HM-2800.4F		1	1
Strain				
Load Ring 2,200 lbf (10 kN)	H-4454.020		1	1
Dial Gauge 2.0" travel, 0.001" divisions	H-4463		1	1
Pore Pressure Transducer	HM-4170		1	
Ball Seat Adapter	HM-200387		1	1
Single Channel Readout	HM-2350		1	
HMTS Software Basic, User Defined	included		1	1
Pressure				
Pressure Distribution Panel	HM-4150.3F		1	
	HM-4150M.3F			
Pressure Distribution Panel	HM-4140.3F			1
	HM-4140M.3F			
DeAiring System	HM-4187A.3F		1	1
Vacuum Pump	H-1763A.4F		1	1
Triaxial Cell (choose 1 below)				
3" / 75mm dia. capacity	HM-4199B		1	1
4" / 100mm dia. capacity	HM-4199B-4		1	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX		1	1

Typical Unconfined Compression Setup

COMPONENTS		
Load		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-2800	1
	HM-2800.4F	1
Upper Unconfined Platen	HM-2002	1
Displacement Indicator Platform	HM-3000.10.2	1
Displacement Indicator Rod	HM-3000.10.1	1
Load Ring 500 lbf (2.5 kN)	H-4454.050	1
Dial Gauge 1.0" travel 0.0001" Divisions	H-4158.1	1

Typical Soil Cement Setup

COMPONENTS		
Load		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-2800	1
	HM-2800.4F	1
Upper Swivel Platen	HM-2003E	1
Strain		
Load Ring 5,000 lbf (25 kN)	H-4454.050	1

Standard Triaxial Sample Prep Accessories:

(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1			



Automated, 3-Cell Control Panel— HM-4155
Automated, 1-Cell Control Panel— HM-4154

Used in conjunction with the HM-2450A.3F Pressure Controller, Humboldt Automated Control Panels provide an accurate and easy-to-operate solution for providing the controls necessary for distributing compressed air, water, de-aired water and vacuum within an air/water bladder-type triaxial testing system. The use of these Control Panels and the HM-2450A.3F Pressure Controller allows changes in cell and back pressures required for sample saturation to be done automatically without the need for an operator. This feature reduces the need for continual monitoring of the sample saturation process during a triaxial test.

Humboldt Auto Control Panels feature an analog input pressure gauge and controller, an air/water filter for the input pressure and de-aired water tank input, as well as quick-disconnects for quickly connecting bladders, the pressure controller and triaxial cells.

The HM-4154 provides connections for one triaxial cell, while the HM-4155 provides connections for up to three triaxial cells. For each triaxial cell, one bladder is required for generating the cell pressure and a second bladder is required for back pressure.

Specifications			
Pressure Gauge	psi	BAR	Mpa
Max. Input Pressure	200	14	1.4
Max. Output Pressure	150	10	1
Pressure Resolution	0.1	0.01	0.001
HM-4154 Dimensions (L x W x H)	8 x 8 x 37.5" (203 x 203 x 952mm) Shipping wt. 80 lbs. (36kg)		
HM-4155 Dimensions (L x W x H)	8 x 19.5 x 37.5" (203 x 495 x 952) Shipping wt. 45 lbs. (20kg)		

Manual, 3-Cell Control Panel, 120/220V 50/60Hz— HM-4165.3F
Manual, 3-Cell Panel (kPa), 120/220V 50/60Hz— HM-4165M.3F
Manual, 1-Cell Control Panel, 120/220V 50/60Hz— HM-4164.3F
Manual, 1-Cell Panel (kPa), 120/220V 50/60Hz— HM-4164M.3F

For those operations, which do not require automated control, Humboldt's HM-4164 and HM-4165 Manual Control Panels provide an accurate and easy-to-operate solution for controlling compressed air, water, de-aired water and vacuum within an air/water bladder-type triaxial testing system.

The use of these Control Panels provides the necessary control for making changes in cell and back pressures required for sample saturation to be done from a central location on the panel. The operator has complete control of system pressure during the triaxial test with three independently-controlled pressure regulators. These control panels have a bias pressure regulator feature, which allows simultaneous control of confining and back pressures, while maintaining a constant differential pressure

Humboldt Manual Control Panels feature an analog input pressure gauge and controller, an air/water filter for the input pressure and de-aired water tank input, a digital pressure readout for each set of cell functions, as well as quick-disconnects for quickly connecting bladders, the pressure controller and triaxial cells.

The HM-4164 provides connections for one triaxial cell, while the HM-4165 provides connections for up to three triaxial cells. For each triaxial cell, one bladder is required for generating the cell pressure and a second bladder is required for back pressure.

Specifications			
Pressure Gauge	psi	BAR	Mpa
Max. Input Pressure	200	14	1.4
Max. Output Pressure	150	10	1
Pressure Resolution	0.1	0.01	0.001
Display	LCD		
HM-4164 Dimensions (L x W x H)	8 x 8 x 37.5" (203 x 203 x 952mm)		
HM-4165 Dimensions (L x W x H)	8 x 19.5 x 37.5" (203 x 495 x 952)		



HM-4140 HM-4150 HM-4150A HM-4160 HM-4160A

Humboldt FlexPanels (see page 47 for specifications):

Humboldt FlexPanels provide an accurate and easy-to-operate solution for controlling compressed air, water, de-aired water and vacuum without the need for air/water bladder interfaces to produce the pressures necessary for triaxial testing. FlexPanels utilize a set of three burettes to control cell, top cap and base pedestal pressures.

This extremely versatile pressure system controls the pressure, water, de-airing tank and vacuum from a single panel. The three burettes allow for the control of the cell pressure and the back pressure for each cell. They can monitor volume change in the sample and can be used to measure the flow of water through the sample for permeability testing. FlexPanels can manually measure volume change or permeability in a triaxial test sample without the use of a volume change apparatus, a distinct benefit when compared to air/water bladder systems.

- Bias pressure regulator allows simultaneous control of confining & back pressures, while maintaining a constant differential
- Longer Burette and 0.02ml graduation give more accurate results, better productivity, and faster turnaround
- Uses no-volume-change Swagelock valves
- Bridge feature delivers simultaneous control of base and top pressures by adjusting one pressure regulator simplifying testing
- Quick-connect hookups for fast and reliable set up.
- Master control panel houses digital pressure readout for the controlling pressure, inlet vacuum regulator & gauge, inlet pressure regulators & gauge, de-aired water tank controls, tap & de-aired water supply outlets, and pressure & vacuum outlets
- Complies with ASTM D5084; BS 1377 Part 6 1990.

Distribution Panel Accessories



Quiet Compressor, 115V 50/60Hz— HM-4220
Quiet Compressor, 220V 50/60Hz— HM-4220.4F

When operating under full load this exceptionally quiet compressor offers a tremendously low noise level of 42 db/A. Each compressor is built with quality in mind, and comes equipped with powder-coated air tank, pressure switch, 1-micron air filter, regulator, and pressure gauges for completely automatic and trouble free operation.

Output in CFM and L/Min:	4.2 CFM/120 L.Min
Horse Power:	1.0Hp
Tank Size Gal / Lt.:	13 Gal/50 Lt.
Noise Level:	42 db/A
Dimensions:	41 x 13 x 2743 x 18 x 33 (Packed)
Weight:	121 lbs. (147 lbs. Packed)
Max Pressure PSI / Bar:	120 PSI (8 Bar)
Operating Pressure PSI / Bar:	90-120 PSI/6-8 Bar

Pressure Regulator, 2-150PSI w/Fittings— HM-4150.22AS
Positive Bias Regulator w/Fittings— HM-4150.23AS

High Vacuum Pump, 120V 60Hz— H-1763A
High Vacuum Pump, 230V 50/60Hz— H-1763A.4F

Direct-drive two-stage rotary sliding vane high vacuum pump features gas ballast and trap to reduce risk of oil being sucked into the system. Produces free air displacement 85L per minute (3 cu. ft. per minute) and maximum vacuum 29-30". Operating temperature is 30 to 170°F (-1.11 to 76.6°C). Has 1/4" OD intake ports for 1/4" ID tubing. Dimensions: 11-1/4" x 15-1/2" x 6-1/2" (28.6 x 39.4 x 16.5cm). Shipping wt. 26 lbs (13kg)

- Quick-Connect, 1/4" Male— HM-4150.72**
- O-Ring Replacement for HM-4150.72— HM-4196.CXO**
- O-Ring For Triaxial Top Cap, 1/8" Tubing—HM-4193.006**

- Tube Reducing Coupler, 1/4" to 1/8"— HM-003174**
- Brass Ferrules, 1/8" (set of 10)— HM-4197.12**
- Brass Ferrules, 1/4" (set of 10)— HM-4197.25**
- Tubing, 1/8" by the foot— HM-4196.12**
- Tubing, 1/4" by the foot— HM-4196.25**





HM-4151A



HM-2450A.3F



HM-4187H

HM-4187A.3F



HM-2315



HM-2310.10



HM-4170

Air/Water Bladder Cylinder— HM-4151A

The Humboldt Air/Water Bladder Cylinder is used to deliver pressurized de-aired water to the triaxial cell. The bladder acts as a reservoir and interface between the compressed air, used as the pressure source, and the de-aired water, which is used as the pressurizing medium for the sample. The use of the bladder eliminates the reintroduction of air into the de-aired water, while providing a high-degree of accuracy. The cylinder will operate continuously to a maximum pressure of 150 psi (1000 kPa). It is constructed of anodized aluminum top and bottom plates, acrylic cylinder and a viton bladder. Shipping wt. 8 lbs. (3.7kg)

Spare Replacement Bladder— HM-4151.1

Viton replacement bladder for HM-4151A, quantity (1).

Automatic Volume Change Apparatus— HM-2315

The apparatus is used for measuring the volume change of a soil sample by monitoring the flow of water through the chamber of the unit. The lower assembly contains changeover valves, which when used in conjunction with the upper assembly provides limitless capacity. The unit can be used with a linear strain transducer, a digital indicator, or as part of an automated system. It is accurate to better than ±0.05 ml and is easily de-aired in seconds. Includes connectors, valves, and tubing. Order strain transducer or digital indicator separately. Shipping wt. 21 lbs. (9.5kg)

Strain Transducer— HM-2310.10

Strain transducer, 1" (25mm) for use with HM-2315 Automatic Volume Change Apparatus

Transducer Bracket— HM-2310BR

Bracket to attach strain transducer to HM-2315 Automatic Volume Change Apparatus

Pore Pressure Transducer— HM-4170

Highly accurate, 200 psi (1400 kPa) Pore Pressure Transducer. Designed for geotechnical lab applications with outstanding overload protection and protected from corrosive water. Requires input of 10 V DC, with an output of 100 mV. Supplied with 2 meter cable and 5-pin DIN plug.

Pressure Controller, 120/220V 50/60Hz— HM-2450A.3F

Stand alone control unit for accurate control of air pressures in the triaxial laboratory testing. It provides automatic, incremental back pressure saturation with B-value calculation and check. When used with HMTS (Humboldt Material Testing Software) and Humboldt Triaxial testing equipment, the on-board, digital and bias-pressure regulators, plus two air/water bladder systems (HM-4151A) and the distribution panel (HM-4155 or HM-4154) allow simultaneous control of the confining and back pressure while maintaining a constant differential pressure.

Specifications	
Pressure Readout	psi/kPa
Maximum Input Pressure	200/1400
Maximum Output Pressure	150/1000
Pressure Resolution	0.1/1
Input Voltage	110/220 VAC 50/60 Hz
Display	LCD
Dimension (L x W x H)	12 x 12 x 7 inches (300 x 300 x 175 mm)

De-Airing Water Tank— HM-4187H

For use with Triaxial/Permeability Distribution Panels. Requires a Vacuum Pump, (see page 75). Shipping wt. 13 lbs. (6kg)

De-Airing Water System, 120/220V 50/60Hz— HM-4187A.3F

The HM-4187A.3F produces 8-liter batches of de-aired water without the use of heat. Combined mechanical agitation and vacuum evacuation removes gasses at much higher rate than conventional heat-boiling methods. Will de-air water to less than 0.5 pph dissolved oxygen in 4 minutes. Requires a Vacuum Pump, (see page 75) 1/55hp motor 110V, 60Hz. 7.5 x 7.5 x 20" (190 x 190 x 508mm). Shipping wt. 19 lb (8.6kg)



Triaxial Cells

HM-4199B Triaxial Cells are available for use with sample sizes from 1.4" (35mm) to 6" (150mm). The clear acrylic chamber has a working pressure of 150 psi (1,000 kPa) and is tested to 250 psi (1,700 kPa). The design features a solid base, which provides an extremely stable test platform making it faster and easier to center the cell on the load frame platen— reducing setup times. HM-4199B cells provide easy access to the test chamber by utilizing a one-piece, chamber unit that is quickly removed through the removal of three easy-turn knobs. These cells also have an integral de-airing block for the pore pressure transducer built into the side. The cells have five no-volume-change valves aligned on one side for maximum convenience. Two valves handle top drainage, two valves handle bottom drainage, and one valve handles filling and drainage, as well as providing confining

pressure to the cell. The removable base pedestal accommodates various sample diameters. Top caps and base pedestals are available in a choice of black-anodized aluminum or stainless steel in various sizes (see chart below). Other sizes are available. The cell top and base are precision machined from 6061 T6 aluminum, hard-coated and Teflon impregnated. A 5/8" hardened stainless steel piston runs inside a linear bearing to reduce friction. Choice of brass or stainless steel valve fittings is available (stainless steel for use with hazardous materials). When ordering, specify top cap and base pedestal for desired sample size. Order porous stones separately, see page 21. Cell dimensions are: 13-3/4" H x 8-3/4" dia. (349.2 x 222.3mm); overall diameter is: 11" (279.4mm).

Triaxial Cells and Top Cap/Base Pedestal Sets				
Size	Standard Cell	Stainless Cell*	Anodized Aluminum**	Stainless Steel*
35mm	HM-4199B	HM-4199SS	HM-4199.35	HM-4199.35SS
1.4"			HM-4199.14	HM-4199.14SS
38mm			HM-4199.38	HM-4199.38SS
1.5"			HM-4199.15	HM-4199.15SS
50mm			HM-4199.50	HM-4199.50SS
2.0"			HM-4199.20	HM-4199.20SS
70mm			HM-4199.70	HM-4199.70SS
2.8"			HM-4199.28	HM-4199.28SS
100mm	HM-4199B-4	HM-4199SS-4	HM-4199.100	HM-4199.100SS
4.0"			HM-4199.40	HM-4199.40SS
150mm	HM-4199B-6	HM-4199SS-6	HM-4199.150	HM-4199.150SS
6"			HM-4199.60	HM-4199.60SS



To order individual Top Caps or Pedestal Bases, use the part number for the set of the desired size indicated at left and add a "T" suffix for a Top and a "B" suffix for a base, i.e. HM-4199.20T would be the part number for a 2" Top Cap.

Cell	Height	Overall Diameter	Weight
HM-4199B	13.75	11	15 lb (7kg)
HM-4199B-4	15	11.75	28 lb (13kg)
HM-4199B-6	25.5	12.75	120 lb (54kg)

*Stainless steel valve fittings for use with hazardous materials.

**Set contains Top Cap and Base Pedestal



Two-Part Compaction Molds

Two-part Aluminum molds with easy-close band clamp closure. Base plate/Pedestal combination provides a stable platform for mold during production. Ratio of sample height to diameter is 2:1

Two-Part Compaction Molds

Sample	Mold	Base Plate
1.4"	HM-3817.14	HM-3817.14BP
1.5"	HM-3817.15	HM-3817.15BP
1.875"	HM-3817.18	HM-3817.18BP
2.0"	HM-3817.20	HM-3817.20BP
2.36"	HM-3817.23	HM-3817.23BP
2.5"	HM-3817.25	HM-3817.25BP
2.8"	HM-3817.28	HM-3817.28BP
4.0"	HM-3817.40	HM-3817.40BP
6.0"	HM-3817.60	HM-3817.60BP
35mm	HM-3817.35	HM-3817.35BP
38mm	HM-3817.38	HM-3817.38BP
50mm	HM-3817.50	HM-3817.50BP
70mm	HM-3817.70	HM-3817.70BP
100mm	HM-3817.100	HM-3817.100BP
150mm	HM-3817.150	HM-3817.150BP

Length Comparator— HM-4173

Length comparator designed to quickly and accurately measure the height of soil samples to within ±0.1% of the total height. Includes a digital indicator accurate to within 0.0001 inches (0.002mm) with 0 to 1" (0 to 25mm) total range. The comparator is comprised of an upright support 14" (356mm) tall attached to a 6 x 6 x 2" (150 x 150 x 50mm) granite base and includes a 6" (152mm) reference bar. Other reference bars such as 4.0", 3.0" and 2.0" for other sample sizes are available. Complies with ASTM D2166, D2850, D4767, BS 1377:8. Reference bar includes Calibration Report traceable to the National Institute of Standards and Technology. Shipping wt. 16 lb (7.2kg)

Soil Sample Trimmer, 1.0 to 3.0"— HM-3130

Soil Sample Trimmer, 1.0 to 4.0"— HM-3140

Sample trimmer for cutting samples to precise diameters. The HM-3130 handles samples up to 3" and HM-3140 handles up to 4" samples by employing easily interchangeable top platens. Stainless steel pins in pedestal & top platen hold sample in position. Top platen bearing assembly is lowered & locked and sample trimmed with wire saw, order top platens and saw separately. Shipping wt. 6 lbs. (2.72kg)

Sample Trimmer Top Platens

Top Platen	Model	Top Platen	Model
1.0"	HM-3130.10	35mm	HM-3130.35
1.4"	HM-3130.14	38mm	HM-3130.38
1.875"	HM-3130.18	50mm	HM-3130.50
2.0"	HM-3130.20	70mm	HM-3130.70
2.5"	HM-3130.25	100mm	HM-3130.100
2.8"	HM-3130.28		
3.0"	HM-3130.30		
4.0"	HM-3130.40		

Wire Saw— HM-3175

Sample trimming saw with replaceable wire blade.

Replacement Wire— HM-3175.1

Replacement wire for HM-3175 saw.

High Vacuum Grease— HM-4198

Effective means of sealing latex membranes to sides of the top cap.

Filter Paper Strips— HM4189FS

Wrapped around sample to accelerate saturation in triaxial testing, 5 x 150mm, Grade 55, 100/pkg.

Precision Diameter Tape, 0.75 to 7"— HM-4174

Precision Diameter Tape, 28 to 200mm— HM-4174M

Diameter tapes provide a fast, reliable method for measuring the diameter of concrete, soil and asphalt cores and cylinders. One reading provides round and out-of-round diameters within an accuracy of .001" (.03mm) by means of special graduations and vernier scale. All tapes are made from a stainless alloy and are precision engraved to ensure accuracy. Tape has diameter range of 2 to 12" (50 to 300mm on metric model). Includes certificate of calibration. Tapes are calibrated and include a NIST-traceable certification. Complies with ASTM D2166, D2850, D4767, BS 1377:8.



Latex Membranes	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4180.14	HM-4180.15	HM-4180.20	HM-4180.28	HM-4180.40	HM-4180.60	HM-4180.14	HM-4180.15	HM-4180.20	HM-4180.28	HM-4180.40	HM-4180.60

Made from non-porous latex rubber. Length varies according to sample diameter. All have sufficient length to enclose full length of sample, both top & base of pedestal, and disc—plus enough surplus to allow doubling over the O-rings. 12/pkg. Membranes are 0.012" in thickness. For 0.025" thickness, add T suffix after part number, i.e. HM-4180.28T

Membrane Stretcher	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4181.14	HM-4181.15	HM-4181.20	HM-4181.28	HM-4181.40	HM-4181.60	HM-4181.14	HM-4181.15	HM-4181.20	HM-4181.28	HM-4181.40	HM-4181.60

Simple & effective method of sheathing (encasing) sample with latex membrane without creasing or damaging the sleeve.

O-Rings	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4182.14	HM-4182.15	HM-4182.20	HM-4182.28	HM-4182.40	HM-4182.60	HM-4182.14	HM-4182.15	HM-4182.20	HM-4182.28	HM-4182.40	HM-4182.60

For sealing membranes from confining fluid and sample. Neoprene. 12/pkg.

O-Ring Placing Tool	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4183.14	HM-4183.15	HM-4183.20	HM-4183.28	HM-4183.40	HM-4183.60	HM-4183.14	HM-4183.15	HM-4183.20	HM-4183.28	HM-4183.40	HM-4183.60

Positions rings to seal membrane with minimum disturbance to specimen.

Porous Stones	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4184.35	HM-4184.38	HM-4184.50	HM-4184.70	HM-4184.100	HM-4184.150	HM-4184.14	HM-4184.15	HM-4184.20	HM-4184.28	HM-4184.40	HM-4184.60

Used for permeability and triaxial testing to allow even distribution of water through sample. Two stones required per cell, each 1/4" thick (6mm).

Membrane Tester	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4185.14	HM-4185.15	HM-4185.20	HM-4185.28	HM-4185.40	HM-4185.60	HM-4185.14	HM-4185.15	HM-4185.20	HM-4185.28	HM-4185.40	HM-4185.60

Tester is easy to use for quick visual detection of possible flaws in membranes.

2-Part Split Miter Box	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-3847.35	HM-3847.38	HM-3847.50	HM-3847.70	HM-3847.100	HM-3847.150	HM-3847.14	HM-3847.15	HM-3847.20	HM-3847.28	HM-3847.40	HM-3847.60

For use with undisturbed samples and for sample trimming of cohesive soils. Made from non-ferrous metal.

2-Part Vacuum Split Former	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-3827.35	HM-3827.38	HM-3827.50	HM-3827.70	HM-3827.100	HM-3827.150	HM-3827.14	HM-3827.15	HM-3827.20	HM-3827.28	HM-3827.40	HM-3827.60

For use with non-cohesive soils and disturbed samples. Made from non-ferrous metal. Larger sizes require use of supporting jacks.

Sample Trimmer with Knife	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4186.14	HM-4186.15	HM-4186.20	HM-4186.28	HM-4186.40	HM-4186.60	HM-4186.14	HM-4186.15	HM-4186.20	HM-4186.28	HM-4186.40	HM-4186.60

Used to trim sample ends or cut sample to a specific length.

Filter Paper	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4189.15	HM-4189.15	HM-4189.20	HM-4189.28	HM-4189.40	HM-4189.60	HM-4189.15	HM-4189.15	HM-4189.20	HM-4189.28	HM-4189.40	HM-4189.60

Used to prevent soil from penetrating into porous stones or into panel. 100/pkg.

Base Disk	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4179.35	HM-4179.38	HM-4179.50	HM-4179.70	HM-4179.100	HM-4179.150	HM-4179.14	HM-4179.15	HM-4179.20	HM-4179.28	HM-4179.40	HM-4179.60

Acrylic disk used in UU triaxial tests.





MiniLogger, 120/220V 50/60Hz— HM-2325A.3F

- Four individual, 16-bit analog to digital converters
- Instrumentation excitation supply of 10 VDC
- Analog outputs for XYt chart recorder
- Ideal with instruments, such as Pressure Transducers, Load Cells, and Strain Transducers.



MiniLogger, 120/220V 50/60Hz— HM-2330D.3F

- For use with Digital Indicators
- Four individual, Digital Indicator inputs.
- Instrumentation excitation supply of 5 VDC.

Data Storage	1000 readings/channel
Voltage	110/220 VAC 50/60Hz
Weight	6 lbs. (2.7Kg)
Dimension (L x W x H)	8.3 x 9.5 x 4.7 inch (210 x 240 x 120mm)

Data Storage	1000 readings/channel
Voltage	110/220 VAC 50/60Hz
Weight	6 lbs. (2.7Kg)
Dimension (L x W x H)	8.3 x 9.5 x 4.7 inch (210 x 240 x 120mm)

**Humboldt MiniLoggers—
Cost-effective Data Acquisition**

Automating data acquisition for your geotechnical lab is easy with Humboldt's MiniLoggers— our simple-to-use, four-channel data loggers specifically designed for use within construction materials testing labs. You can use Humboldt MiniLoggers to cost-effectively update your older, non-computerized load frames, direct shear and consolidation machines with computerized data acquisition; increasing lab output, freeing-up technicians and providing more accurate test results.

Humboldt MiniLoggers can automatically accumulate test data using a wide variety of transducers, load cells and digital indicators; and, come with Humboldt's, highly-regarded, Materials Testing software. MiniLoggers can be used to automate data acquisition for many of your labs tests such as:

Soil: triaxial, direct shear, consolidation, permeability, CBR/LBR, unconfined compression and soil cement

Asphalt: Marshall flow/stability, TSR Hveem

Cost-effective, Modular Design

Humboldt's modular-design, data acquisition concept is designed to give you the most flexible and cost-effective method of data logging your lab. Rather than having to buy into a large data logging system and then growing into it, Humboldt mini-loggers give you the flexibility and low cost outlay of being able to buy loggers on an "as you grow" basis, increasing your data logging capability as your expansion demands. Being 4-channel loggers, you get enough channels to run the test you are trying to automate and have the luxury of having the controls for that test right at the machine rather than at the computer on the other side of the lab.

In this way, single MiniLoggers can be used as stand-alone units for test operations requiring up to 4 channels and connect them directly to a PC for data acquisition, or up to 16 MiniLoggers can be "daisy-chained" together providing 64 channels of data logging to a single PC.

Features:

- Four channels with real-time data acquisition
- Backlit LCD display
- RS232 interface for computer or printer
- USB output with use of HM-000379 Cable
- Nonvolatile test data storage and instrument calibration
- Battery-backed real-time clock
- Auto conversation of instrument calibration between English or Imperial units and SI or metric units
- Test setup and selection via keypad
- Automatic triggering of test logging data
- View logged test data via the LCD display
- Logging rate as fast as 0.1 second/reading
- Windows-based software included for viewing and exporting test data into an Excel format files with plug and play features.
- Up to sixteen units can be connected to a computer.



HM-2300.020P shown mounted on crossbar with LSCT and ram

HM-2003E

HM-2300.100

HM-2300.020

Submersible Load Cells—

For those concerned with reducing the effects of hysteresis on testing results, we offer a submersible load cell, which is designed to work within the triaxial cell. Positioning the load cell within the triaxial cell eliminates the possible drag effect introduced by using a plunger between the sample and an externally-mounted load

Performance Specifications:

- Overload Capacity:** 200%
- Excitation Voltage:** 10 VDC, Maximum
- Non-linearity:** ±0.05% Full Scale Output
- Hysteresis:** 0.05% Full Scale Output
- Diameter:** 75mm
- Cable Length:** 2m
- Height Excluding Ram:** 50mm

Submersible Load Cells

Capacity	Model
Load Cell 1000 lbf (5 kN)	HM-2300.010S
Load Cell 2000 lbf (10 kN)	HM-2300.020S
Load Cell 5000 lbf (25 kN)	HM-2300.050S

Pancake Load Cells—

Pancake-design load cells are available for those who want to use a load cell design that theoretically provides the least amount of deflection in applications.

Capacity	Model
Load Cell 2000 lbf (10 kN)	HM-2300.020P
Load Cell 5000 lbf (25 kN)	HM-2300.050P
Load Cell 10000 lbf (50 kN)	HM-2300.100P
Load Cell 15000 lbf (75 kN)	HM-2300.150P
Load Cell 25000 lbf (125 kN)	HM-2300.250P
Load Cell 50000 lbf (250 kN)	HM-2300.500P

Performance Specifications:

- Overload Capacity:** 150%
- Excitation Voltage:** 20 VDC, Maximum
- Non-linearity:** ±0.05% Full Scale Output
- Hysteresis:** 0.05% Full Scale Output
- Diameter:** 4.13" (104.8mm)
- Cable Length:** 2m
- Height Excluding Ram:** 2.5" (63.5mm)

Swivel, Top Platen— HM-2003E

4.25" (108mm) diameter top swivel platen.

S-Type Load Cells—

Load cells are bi-directional for both tension and compression loads. Constructed from stainless steel. Load cells can be used with various instrumentation to measure loads. Includes: 6 ft. cable with 5-pin DIN plug and calibration certificate.

Performance Specifications:

- Excitation Voltage:** 10 VDC, Maximum 15 VDC
- Rated output:** 3.0 mv/V Minimum
- Non-linearity:** 0.03% Full Scale Output
- Hysteresis:** 0.02% FSO
- Non-repeatability:** 0.01% FSO
- Creep (30 minutes):** 0.03% FSO
- Zero Balance:** ±1.0% FSO

Bridge resistance

- Input: 350 ohms, nominal
- Output: 350 ohms, ±3.5 ohms

Overload

- Safe Static: 150% of Rated Capacity
- Ultimate: 175% of Rated Capacity

Temperature

- Compensated range: 0-150°F
- Effect on output: 0.0006% FSO/°F
- Effect on zero: 0.0008% FSO/°F

Finish:

Nickel-plated or Stainless Steel

Seal:

Waterproof

S-type Load Cells

Capacity	Model
Load Cell 500 lbf (2.5 kN)	HM-2300.005
Load Cell 1000 lbf (5 kN)	HM-2300.010
Load Cell 2000 lbf (10 kN)	HM-2300.020
Load Cell 5000 lbf (25 kN)	HM-2300.050
Load Cell 10000 lbf (50 kN)	HM-2300.100

**Linear Strain Conversion Transducers (LSCT)**

Extremely accurate and reliable strain gauge instruments. Compact size does not require a module. High resolution and performance superior to LVDT.

- Less than 250g spring force on spindle
- Non-linearity better than $\pm 0.1\%$ of full scale deflection
- Hysteresis-compensated with linearity better than $\pm 0.1\%$ of full scale in both directions
- Negligible temperature effect

Stainless steel casing for environmental protection. Operating temperature range 0 to 70°C. Requires input of 10V dc; output up to 6.5 mV per volt.

LSCT

Size	Model
Linear strain transducer, .4" (10mm)	HM-2310.04
Linear strain transducer, 1.0" (25mm)	HM-2310.10
Linear strain transducer, 2.0" (50mm)	HM-2310.20

LSCT Mounting Bracket— HM-4178BRT

Bracket used for CBR and 3" bracket.

LSCT Mounting Bracket— HM-2310BR

Bracket used in mounting LSCT to equipment in replacement of dial gauge.

LSCT Mounting Bracket— HM-4193BR

Bracket used in mounting LSCT or dial gauge to the upper part of a triaxial cell with a 5/8" (15.5mm) dia. ram for strain measurement. (HM-2310BR also required for use with LSCT.)

Transducer (load cell, LSCT, Pressure)**Data Cable Extension— HM-2310C**

Sold by the foot, specify length desired.

De-Airing Block— HM-4170B

For use with Pore Pressure Transducer

Pore Pressure Transducer— HM-4170

Highly accurate, 200 psi (1400 kPa) Pore Pressure Transducer. Designed for geotechnical lab applications with outstanding overload protection and protected from corrosive water. Requires input of 10 V DC, with an output of 100 mV. Supplied with 2 meter cable and 5-pin DIN plug.

Digital Pressure Transducer— HM-4172

Solid state transducer/readout unit incorporates the latest semiconductor technology into a high-quality, yet inexpensive strain gauge. Three-digit readout display has $\pm .25\%$ of full scale accuracy—comparable to others at twice the cost. Battery operated with very long battery life—typically up to 5 years. On/off button at top of readout has factory set "on" time built into the memory. Readout shuts off automatically after 20 minutes.

Digital Pore Pressure Set, 120V 60Hz— HM-4175**Digital Pore Pressure Set, 220V 50/60Hz— HM-4175.4F**

For accurately measuring and monitoring pore water pressures and back pressure. For determining level of saturation ("B" parameter) during saturation stages of triaxial/permeability tests. Includes readout, pore pressure transducer, and de-airing block assembly. Shipping wt. 8 lb. (3.63kg)

Digital Indicators—

Switchable inch/metric digital indicator is accurate to $\pm .0001"$ (.002mm). Instant zero feature. Locks in maximum reading on LCD display with characters 0.240" high and 0.115" wide. Runs either clockwise or counter clockwise. Operates with replaceable batteries or AC power with automatic shutoff. Will replace any mechanical dial gauge.

Digital Indicators

Range	Resolution	Model
.250" / 6.35mm	.0001" / .002mm	HM-4469.02
.600" / 15.0mm	.0001" / .002mm	HM-4469.05
1.0" / 25.4mm	.0001" / .002mm	HM-4469.10
2.0" / 50.0mm	.0001" / .002mm	HM-4469.20
4.0" / 101.6mm	.0001" / .002mm	HM-4469.40

CABLES**AC Adapter for Digital Indicator, 120V 60Hz— HM-4469AC**

Allows Indicator to run off AC power.

Data Cable for Digital Indicator— HM-4469C

Used with HM-2330D.3F MiniLogger

Serial Data Cable for Digital Indicator— HM-4469RS**USB Data Cable for Digital Indicator— HM-4469USB**

Data cables to transfer data from indicator to computer.

Multi-Device Cable— HM-000379

Allows one computer to control multiple, daisy-chained machines.



H-4454.050D

H-4454.050

Load Rings—

Sometimes called “Proving Rings,” Load Rings are used with various asphalt, concrete, or soil instrumentation to measure loads, and are ideal for use with our MasterLoader compression machines, Direct Shear machines and other testing equipment. Our high quality tensile steel rings have spherical seatings suitable for all shear boxes and load frames. Each load ring is shipped with a fitted dial gauge and calibration certificate, and supplied with tables listing all measurement units. 8-1/4" (210mm) high, 3/4-16 UNF thread female mounting. Available with digital indicators compatible with data acquisition systems. Eight models range in size from 110 to 22,000 lbf (0.5 to 100.0 kN). Meet ASTM E74.

Load Ring with Digital Indicator

lbf	kN	kgf	Model
110	0.5	50	H-4454.001D
220	1.0	100	H-4454.002D
550	2.5	250	H-4454.005D
1100	5.0	500	H-4454.010D
2200	10.0	1000	H-4454.020D
5500	25.0	2500	H-4454.050D
11000	50.0	5000	H-4454.100D
22000	100.0	10000	H-4454.200D

Load Ring with Dial Gauge

lbf	kN	kgf	Model
110	0.5	50	H-4454.001
220	1.0	100	H-4454.002
550	2.5	250	H-4454.005
1100	5.0	500	H-4454.010
2200	10.0	1000	H-4454.020
5500	25.0	2500	H-4454.050
11000	50.0	5000	H-4454.100
22000	100.0	10000	H-4454.200

Magnetic Indicator Mount— H-4470

Convenient, portable mount for mounting indicators and gauges. Mount has magnetic base, which mounts on flat or curved metallic surfaces. Non-magnetic stainless steel holding rod is 6 x 1/4" (154 x 6.4mm) and set in hardened ball socket so indicator or gauge may be mounted in almost any position.

Gauge Contact Point Extensions—

Used in applications where gauges require longer contact points to ensure correct gauge placement. Contact Points feature hardened steel points with polished tip to prevent scratching. Points fit all standard indicators and gauges. Not compatible with H-4471, H-4471CC, H-4465.12, and H-4465.12CC gauges.



H-4158.1



H-4665.25CC



H-4470



H-4466.30
H-4466.15
H-4466.10

Dial Gauges

Indicators are built to American Gauge Design Specifications for accuracy and are used in field and laboratory testing applications. Dials are high-quality, low-friction type, designed for long life and accurate repeatable readings. All dial indicators have continuous graduations and revolution counters that show revolutions of the indicator hand. They are furnished with a lug back (with a 90° mounting hole to be used vertically or horizontally), a regular contact point .25" long, and a dust cap. Dials listed are clockwise rotation; counter-clockwise rotation see note below.

Dial Gauges, Inches

Range	Division	Dia.	Brake	Model	CC*
.200"	.0001"	2.25"	No	H-4460	H-4460CC
.200"	.0001"	2.25"	Yes	H-4461A	NA
.300"	.0001"	2.25"	No	H-4462	H-4462CC
.500"	.0001"	2.25"	No	H-4471	H-4471CCC
1.000"	.001"	2.25"	No	H-4158.1	H-4158.1CC
2.000"	.001"	2.75"	No	H-4463	H-4463CC
3.000"	.001"	2.75"	No	H-4464	H-4464CC
4.000"	.001"	2.75"	No	H-4465	H-4465CC
5.000"	.001"	2.75"	No	H-4466	NA

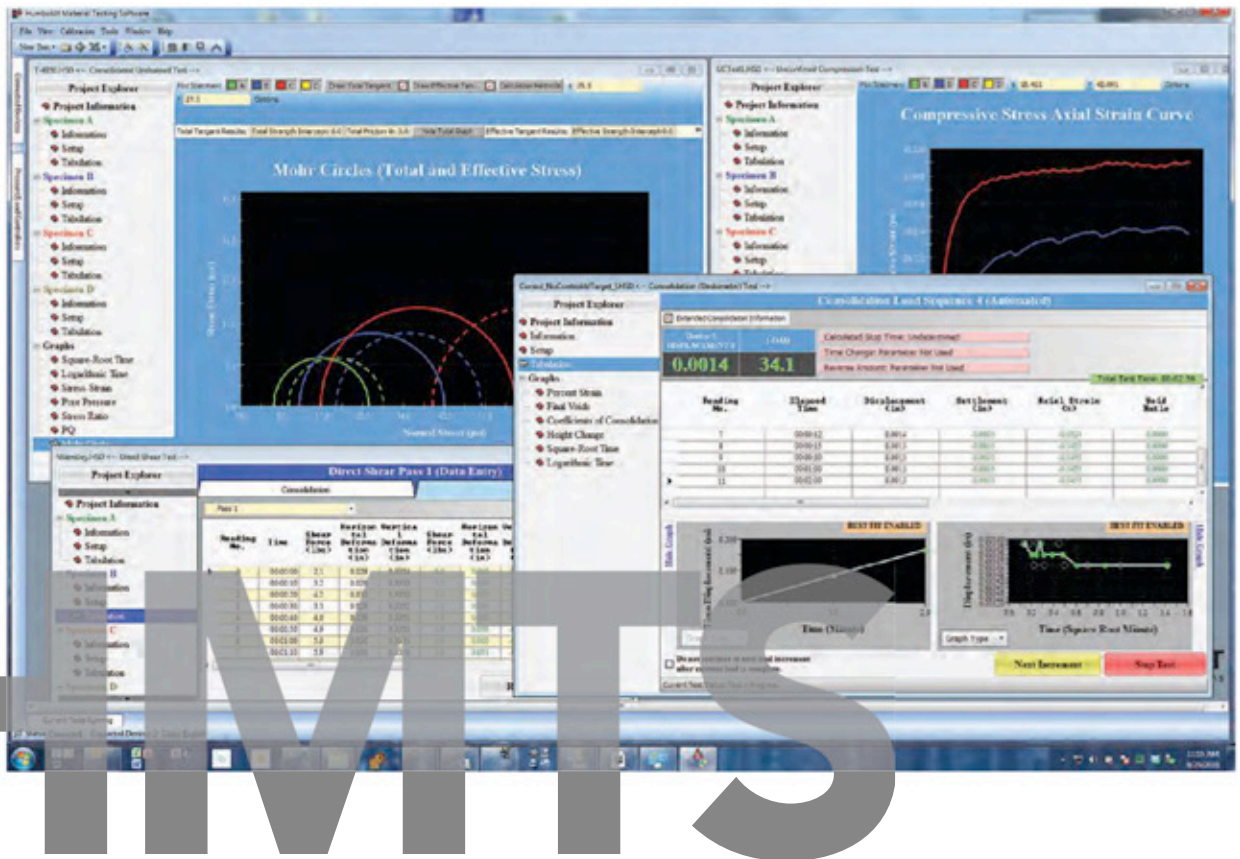
*counter-clockwise reading dial indicators

Dial Gauges, Metric

Range	Division	Dia.	Brake	Model	CC*
8mm	.002mm	57mm	No	H-4465.08	NA
12mm	.002mm	57mm	No	H-4465.12	H-4465.12CC
25mm	.010mm	57mm	No	H-4465.25	H-4465.25CC
50mm	.020mm	70mm	No	H-4465.50	H-4465.50CC

*counter-clockwise reading dial indicators

Contact Point Extensions	Model
.25" (6.4mm) Extension	H-4466.2
1" (25mm) Extension	H-4466.10
1.5" (38mm) Extension	H-4466.15
2" (50mm) Extension	H-4466.20
3" (76mm) Extension	H-4466.30
5" (127mm) Extension	H-4466.5



From a single operation to controlling a complete geotechnical lab, Humboldt Material Testing Software (HMTS), in conjunction with compatible Humboldt testing equipment, provides a complete solution for the acquisition, recording and presentation of testing data. HMTS works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel. The HMTS is configured in two levels of functionality.

Basic, User-Defined Level

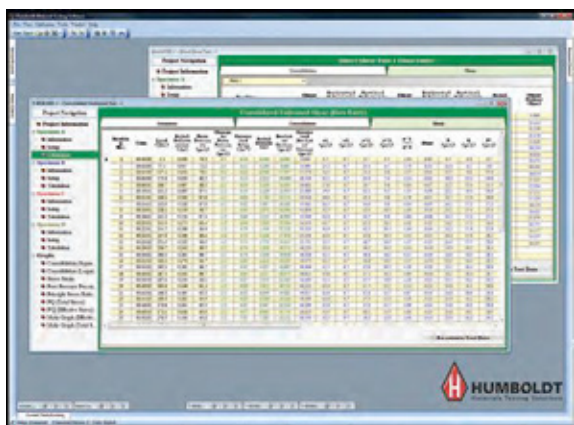
Our basic solution, or user-defined level software, is provided free with our HM-3000 MasterLoader, HM-2900 Pro Loader, HM-2325A and HM-2330D MiniLoggers, HM-2560A Shear and the HM-2750A and HM-2750D Shear Testers. This free software allows you to:

- set up and run user-configured tests;
- save test configurations as templates for rapid setup of future tests;
- collect and view data in real time with basic graphing functions;
- generate graphs in real time through the use of custom-designed Excel templates for report generation and printing, and
- simultaneously run multiple tests on one computer—based on the number of Humboldt logger-capable machines listed above that you have connected.

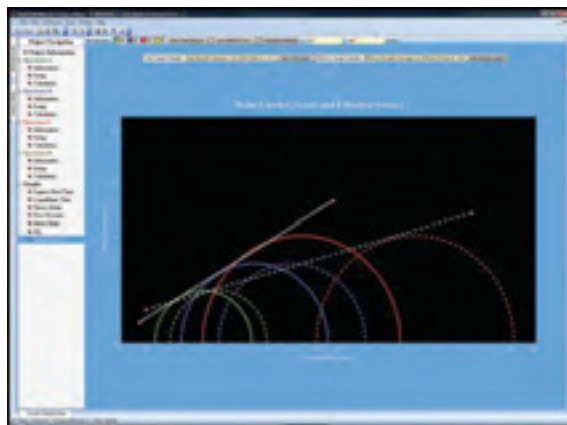
Advanced, Module Level

The advanced version of the HMTS involves upgrading the capabilities of the basic HMTS by purchasing and registering test-specific modules that are unlocked, with a registration code, from the free version of the software. Purchasing test-specific modules allows you to go beyond the functionality of the basic software by providing you with the following capabilities:

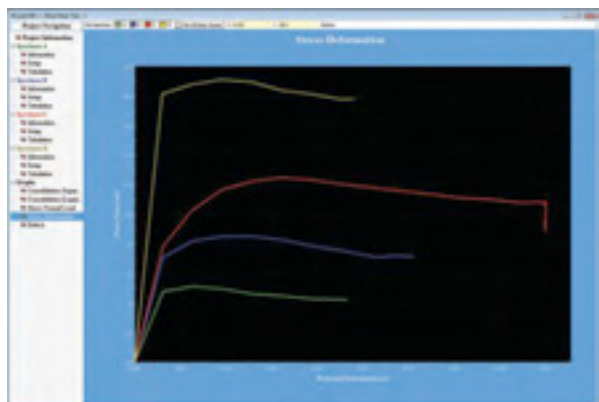
- test-specific setup that guides you through the process, which includes selecting data collection parameters that best fit the specific test;
- input specific project information for each test, such as project name, client information, etc;
- all test-specific initial, intermediate, and final parameters required by ASTM and BS standards is dynamically calculated for you, based on your input of specimen information, such as size, weight, etc.
- tabulated test data, graphs and all test-specific calculations are provided in real time, allowing you to monitor tests in process;
- generate test-specific reports that include all graphs and data presented in the projects. Reports are generated in Microsoft Excel workbooks allowing you to modify any report template to fit your company's needs
- simultaneously run multiple tests on one computer, involving any of the available HMTS modules and any compatible Humboldt equipment up to 255 device connections, which is up to 1020 inputs;
- create and store test-specific test setup templates for rapid setup of future tests;
- produce test-specific graphs, which allow you to draw construction lines to calculate angles and other test-specific parameters;
- automatically recover from a PC shutdown without loss of data;
- single click between imperial and metric units;
- easily change between different test standards, and
- access free, downloadable software upgrades for purchased modules.



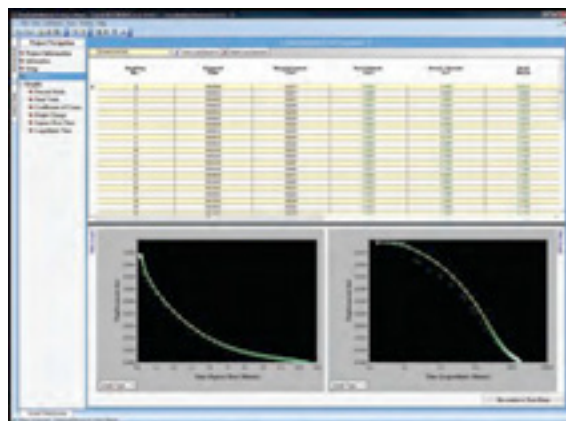
Data Entry Tabulation from CU Shear and Direct Shear tests.



Mohr Circles plot from CU test.



Stress Deformation graph from Direct Shear test.



Consolidation tabulation with plots.

Available advanced modules include:

Consolidation— HM-1100SW

ASTM: D2435, D4546, AASHTO: T216, BS: 1377:5

Direct Shear— HM-2700SW

ASTM D3080, AASHTO T236 and BS1377:7

CBR/LBR— HM-3001SW

ASTM D1883; AASHTO T193; BS 1377 Part 4

Unconfined Compression— HM-3004SW

ASTM D2166, BS 1377-7

UU Triaxial— HM-3002SW

ASTM D2850, BS 1377-7

CU Triaxial— HM-3003SW

ASTM D4767, BS 1377-8

CD Triaxial— HM-3006SW

ASTM D4767, BS 1377-8

Marshall Design— HM-3005SW

ASTM D6927, D4123-82; AASHTO T245, T283, BS 598-107

Operating System Requirements

Windows 2000 (with at least Service Pack 4), Windows XP Professional, Windows XP Home, Windows Vista and Windows 7. Other Windows versions, such as Windows 3.1, Windows 95, 98, and NT are not supported.

Software Requirements

Microsoft® Excel is required for creating reports.

Hardware Requirements

- Pentium® 4 (32-bit) equivalent or faster
- Minimum 512 MB RAM (1024 MB or more recommended)
- 300 MB swap space (or more)
- CD-ROM or DVD Drive
- 1024 x 768 display resolution

Internet Connection

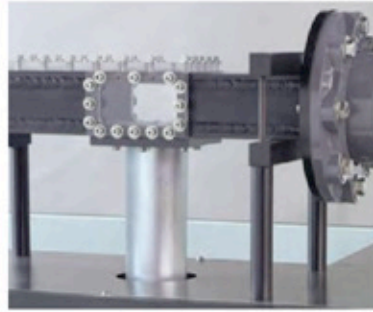
As recommended above, it is highly recommended that you have an internet connection. With an internet connection you can:

- Check for updates.
- Automatic updates are performed.
- Tests can be sent to Humboldt or to anyone you choose.
- Humboldt can be notified of issues.
- Registration can be sent directly to Humboldt for quicker processing.
- In the event of issues with the software we can connect to your computer remotely and help you.

How to Use the Software

The HMTS disk contains the complete HMTS offering including all test-specific modules. After installation on your computer, you will be able to use the Basic Level software capabilities for any applicable application, for as long as you like for free. You will also be able to use all the Advanced Level Modules, with full capabilities 20 times for each test module as a free trial. The software will keep track of the number of uses and display the remaining number of tests available on the screen.





Test observation window

Specifications

Flow Rate	0 to 8 meters per second
Specimen Size	Accepts 3.0" OD x 2.875" ID (76.2 x 73mm) Shelby Tubes
Dimensions	96" x 40" x 96" 2,438 x 1,016 x 2,438mm) excluding wheels and PC Shipping wt. 1500 lbs. (680kg)

Supplied complete with PC, SRICOS Analysis Software and Flow/ Temperature Sensors.

Erosion Function Apparatus— HM-4000

The HM-4000 Erosion Function Apparatus (EFA) was designed and built to prevent bridge failures by measuring the erodibility of soil. Used in conjunction with the SRICOS scour prediction method, the HM-4000 can provide more accurate erodibility measurements and scour predictions than previously obtainable. Applications for its use include: scour at bridges, piping of dams, beach erosion and surface erosion problems. In the case of scour at bridges, the EFA leads to improved accuracy on scour depth predictions, offering several advantages over previous test methods. These advantages include: minimum sample disturbance; measurement of erosion rate vs. shear stress; measurement of critical shear stress, and incorporation of the test results from the SRICOS scour prediction method.

The HM-4000 Erosion Function Apparatus uses standard 3.0" OD x 2.875" ID (76.2 x 73 mm) Shelby tubes; and is supplied with a PC, SRICOS software and flow/temperature sensors. The SRICOS Method improves the accuracy of Pier Scour Predictions.

The HM-4000 EFA is designed to be used in conjunction with the SRICOS Method of scour prediction. The SRICOS scour prediction method and the HM-4000 Erosion Function Apparatus were developed through research carried out by Jean-Louis Briaud, PHD, PE. and the Scour Research Team at the Texas Transportation Institute of the Texas A&M University System.

In comparison with the HEC-18 equation (a standard for calculating scour predictions), SRICOS generally leads to smaller calculated scour depths and compares more favorably to actual measured scour depths.

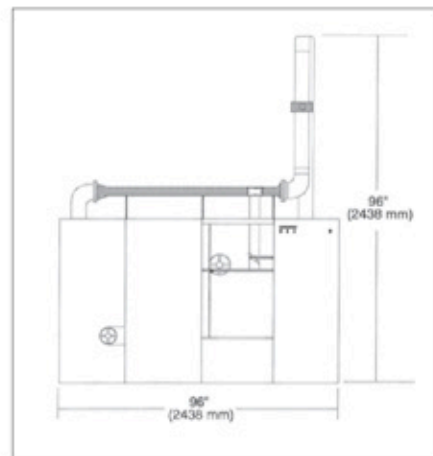
The EFA uses either of two variants of the SRICOS method:

The Extended SRICOS Method

- 1) Calculate the maximum depth of scour
- 2) Collect soil samples at the site
- 3) Test samples in the EFA to obtain the erosion rate vs. the hydraulic shear stress applied
- 4) Prepare the velocity hydrograph for the bridge
- 5) Use the SRICOS program with 3 & 4 above as input and generate the depth of scour vs. time over the period covered by the chosen hydrograph.

The Simple SRICOS Method

- 1) Calculate the maximum depth of scour
- 2) Collect soil samples at the site
- 3) Test samples in the EFA to obtain the erosion rate vs. hydraulic shear stress applied
- 4) Calculate the equivalent time for a given design life of the bridge and for the design velocity
- 5) Using known equations, calculate the scour depth at the end of the design life



Concrete

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Testing Equipment for



Construction Materials

HUMBOLDT

www.humboldtmfg.com
1.800.544.7220 • 708.468.6300

All Type B Concrete Air Meters feature our all-brass Super Pump (H-2785.DB) for reliability and faster operation. All air meters comply with ASTM C231; AASHTO T152.



Super Pump for Press-Ur-Meter Type B— H-2785.DB

The Super Pump's all brass construction resists acids in cement. All parts, including valve, are replaceable. For use with all Type B air meters. Ship wt. 1lb. (.45kg)

Plastic Air Meter Calibrator (5%)— H-2788

Calibrator checks the accuracy of any pressure-type concrete air meter. Set the specially designed canister upright at the bottom of the water-filled base, and the meter should read 5% air by volume. Two calibrators will check 10% air reading. Dimensions: 4" dia. x 3-3/4" (102 x 95mm). Ship wt. 2lbs. (0.9kg)

Brass Air Meter Calibrator (5%)— H-2789

Same concept as calibrator above, this model is constructed from machined brass for greater durability. Ship wt. 4lbs. (1.8kg)

Aluminum Air Meter Calibrator (5%)— H-2793

Same concept as calibrator above, this model is constructed from machined aluminum. Ship wt. 3lbs. (1.3kg)



Air Meter Accessories

- Calibration Vessel, plastic- H-2783.30
- Calibration Vessel, metal- H-2785.31
- Calibration Tube (outside)- H-2785.32
- Calibration Tube (inside)- H-2785.33
- Strike-off Bar- H-2785.34
- Tamping Rod 5/8" x 16"- H-2785.35
- Syringe- H-2785.36
- Scoop- H-3731
- Wooden Case, Vert.- H-2785.38
- Plastic Case, Vert.- H-2785.38P
- Plastic Case, Horiz.- H-2783.62H

Humboldt Pressure Air Meter— H-2783

Easy-to-use, stainless steel clamping system employs four, one-piece, self-locking clamps to quickly seal lid to base with proper tension. O-ring assures watertight seal. Large, Easy-to-read (to nearest 0.1%) 4-inch diameter, direct percentage gauge with calibration adjustments. Features all-brass H-2785.DB super pump for reliability and faster operation. Unique pop-it valve eliminates seal failures. Furnished with all necessary accessories for calibration and operation, plus plastic, toolbox-style carrying case. Ship wt. 41lbs. (18.6kg)

Press-Ur-Meter with wooden case— H-2786

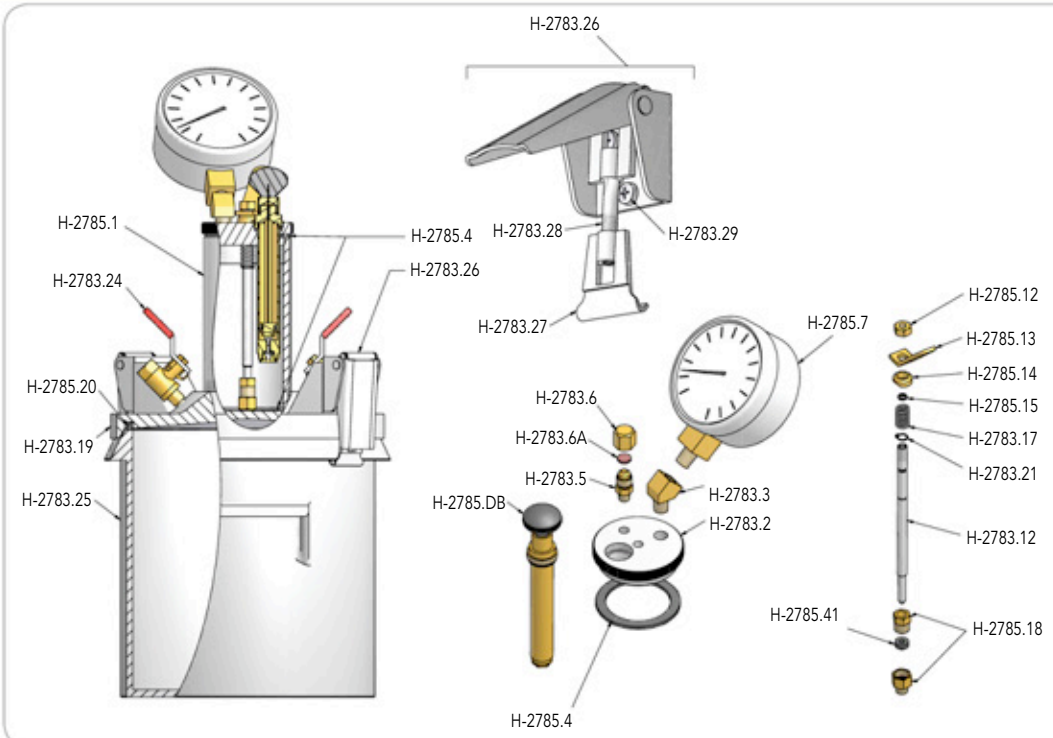
The original Press-Ur-Meter for field and laboratory tests, 1/4-cu.-ft. (.007m³) air meter is designed to determine air content, determination of specific gravity and free moisture test of aggregates. Designed to save time, reduce water used, ensure accuracy and maintain sample integrity (sample may be used for slump and compression tests). Features built-in, all-brass H-2785.DB super pump. Furnished with all necessary accessories for calibration and operation, plus wood upright carrying case. Overall height: 20-1/2" (521mm). Ship wt. 35lbs. (15.9kg)

Press-Ur-Meter with plastic case— H-2786P

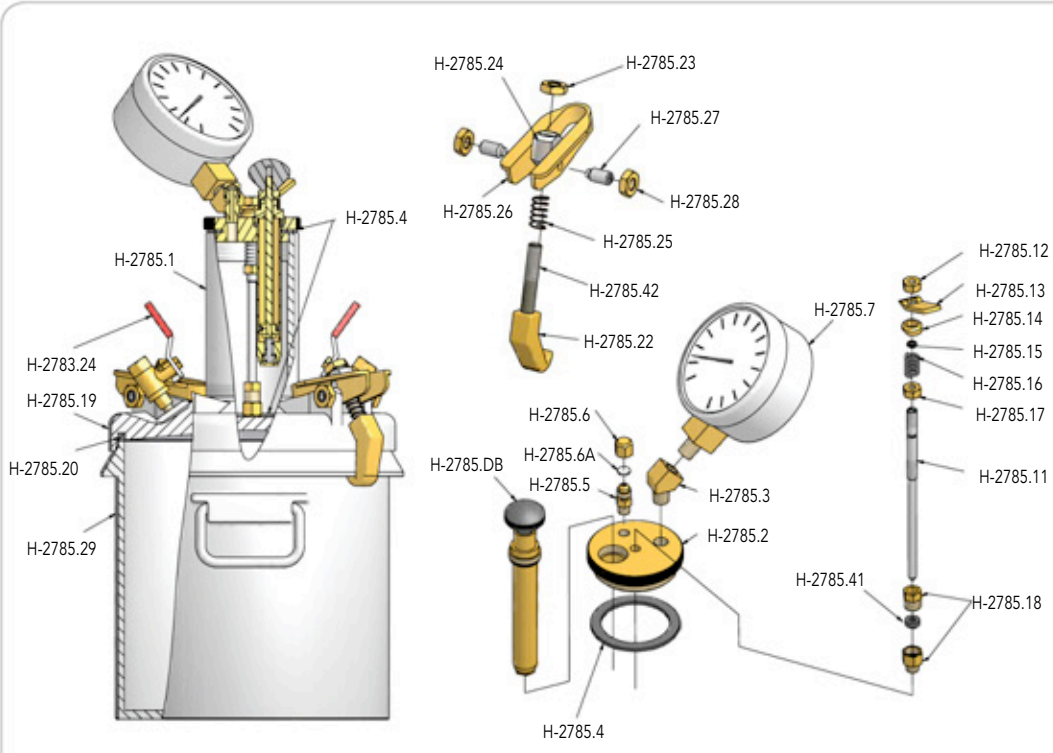
Same as H-2786 except that it comes with a plastic upright carrying case. Ship wt. 36lbs. (16.3kg)

Concrete Air Meter— H-2786C

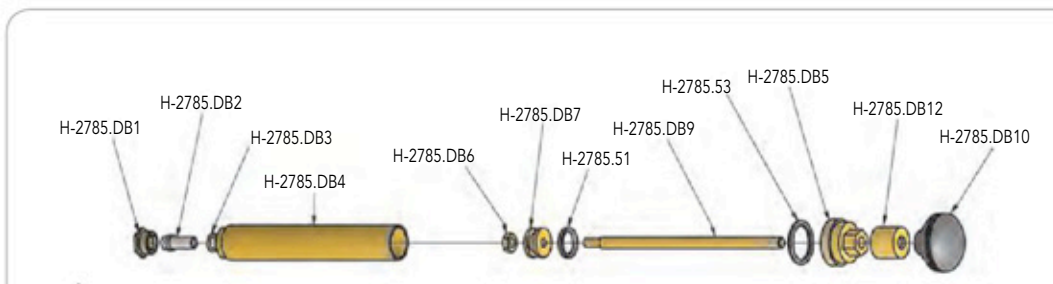
Low maintenance air meter. Similar to H-2786 except no moving parts inside chamber. Pressure is released into the base by an external, brass, quick-release T-valve. The base is machined inside and out for easy cleaning. Chamber and cover are one solid component. No more bottom gasket leaks. Furnished with all necessary accessories for calibration and operation, plus plastic toolbox-style carrying case. Ship wt. 36lbs. (16.3kg)



H-2783 Air Meter Replacement Parts	
Part No.	Description
H-2785.1	Pressure chamber
H-2783.2	Pressure chamber cap
H-2783.3	Pressure chamber elbow
H-2785.4	Pressure chamber gasket
H-2783.5	Air-release stem
H-2783.6	Air-release cap
H-2783.6A	Release cap gasket
H-2785.7	Air meter gauge
H-2783.12	Needle valve stem
H-2785.13	Needle valve lever
H-2785.14	Needle valve spacer
H-2785.15	Needle valve O-ring
H-2783.17	Needle valve spring
H-2785.18	Needle valve seat assembly
H-2783.19	Cover
H-2785.20	Cover O-ring
H-2783.21	Needle valve spring retainer
H-2783.24	Cover Petcock
H-2783.25	Base
H-2785.41	Needle valve seat gasket
H-2783.26	Latch Assembly
H-2783.27	Latch
H-2783.28	Adjusting rod
H-2783.29	Latch Assy. screw
H-2785.DB	Super Pump Assembly
H-2783.39	Gasket replacement kit



H-2786 Air Meter Replacement Parts	
Part No.	Description
H-2785.1	Pressure chamber
H-2785.2	Pressure chamber cap
H-2785.3	Pressure chamber elbow
H-2785.4	Pressure chamber gasket
H-2785.5	Air-release stem
H-2785.6	Air-release cap
H-2785.6A	Release cap gasket
H-2785.7	Air meter gauge
H-2785.11	Needle valve stem
H-2785.12	Needle valve nut
H-2785.13	Needle valve lever
H-2785.14	Needle valve spacer
H-2785.15	Needle valve O-ring
H-2785.16	Needle valve spring
H-2785.17	Needle valve spring retainer
H-2785.18	Needle valve seat assembly
H-2785.19	Cover
H-2785.20	Cover O-ring
H-2783.24	Cover Petcock
H-2785.22	Clamp with stud
H-2785.23	Clamp nut
H-2785.24	Clamp trunnion
H-2785.25	Clamp spring
H-2785.26	Clamp toggle
H-2785.27	Clamp toggle set screw
H-2785.28	Clamp toggle lock nut
H-2785.29	Base
H-2785.41	Needle valve seat gasket
H-2785.42	Stud
H-2785.DB	Super Pump Assembly
H-2785.55	Gasket replacement kit



H-2785.DB Super Pump Replacement Parts	
Part No.	Description
H-2785.DB1	Valve nut
H-2785.DB2	Valve
H-2785.DB3	Valve O-ring
H-2785.DB4	Pump tube
H-2785.DB5	Pump cap
H-2785.DB6	Stem nut
H-2785.DB7	Pump piston
H-2785.DB9	Pump stem
H-2785.DB10	Pump handle
H-2785.DB12	Stem cap
H-2785.51	Pump piston O-ring
H-2785.53	Pump tube O-ring

H-3637 and H-3635
Slump Cone Sets
feature Easy-Carry
Configuration



Standard Slump Cone Set— H-3637

The Humboldt, Standard Slump Cone Set provides you with the basic slump test components in an easy-carry configuration. The unique base design allows you to combine the individual components together into a one-piece, portable unit (see photo). The Standard Set includes our H-3636 cast aluminum Base Plate, H-3640 Slump Cone (standard steel), H-3651 Tamping Rod w/ 6" scale on handle. The base includes bolt-on clamps, which hold the slump cone securely during filling and rodding. The integral handle, attached to the base, can be rotated above the specimen once the cone has been removed and used as a guide to measure the slump. Ship wt. 21 lbs. (9.5kg)

Deluxe Slump Cone Test Set— H-3635

The Humboldt, Deluxe Slump Cone Set provides you with the basic slump test components in an easy-carry configuration, plus a scoop and funnel to aid in filling the slump cone. The set also includes a specially-designed "crete-brush" with a 20" handle, which stands up to the harsh acids used to clean slump test equipment. The Deluxe set includes: H-3636 Base Plate, H-3638 Funnel, H-3639.20 Brush, H-3640 Slump Cone (standard steel), H-3651 Tamping Rod w/ 6" scale on handle, and a H-3731 Scoop. Ship wt. 25 lbs. (11.4kg)

Slump Test Set w/ Pan— H-3645

The H-3645 Slump Cone Test Set is designed for those who prefer a traditional pan setup. This Set includes our H-3640 Slump Cone (standard steel), the H-3800 wire-bristle, wooden-handled Brush, a H-3650 Tamping (Puddling) Rod, the H-3725 galvanized-steel, 20" x 20" x 3" Slump Pan, and a H-3760 Trowel. Ship wt. 24 lbs. (10.9kg)

K Slump Tester— H-3643

Provides a fast approximate determination of slump and workability of wet concrete. Can be used to measure slump in buckets, wheelbarrows, ready-mix truck chutes, as well as in-place forms and test molds. The Tester is capable of indicating a fairly accurate correlation to an actual slump test. The Probe can also be used to determine the workability and the degree of compaction of fresh concrete. Includes correlation chart and instructions. Complies with ASTM C1362. Shipping wt. 1 lb. (0.5kg)

Ball Penetration Apparatus (Kelly Ball)— H-3655

Ball Penetration Apparatus (Kelly Ball), 20 lb.— H-3655-20

A test for the consistency of concrete using the penetration of a half sphere; a 1-inch (2.5-centimeter) penetration by the Kelly ball corresponds to about 2 inches (5 centimeters) of slump. Determines depth of penetration of metal weight into plastic concrete. Apparatus consists of 30 lb. (14kg) cylinder with hemispherically shaped bottom and handle. Stirrup or frame guides handle and acts as reference for measuring depth of penetration. Handle is graduated in 1/4" (6.4mm) increments on one side and half-centimeter increments on the other side. Concrete may be tested as placed in the forms prior to any manipulation or in a suitable container. Complies with ASTM C360; AASHTO T183; California Test Method CTM533. Shipping wt. 40 lbs. (18kg)

Ball Penetration Apparatus Carrier— H-3656

Heavy-duty, cast-aluminum design with quick release latches. Provides convenience for the operator and protection to Kelly ball when transporting to and from the job site. Shipping wt. 18 lbs. (8kg)

Concrete Pocket Penetrometer— H-4134

Concrete Pocket Penetrometer, w/ Dial— H-4132

Lightweight, spring-reaction type concrete penetrometer for field and lab evaluation of the initial set of concrete mortar, based on ASTM C403. Penetration plunger has a 1/20 sq. in. tip area. Plunger is steadily pushed into the mortar to a 1 in. depth, as indicated on the shaft, at periodic time intervals. Penetrometer's calibrated range is 0-700 psi. Resistance in psi is indicated on the scale. The term "initial set" is the semi-hardened, partially hydrated condition of the concrete beyond which it can no longer be worked. The point of initial set is reached when the penetration value is 500psi. Complies with ASTM C780.

Penetrometer Foot— H-4134F

For use with masonry mortars to determine board life and initial consistency. Method can be used as a basis for acceptance of mortars. Stainless steel disk, 2.70" (68.58mm) dia. Can be used with H-4134 or H-4132 Penetrometers. Complies with ASTM C780.

Slump Cone Sets comply with ASTM C143, AASHTO T119, BS 1881

SLUMP CONE SET INDIVIDUAL COMPONENTS & ACCESSORIES



Steel Slump Cone— H-3640

Steel slump cone has plated finish to resist rust. Fitted with handles and foot lugs for use with H-3636 base plate. 8" (203mm) dia. at base, 4" (102mm) dia. at top and 12" (305mm) high. Ship wt. 6 lbs. (2.7kg)

Metric Slump Cone— H-3640M

Same as above except with metric dimensions: (200mm) dia. at base, (100mm) dia. at top and (300mm) high. Ship wt. 6 lbs. (2.7kg)

Plastic Slump Cone— H-3640P

Lightweight, plastic slump cone will not dent or rust and can be cleaned with an acid bath. Formed with handles and foot lugs for use with H-3636 base plate. 8" (203mm) dia. at base, 4" (102mm) dia. at top and 12" (305mm) high. Complies with ASTM C143 and AASHTO T119. Ship wt. 3 lbs. (1.4kg)

Scoop— H-3731

One-piece aluminum scoop. Shipping wt. 1 lb. (.5kg)

Funnel— H-3638

Aluminum funnel for use with all slump cones to assist in filling. Shipping wt. 2 lbs. (1kg)

Tamping (Puddling) Rod— H-3650

Round, straight steel rod for use with concrete cylinder molds, slump cones and unit weight measures. Rod measures 5/8" (16mm) dia. x 24" (610mm) long. Both ends rounded to hemispherical tip. Plated for rust resistance. Ship wt. 2 lbs. (0.9kg)

Graduated Tamping Rod— H-3651

Tamping Rod with 6" scale in 1/4" increments engraved on handle for measuring amount of slump when handle of H-3636 base is raised over specimen. Ship wt. 2lbs. (0.9kg)

Base Plate— H-3636

Cast-aluminum base plate firmly holds all slump cone models, permitting one person to conveniently perform test. Base clamps turn down over cone foot lugs to secure entire assembly. Movable handle raises vertically over specimen (after removal of cone) and slump is easily measured with the 6" scale cut into handle end of H-3651 tamping rod. Ship wt. 10 lbs. (4.5kg)

Galvanized Slump Pan— H-3725

Durable steel pan, 24" x 24" x 3" (610 x 610 x 76mm) Ship wt. 18 lbs. (8.2kg)

Brush— H-3800

Brass Wire with Wood Handle. Ship wt. 2 lbs. (0.9kg)

Trowel— H-3760

Forged Steel with comfort handle, 2-3/4" X 5".

Tape Measure— H-4901

16.4 ft/5m tape measure with rubber grip cover and wrist strap.

Field Testing Video CD— H-0734

Video CD that covers ASTM concrete field testing with presentations and test specific videos that explain and show the step-by-step procedures needed to accomplish each test.

Crete Brush, 8" Handle— H-3639.8

8 inch acid-proof crete brush. Ship wt. 2 lbs. (0.9kg)

Crete Brush, 20" Handle— H-3639.20

20 inch acid-proof crete brush. Ship wt. 2 lbs. (0.9kg)

Self Consolidating Concrete (SCC) Flowability

These tests are used to determine the flowability and passing ability of self-consolidating concrete (SCC), ASTM C1621.

Passing ability refers to the ability of SCC, under its own weight (without vibration), to flow into and completely fill the spaces within intricate framework, containing obstacles such as reinforcement bars.



H-3652

J-Ring Test Set, Smooth Rods— H-3652

Provides a method to measure the distance of lateral flow of Self Consolidating Concrete. Designed for durability, the set includes a slump cone, J-Ring with smooth rods, and steel base plate with engraved rings to measure flow distance. Complies with ASTM standards C1611-09, C1621/1621M-06.

Shipping wt. 65 lbs. (29kg) 

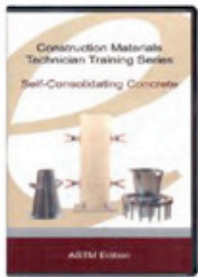
J-Ring Test Set, Rebar Rods— H-3652R

This set includes a slump cone, J-Ring with rebar rods, and steel base plate with engraved rings to measure flow distance.

Shipping wt. 65 lbs. (29kg) 

Individual Components

Description	Part No.
J-Ring with Smooth Rods	H-3654
J-Ring with Rebar Rods	H-3654R
Stainless Steel Base Plate, Engraved	H-3653
Slump Cone	H-3640



H-0733



H-3658

L-Box Flowability Test— H-3658

Method used to determine flow rates and passibility of SCC in confined spaces. Test box is comprised of concrete reservoir, slide gate, three obstacles and test basin. Includes metal strike-off bar. Complies with IL TP SCC-4. Ship wt. 27 lbs. (12kg)

V-Funnel Flowability Test— HC-3665

Stainless steel construction with 10L capacity. Upper edge is smooth and reinforced and the outflow orifice is equipped with seal valve. Includes polyethylene box to collect discharge and 900mm long straight edge to level concrete before test.

Ship wt. 53 lbs. (24kg)



HC-3665



HC-3666

Static Segregation Column Mold— HC-3666

Used to determine the potential static segregation of self-consolidating concrete. An easy-to-use clamping and collection system allows the segregation test to be conducted by a single operator. Built with Schedule 40 PVC, the 8" diameter mold has sections of 6.5", 13", and 6.5" in height. The supporting base is 15" x 15". The 2 collection plates are 8.5" wide stainless steel. Complies with C1610 Shipping wt. 24 lbs. (11kg)

Self Consolidating Concrete Video Training CD— H-0733

Use this interactive CD to train your technicians on how to properly test self-consolidating concrete (SCC) in the field and laboratory. The CD covers ASTM C1610– Column Segregation, C1611– Slump Flow, and C1621– Passing Ability, J-Ring. Each test procedure is explained using slide presentations, test specific video demonstrations, glossary of terms, and a step-by-step procedural outline. Comes with a Multi-User license.



ASTM Unit Weight Measures— Machined aluminum cylindrical unit weight measures with handles for determining unit weight of fine, coarse or mixed aggregates. Water-tight with true and even top and bottom. Measures retain form after repeated use. Meet ASTM C29, C138, C192 and AASHTO T19, T121, T158.

Capacity	Inside Dia.	Inside Ht.	Ship Wt.	Model
1/10 cu. ft (2.8 liter)	6" (152mm)	6.1" (155mm)	6 lbs. (2.7kg)	H-3660.1
1/2 cu. ft (14.1 liter)	10" (254mm)	11" (279mm)	16 lbs. (7.2kg)	H-3661.1
1 cu. ft (28.3 liter)	14" (356mm)	11.2" (285mm)	31 lbs. (13.6kg)	H-3662.1
1/3 cu. ft (9.3 liter)	8" (203mm)	11.5" (292mm)	17 lbs. (7.7kg)	H-3663.1
1/4 cu. ft (7.1 liter)	8" (203mm)	8.8" (224mm)	11 lbs. (4.9kg)	H-3664.1

Tamping (Puddling) Rod— H-3650

Round, straight steel rod for use with concrete cylinder molds, slump cones and unit weight measures. Rod measures 5/8" (16mm) dia. x 24" (610mm) long. Both ends rounded to hemispherical tip. Plated for rust resistance. Ship wt. 2 lbs. (0.9kg)



Non-ASTM Unit Weight Measures— Heavy-gauge, seam-welded, water-tight, steel unit weight measures with bail handles. Can be used for concrete or aggregate.

Capacity	Inside Dia.	Inside Ht.	Ship Wt.	Model
1/10 cu. ft (2.8 liter)	6" (152mm)	6.1" (155mm)	7 lbs. (3.2kg)	H-3660
1/2 cu. ft (14.1 liter)	10" (254mm)	11" (279mm)	22 lbs. (10kg)	H-3661
1 cu. ft (28.3 liter)	14" (356mm)	11.2" (285mm)	33 lbs. (15kg)	H-3662
1/3 cu. ft (9.3 liter)	8" (203mm)	11.5" (292mm)	19 lbs. (8.7kg)	H-3663
1/4 cu. ft (7.1 liter)	8" (203mm)	8.8" (224mm)	15 lbs. (6.8kg)	H-3664

Strike-off Plates (Clear Acrylic Plate (5/8" thick))

8" sq. (203mm sq.)	10" sq. (254mm sq.)	12" sq. (305mm sq.)	16" sq. (406mm sq.)
H-3669.1P	H-3669.4P	H-3669.2P	H-3669.3P

NOTE: Use 2" larger plate than the diameter of the unit weight measure.

Scales for Unit Weight Measures



150lb/60kg Low Profile Scale, 120V 60Hz— HB-4931
150lb/60kg Low Profile Scale, 220V 50/60Hz— HB-4931.4F

The HB-4931 is a feature-rich bench scales, combining an ABS plastic indicator with a painted steel base with mounting brackets. It offers a multi-functional indicator with multiple weighing units (kg, g, lb, oz, lb:oz (decimal), metric tonnes and a user-definable unit). Its quick display of results using a large LCD with high-contrast white backlight makes it easy to read and its adjustable non-slip rubber leveling feet and externally visible level indicator provide quick setup. The internal power supply allows the user to use the universal line cord or 6 "C" batteries (80 hr battery life). The base and indicator are connected using a quick-connect plug

Hard Carrying Case for HB-4785 Scale—HB-4785C



165lb (75kg) Portable Scale, 120V 60Hz— HB-4775A
165lb (75kg) Portable Scale, 220V 50/60Hz— HB-4775A.4F

Compact and portable, this scale has a capacity of 165lb (75kg) and a readability of .05lb (.02kg). Pan size is 12.25" x 12" (310 x 305mm). Can be used with AC or batteries and a great, hard carrying case is available. Shipping wt. 10 lbs. (5kg)

Hard Carrying Case for HB-4775 Scale—HB-4775C



H-4137

Mortar Penetration Resistance Apparatus— H-4137

Spring-reaction-type apparatus, graduated from 10 to 130 lbf (45 to 580N) in increments of 2 lbf (9N) for testing rate of hardness of mortars sieved from concrete mixtures. Determines effects of variables such as temperature, cement, mixture proportions, additions and admixtures upon the time of setting and hardening of concrete. Penetration resistance is measured by the downward vertical force exerted to penetrate the mortar 1" (25mm). Pressure reading is measured by a scale with a sliding ring indicator on the handle's stem. Includes these interchangeable mortar penetration resistance needles: 1, 1/2, 1/4, 1/10, 1/20 and 1/40 sq. in. (645, 323, 161, 65, 32, 16mm²). Complies with ASTM C403; AASHTO T197. Shipping wt. 20 lbs. (9kg)

Replacement Resistance Needle Set— H-4143

Set of six, screw-on type, replacement needles for use with H-4137 mortar penetration resistance apparatus. Available as set or separately below.

Individual Resistance Needles

Description	Part No.
1 sq. in. (645mm ²)	H-4143.1
1/2 sq. in. (323mm ²)	H-4143.50
1/4 sq. in. (161mm ²)	H-4143.25
1/10 sq. in. (65mm ²)	H-4143.10
1/20 sq. in. (32mm ²)	H-4143.05
1/40 sq. in. (16mm ²)	H-4143.025

Data Sheets, 100/pkg.— H-4133F

"Time of Setting of Concrete Mixtures" data sheets for use with H-4133 and H-4137.



H-4133

H-4133N

Acme Penetrometer— H-4133

Hydraulic reaction-type apparatus for determining the setting time of concrete with slump greater than zero by testing mortar sieved from the concrete mixture. It also determines the effects of variables such as temperature, cement, mixture proportions, additions and admixtures upon the time of setting and hardening of concrete. The penetrometer's design makes it easy to operate, being more efficient, with a longer gear rack. All needles are one length so settings may remain the same. Loads are applied hydraulically with pressures read on a 200 lbf (890N) capacity gauge graduated in 2 lbf divisions. Set of six needles allows multiplication to a maximum reading of 8000 lbf. The Acme penetrometer features cast aluminum base and set of stainless steel penetration needles in a wooden block (bearing area: 1, 1/2, 1/4, 1/10, 1/20 and 1/40 sq. in., (645, 323, 161, 65, 32 and 16mm²). Includes 100 laboratory test data reporting forms. Complies with ASTM C403; AASHTO T197. Shipping wt. 60 lbs. (27kg)

Penetration Needle Set— H-4133N

Set of six, stainless steel needles and holding block for use with the H-4133 Acme Penetrometer Mortar Penetration Resistance Apparatus. Individual needles are listed below. Shipping wt. 7 lbs. (3kg)

Individual Resistance Needles

Description	Part No.
1 sq. in. (645mm ²)	H-4133.15
1/2 sq. in. (323mm ²)	H-4133.16
1/4 sq. in. (161mm ²)	H-4133.17
1/10 sq. in. (65mm ²)	H-4133.18
1/20 sq. in. (32mm ²)	H-4133.19
1/40 sq. in. (16mm ²)	H-4133.20



HC-4972



H-2682

Cementometer, Type-R Moisture Meter— HC-4972

The Cementometer Type R handles normal water/cement ratios between 0.35 to 0.65 water/cement. The unit is calibrated for standard type I, II, and III cements and can also be programmed with up to ten different mix designs by the user. For highest accuracy, the user should program the unit for the material being used. The simple-to-use calibration process rapidly creates user programs without the need for external computing devices. The unit can store over 150 readings complete with time and date for future reference. Data can be recalled via RS-232 interface. Shipping wt. 2 lbs. (1kg)

Multi-Channel Maturity Meter Set— H-2680

Digital unit gives maturity number calculation, instant readout and temperature history. All four channels may be used simultaneously. All information is available on menu-driven alphanumeric display. Datum temperature is programmable from -20° to +60°C. Communications port allows information transfer from meter to meter, printer or computer. Includes four type "T" thermocouple wire, GFE connectors, RS-232 communications cable and plastic carrying case. Dimensions: 8 x 4-3/4 x 3" (203 x 121 x 76mm). Complies with ASTM C1074. Shipping wt. 10 lbs. (5kg)

Rechargeable Multi-Channel Meter Set— H-2682

Same as H-2680 except that a rechargeable nickel-cadmium battery is used. A waterproof battery charge connector enables charging from the 120V charger supplied or run directly off of AC power. This unit provides improved low ambient service temperature performance. Complies with ASTM C1074. Shipping wt. 10 lbs. (5kg)



H-3648



H-3649

Consistency Test, Vibrating Table, 120V 60Hz— H-3648
Consistency Test, Vibrating Table, 220V 60Hz— H-3648.2F
Consistency Test, Vibrating Table, 220V 50Hz— H-3648.5F

Model H-3648 conforms to ASTM C1170 for determining the consistency of stiff to extremely dry concrete mixtures like those used in roller-compacted concrete mixtures. Density of the specimens is determined by determining the mass of the consolidated specimen and dividing by its volume. The unit is comprised of a vibrating table, which can be bolted to a floor or substantial base slab. A swing arm with a guide sleeve for the 50 lb (22.7kg) surcharge weight is attached to the base, which allows the weight to swing out of the way when filling the mold, but allows easy application of the weight to the top of the specimen in the mold prior to vibration. The test mold is 9.5" x 7.75" ID with handles for easy movement and is locked into place on the base with positioning tabs and wing nuts. Shipping wt. 10 lbs. (150kg)

Individual Components

Description	Part No.
Thermocouple Wire, 24 GA, (per foot)	H-2670.1
Thermocouple Wire, 20 GA, Type T (per foot)	H-2670.1T
Thermocouple Wire, 24 GA, Type T, 50 Ft.	H-2670.1.50
Thermocouple Wire, 24 GA, Type T, 100 Ft.	H-2670.1.100
Plug for thermocouple	H-2680P
Printer	H-2684
AC Adapter/Charger	H-2686CH
Serial Cable	H-2686

Cylinder Mold, Vibrating Table Apparatus, 120V 60Hz— H-3649
Cylinder Mold, Vibrating Table Apparatus, 220V 60Hz— H-3649.2F
Cylinder Mold, Vibrating Table Apparatus, 220V 50Hz— H-3649.5F

Model H-3649 conforms to ASTM C1176 for making roller-compacted concrete in cylinder molds using a vibrating table. This practice is used when the standard procedures of rodding and internal vibration are not practicable. The unit is comprised of a vibrating table, which can be bolted to a floor or substantial base slab. A swing arm with guide sleeve for the 20 lb (9kg) surcharge weight is attached to the base, which allows the weight to swing out of the way when filling the mold, but allows easy application of the weight to the top of the specimen in the mold prior to vibration. The test mold is a 6" x 12" mold conforming to ASTM C470 and is locked into place on the base of the unit. Shipping wt. 305 lbs. (138kg)



H-3847




Utility Mixer with Steel Drum

- 1/2HP Electric, 110V 60Hz— **H-3847A**
- 1/2HP Electric, 220V 60Hz— **H-3847A.2F**
- 1/2HP Electric, 220V 50Hz— **H-3847A.5F**
- 3.5HP Gasoline Motor— **H-3847A.G**

Drum mixing capacity is 3 cu. ft. (85 Liters). Drum size: 5-1/2 cu. ft. (156 Liters). Compact, sturdy, lightweight concrete mixer for concrete, mortar, etc., can be bolted to floor or skid for permanent installation. Convenient drum lock allows the operator to secure the drum in one of five positions. Welded steel frame and heavy bushings for a long dependable life. Precision case, one-piece ring gear provides years of service. Quad-mixing system utilizes a four-piece, replaceable paddle and blade combination that create four different mixing patterns for a more consistent mix.

See below for tow-kit options.

Overall dimensions:
41 x 26 x 55" (1041 x 660 x 1397mm).
Comply with ASTM C192.
Shipping wt. 366 lbs. (166kg) 

Lightweight, Wheelbarrow Mixer


- 1/2HP Electric, 110V 60Hz— **H-3846**
- Drum mixing capacity is 3.5 cu. ft. (99.1 Liters). Lightweight, portable mixer only weighs 125 lbs. High-torque, 1/2 HP electric motor with on/off switch. Strong polyurethane drum will not crack or rust and is easy to clean. Ring gear is enclosed for safe operation. Transport handles adjust for easy storage. Can clear a 30" (762mm) door opening. Ships unassembled in a box. Not available in 220V configurations.
Shipping Dimensions:
24 x 23 x 30" (610 x 584 x 762mm)
Shipping wt. 121 lbs. (55kg) 

Utility Mixer with Poly Drum

- 1/2HP Electric, 110V 60Hz— **H-3849**
- 1/2HP Electric, 220V 60Hz— **H-3849.2F**
- 1/2HP Electric, 220V 50Hz— **H-3849.5F**
- 3.5HP Gasoline Motor— **H-3849.G**

Drum mixing capacity is 3 cu. ft. (85 Liters). Drum size: 5-1/2 cu. ft. (156 Liters). Compact, sturdy, lightweight concrete mixer for concrete, mortar, etc., can be bolted to floor or skid for permanent installation. Convenient drum lock allows the operator to secure the drum in one of five positions. Welded steel frame and heavy bushings for a long dependable life. Precision case, one-piece ring gear provides years of service. Non-stick, polyethylene drum provides easy clean-up and is replaceable. Sturdy, in-mold mixing blades.

See below for tow-kit options.

Overall dimensions: 41 x 26 x 55"
(1041 x 660 x 1397mm). Comply with ASTM C192.
Shipping wt. 346 lbs. (157kg) 

Poly Drum Replacement— H-3849PL

3 cu. ft. replacement liner for H-3849 mixer.

Tow Kit Options for Models H-3847A and H-3849

- Hand Tow Kit with 2.75 x 10" Semi-Pneumatic Tires— use HT Suffix (example: H-3847HT)
- High-Speed Tow Kit with 4.8 x 12" Pneumatic Tires and Hitch— use HS Suffix (example: H-3849HS)



HT— Hand Tow Kit



HS— High-Speed Tow Kit

Concrete Beam Tester—

16" distance, single point, manual pump— H-3030A

18" distance, single point, manual pump— H-3032A

18" distance, three point, manual pump— H-3033

Self-contained shock-proof portable concrete beam tester accurately and easily determines flexural strengths of 6 x 6" cross-section test beams. Hydraulically driven unit uses center-point loading method with continuous readings to the break and retains maximum reading to eliminate lost data. Gauge resets to zero for repeat tests. Lightweight aluminum unit has dual registration of modulus of rupture between 15,000 lbf. and 0–6,700 kgf. Shipping wt. 65 lbs. (29kg)



H-3030A

Concrete Beam Forms

Reusable. Fast and easy to assemble and use. Easy to strip, clean, knock-down and store. Molds give accurate specimens for center or third-point loading tests. Comply with ASTM C31, C78, C192, C293; AASHTO T23 and T197.

Lightweight, Stamped-Steel		
6" x 6" x 22" (152 x 152 x 559mm)	Lightweight, Stamped-Steel Model Hinge-free, collapsible in to interchangeable parts. Fastened with wing nuts. Shipping wt. 21 lbs (9.5kg)	H-3007
Heavyweight, Machined 3/8" Steel		
6" x 6" x 21" (152 x 152 x 533mm)	Concrete Beam Form, heavyweight, machined 3/8" steel. One-piece sides hinge to base, ends hinge to sides. Fastened with wing nuts. Shipping wt. 59 lbs (26.8kg)	H-3005
6" x 6" x 24" (152 x 152 x 610mm)	Concrete Beam Form, heavyweight, machined 3/8" steel. One-piece sides hinge to base, ends hinge to sides. Fastened with wing nuts. Shipping wt. 67 lbs (30.4kg)	H-3010
6" x 6" x 30" (152 x 152 x 762mm)	Concrete Beam Form, heavyweight, machined 3/8" steel. One-piece sides hinge to base, ends hinge to sides. Fastened with wing nuts. Shipping wt. 82 lbs (37.2kg)	H-3015
6" x 6" x 36" (152 x 152 x 914mm)	Concrete Beam Form, heavyweight, machined 3/8" steel. One-piece sides hinge to base, ends hinge to sides. Fastened with wing nuts. Shipping wt. 100 lbs (45.4kg)	H-3020
Plastic Beam Molds		
6" x 6" x 21" (152 x 152 x 533mm)	Single-cavity steel cube mold with base plate is 6 x 6 x 6" (152 x 152 x 152mm). Used for compression testing of concrete cubes and for mortar specimens in the Time of Initial and Final Setting of Concrete. Complies with ASTM C403; AASHTO T197. Shipping wt. 10 lbs. (5kg)	H-3009
Cube Molds		
6" x 6" x 6" (152 x 152 x 152mm)	Single-cavity steel cube mold with base plate is 6 x 6 x 6" (152 x 152 x 152mm). Used for compression testing of concrete cubes and for mortar specimens in the Time of Initial and Final Setting of Concrete. Complies with ASTM C403; AASHTO T197. Shipping wt. 27 lbs. (12kg)	H-2827
150 x 150 x 150mm	Steel metric cube mold, single-cavity	H-2827M
150 x 150 x 150mm	Plastic metric cube mold, single-cavity	H-2827MP



H-3007



H-3005



H-3009



H-2827



H-2827MP



Curing Cover for 21", 22", 24" Beam Molds— H-3021.24

Curing Cover for 30" Beam Molds— H-3021.30

Curing Cover for 36" Beam Molds— H-3021.36

Constructed of heavy-duty rip-stop nylon with removable pad, which can be saturated with water for moisture retention during curing.



H-2942



H-2934



H-2950H



H-2920



H-3041



H-3037PML



H-3041L



H-3043.6



H-3043.4



H-3037



H-3040



H-3041S

H-3041SMA

Metal Cylinder Molds

Molds are constructed of plated steel for rust resistance and are dimensionally stable under severe use. Molds are split along one side with 2 quick-acting clamps welded to mold. When open, mold springs apart slightly to allow specimen removal. Include detachable base plate. Comply with ASTM C31, C39, C192, C470; and AASHTO T22, T23, T126, T198.

6" x 12" (152 x 305mm)	1/8" (3mm) wall thickness, 1/4" (6mm) base plate. Shipping wt. 18 lbs. (8.2kg)	H-2942
6" x 12" (152 x 305mm)	Similar to above, except 1/4" (6mm) wall thickness. Shipping wt. 31 lbs (14kg)	H-2950
6" x 12" (152 x 305mm)	Similar to H-2950 with built-in carrying handle. Shipping wt. 32 lbs (15kg).	H-2950H
4" x 8" (102 x 203mm)	1/4" (6mm) wall thickness and base plate. Shipping wt. 8 lbs (3.6kg)	H-2934
4" x 8" (102 x 203mm)	1/8" (3mm) wall thickness and 1/4" (6mm) base plate. Shipping wt. 8 lbs (3.6kg)	H-2935
3" x 6" (76 x 152mm)	1/4" (6mm) wall thickness and base plate. Shipping wt. 7 lbs (3.2kg)	H-2931
2" x 4" (51 x 102mm)	3-Gang, split, cast bronze mold has heavy rib reinforcement at top, bottom and sides. Fitted with heavy, quick-acting yoke clamps, bolts and thumbscrews for locking halves. Meet ASTM C31, C39, C192. Shipping wt. 5 lbs (2kg)	H-2920

Plastic, Single-Use Cylinder Molds

Disposable, plastic cylinder molds with flat bottoms. Easily stripped with stripper tools (order separately). Meet ASTM C31, C39, C192, C470, C496; AASHTO T22, T23, T126, T198, M205.

6" x 12" (152 x 305mm)	Reinforcing rib around top opening. Lids not included. Sold in cartons of 36, oversize shipping charges apply.	H-3041
6" Lid (Domed)	6" plastic lid for use with H-3041 mold. Protects specimens from damage. Sold individually.	H-3041L
4" x 8" (102 x 203mm)	Complete with integral, domed plastic lid. Sold in cartons of 36, oversize shipping charges apply.	H-3037PML
3" x 6" (76 x 152mm)	Complete with integral, domed plastic lid. Sold in cartons of 80, oversize shipping charges apply.	H-3038PML
2" x 4" (51 x 102mm)	Complete with integral domed plastic lid. Sold in cartons of 84.	H-3039P

Plastic, Reusable Cylinder Molds

Lightweight, impact resistant construction. Will not crack, rust or deform. Can be reused up to 100 times. Comply with ASTM specifications. 1/4" (6.2mm) wall thickness. Sold individually.

6" x 12" (152 x 305mm)	Meets ASTM specifications. 1/4" (6.2mm) wall thickness. Sold individually.	H-3043.6
4" x 8" (102 x 203mm)	Meets ASTM specifications. 1/4" (6.2mm) wall thickness. Sold individually.	H-3043.4

Cardboard, Single-Use Cylinder Molds

Waxed cardboard molds with flat bottoms. Comply with ASTM C31, C39, C192, C470, C496; and AASHTO T22, T23, T126, T198

6" x 12" (152 x 305mm)	Carton of 24, oversize shipping charges apply	H-3040
4" x 8" (102 x 203mm)	Carton of 50, oversize shipping charges apply	H-3037
3" x 6" (76 x 152mm)	Carton of 50, oversize shipping charges apply	H-3038
2" x 4" (51 x 102mm)	Carton of 50	H-3039

Tamping (Puddling) Rod— H-3650

Round, straight steel rod measures 5/8" (16mm) dia. x 24" (610mm) long. Ship wt. 2 lbs. (0.9kg)

Tamping (Puddling) Rod— H-2905.1

Round, straight steel rod measures 3/8" (9.5mm) dia. x 12" (305mm) long. Ship wt. 2 lbs. (0.9kg)

Mold Strippers

H-3041S— T-Handle-style mold stripper, splits single-use cylinder molds for cylinder removal.

H-3041SMA— Screwdriver-style mold stripper, splits single-use cylinder molds cylinder removal.



Vibrating Table, 115V, 60Hz— H-3755

Vibrating Table, 230V, 60Hz— H-3755.2F

Vibrating Table, 230V, 50Hz— H-3755.5F

Cushioned impact vibrating table with load capacity of 300 lbs. (136.1kg) is used to vibrate beam forms, cylinder molds, concrete products and soil specimens. Table deck is 20 x 20" (508 x 508mm). Table vibrates at 3600 vpm. Amplitude or power of vibration is regulated by means of a rheostat in the electrical control circuit. Not supplied with cord and plug due to high wattage consumption requirements—must be connected through electrical conduit and fittings. Complies with ASTM C31, C192. Shipping wt. 115 lb (52kg).

Vibration Indicator, Tachometer Type— H-3753

Precision tachometer is pen size to allow accurate readings even on hard-to-reach equipment. Scale gives readings from 2,000 to 21,000

Vibration Indicator, Visual Type— H-3754A

Visual indicator gives accurate reading of amplitude of vibration so vibrating table may be adjusted.

Laboratory Vibrator—

115V, 50/60Hz 7 amps 1ph— H-2999

230V, 50/60Hz 3.6 amps 1ph— H-2999.4F

Lightweight square-head model is used for vibrating concrete test cylinders and molds in the laboratory or field. Unit is flexible-shaft type, powered with 3/4 HP electric motor. Shaft is 24" (610mm) long; vibrating head is 1" sq x 13" L (25 x 330mm) with a speed of 10,000 vpm. Complies with ASTM C31, C138, C192. Shipping wt. 12 lbs. (5.5kg)

6" Test Cylinder Transport Rack— H-2970.1

Test Cylinder Transport Rack securely holds (8) 6" x 12" cylinders in a lightweight and durable frame, which can be secured to a truck bed or used in conjunction with the Field Curing Chest listed below. Open center position is available for heater. Will not rot or rust. Rack is 23 1/2" square by 9" high. Shipping wt. 35 lbs. (15.9kg)

4" Test Cylinder Transport Rack— H-2970.2

Test Cylinder Transport Rack similar to above, but securely holds (16) 4" x 8" cylinders. Rack is 23" square by 7" high. Shipping wt. 9 lbs. (4.1kg)

Field Curing Chest— H-2970A

Field Curing Chest offers the user with an affordable approach to store, transport and cure concrete test cylinders. The chest consists of a 24" x 24" x 14" (610 x 610 x 356mm) zipper-sealed polymer and vinyl chest with 1/2" (12.7mm) insulating foam. The unit can accept up to nine 6" x 12" concrete cylinders. Shipping wt. 15 lbs. (6.8kg)

Cylinder Carrying Rack— H-2977C

Carrying rack for 4" x 8" test cylinders. Durable, molded plastic construction with molded handles for easy and safe transportation. Easily Carry 8 cylinders at a time in this plastic carrier, which will not deteriorate or corrode in water. Allows you to keep companion cylinders together in same case for curing. Shipping wt. 4lbs (1.8kg)

Cylinder Curing Racks (6 racks)— H-2977S.6

Cylinder Curing Racks (12 racks)— H-2977S.12

Durable, plastic cylinder curing racks provide a stable and open air flow design for storing cylinders during curing. The racks are manufactured from recycled plastic materials to resist moisture, abrasion, as well as chemical and temperature variations. Each rack has built-in handles for easy carrying. Each rack holds (4) 4" x 8" cylinders and the interlocking racks can be stacked 12 high (58"). Shipping wt. 7lbs (3.1kg)/15 lbs. (6.8kg)



Deluxe Concrete Curing Box, 110V, 50/60Hz— H-2968

Lightweight, portable—74 lbs. (33.6kg)— curing box for concrete cylinders. Plastic construction is rugged, durable and rustproof. Up to 22 standard 6" x 12" (152 x 305mm) test specimens can be stored at 72 ±2°F (22.2 ±1.1°C) over an ambient range of -10 to 100°F (-23 to 37.8°C). Sturdy, 14-gauge steel bottom rack provides optimum water circulation for even curing. Bottom valve for fast drainage. Lockable lid resists tampering. Requires minimum 15 amp circuit. Deluxe model includes recirculating water temperature control unit with temperature set buttons, indicating lights and digital readout for water temperature. Complies with ASTM C192, C511, C31; AASHTO M201, T126, T23.

Not available in 220V 50/60Hz. Shipping wt. 200lb. (90.9kg), Shipping Dimensions L76" x W28" x H29" (193 x 71 x 73.6cm)

Concrete Curing Box, 110V, 50/60Hz— H-2967

Same as above except that it only has heating controls, though cooling can be achieved by cool water recirculation if available. Includes adjustable heating control and dial thermometer.

***Not available in 220V 50/60Hz.** Shipping wt. 120lb (54.5kg) Shipping Dimensions L64" x W28" x H29" (162.5 x 71 x 73.6cm)

Heater/Circulator, 110V, 50/60Hz, 9 amp— H-2988

Heater/Circulator, 220V, 50/60Hz, 5 amp— H-2988.4F

Analog controller with proportional temperature control and low liquid safety. Suitable for use with any tank or jar-style bath to create a highly accurate constant temperature circulating system from 5°C above ambient to 100°C. Minimum immersion depth 3" (8cm), maximum immersion depth 7" (17cm). Clamp-on style fits up to 1-3/16" (3cm) wall thickness, or rod type lab stand. All stainless steel construction. Two-speed (7 or 15 liters/min.) pump minimizes turbulence in small tanks, maintains greater uniformity in large tanks. Adjustable flow director accepts 1/2" (13mm) ID tubing for external circulation. Includes thermometer. 6 x 5 x 13" (152 x 127 x 330mm). Shipping wt. 10 lbs (4.5kg)

Curing Tank Circulator, 110V, 60Hz— H-2985

Curing Tank Circulator, 220V, 50/60Hz— H-2985.4F

Silent submersion pump is 1/160HP (30W) with 120 GPH rating at 1ft. (30cm) height. Circulation from the 1/4" (6.4mm) MNPT discharge may be aimed; simply place the housing on any of five sides. Flow also may be directed using elbow connector (included) or by attaching extension tubing. Working parts are lubricated and sealed for life in glass-filled nylon housing with flush inlet. Features 6ft. (1.8m) grounded cord.

Metal Curing Tanks— H-2961 Series

Useful for curing cylinders, beams and material needing total immersion in laboratory or the field. Tanks are constructed from 20GA. galvanized steel. Tanks have side walls, which are deeply corrugated and made from one piece, having only one side seam. All joints are assembled with elastic packing and rivets. Rolled into the metal at top of the tank is a steel pipe, forming a rigid top that will not break or get out of shape. Larger tanks are supplied with top angle brace. Comply with ASTM C192; AASHTO T127.

Capacity gal (L)	Width ft (m)	Depth ft (m)	Length ft (m)	Weight lbs (kg)	Models
95 (360)	2 (.6)	2 (.6)	4 (1.2)	55 (25)	H-2961
142 (538)	2 (.6)	2 (.6)	6 (1.8)	80 (36.3)	H-2961.1
300 (1136)	3 (.9)	2 (.6)	8 (2.4)	120 (54.4)	H-2961.2

Poly Curing Tank, 3' x 2' x 8'— H-2969.8

Poly Curing Tank, 2' x 2' x 6'— H-2969.6

Poly Curing Tank, 2' x 2' x 4'— H-2969.4

Durable seamless design resists breakage. All round-end tanks have an extra heavy duty, molded rim and an extra -deep sidewall rib design for additional strength. Heavy duty, molded-in aluminum drain fitting and 1-1/4" poly drain plug ensure a long-life. Tested to -20° F, corrosion-free impact resistant and recyclable. Premium UV Protection assures long life and resistance to color fade in outdoor use. Six-foot tank weighs 49lbs, and 4-foot tank weighs 30lbs.

Precision Tank Heater, 110V, 50/60Hz— H-2986A

Precision Tank Heater, 230V, 50/60Hz— H-2986A.4F

Designed for efficient and economical indoor operation with H-2961 series curing tanks where temperature does not fall below 55°F (13°C). Temperature is thermostatically controlled and adjustable. The 1,000W, 8.3 amp, 120V solid-state controlled element will warm to a maximum of 200°F. Heater is Incoloy sheathed to prevent rust and is secured to aluminum base. Base provides protection for heater components from test cylinders in the tank. Overall length: 22-1/2" (57cm). Shipping wt. 6 lbs. (2.7kg)



Fogging Fan, 115V, 50/60Hz— H-2734

Designed specifically for small spaces that need a dependable unit in environments up to 100% RH (relative humidity). Well suited for areas between 16 to 30 feet in length, (and can be used in smaller areas down to 12 foot) this model has a maximum fogging output of 5 GPH and can propel fog up to 20 feet. The H-2734 utilizes a two-blade fan, making it about 30% quieter than larger units. The nozzle-free fans can atomize ordinary water supplies into a very fine mist-like fog. Utilizing high-speed centrifugal force and powerful air flow, these units can propel a misty-fog stream up to 20 feet away.

The powerful H-2734 is engineered to withstand humid conditions as high as 100% RH and above, and corrosive environments containing salts, lime, ammonia and other acidic compounds. Units are constructed of impenetrable components like Nema 4 connections, all 304 SST hardware, UV stabilized polyethylene plastics, PVC dip-coated steel, and sulfuric anodized aluminum. Standard configuration includes a 1/2 HP Baldor wash-down-duty motor that is specifically designed for wet, corrosive environments, 115/230V, 1ph, 60Hz.

Included with unit is an: adjustable-angle hanging bracket; visual flowmeter panel with strainer, 12 ft. SJO indoor/outdoor, heavy-duty power cord; 20 ft. Poly-Flo water line tubing; 16 ft. water drainage line; 100% stainless steel hardware, and easy-to-follow operator's manual. Shipping wt. 48 lbs. (22kg)

Fogging Fan, 240V 50/60 Hz— H-2735.5F

Similar to the H-2734 Fan above, but utilizes a 1/3 HP Baldor wash-down-duty motor that is specifically designed for wet, corrosive environments.

Accessories for H-2734 and H-2735.5F fans

- Economy Mobile Floor Stand— H-2734.1
- Ceiling Support— H-2734.2
- Wall Mount Support— H-2734.3
- 24-Hour Timer Control (110-250 Volt 50/60Hz)— H-2734.4
- Humidistat Control (110-250 Volt 50/60Hz)— H-2734.5

Master Humidifier, 110V, 50/60Hz— H-2914

Unit is recommended for humidifying comparatively large areas, evaporating a maximum of 5 lbs. (approximately 6/10 gal) of water per hour. Reservoir is copper; unit includes adjustable brass water float for operation on variable water pressures up to 75 lbs. (334N). Sealed to protect it from water, motor section drives both disc and pump tube to produce vapor without heat. Overall dimensions: 14-1/2" dia. x 10-1/2" height (368 x 267mm). Shipping wt. 22 lbs. (10kg)

Humidistat Controller, 110V, 50/60Hz— H-2915

Measures moisture in air of room or space in which it is installed. Automatically controls H-2914 Master Humidifier to achieve desired indoor relative humidity. Shipping wt. 2 lbs. (1kg)

Fine Mist, Fogging Fan (Bench-Type), 110V, 50/60Hz— H-2737

Fine Mist, Fogging Fan (Hanging-Type), 110V, 50/60Hz— H-2738

The H-2737 Bench-Type Fogging Fan is a quiet and dependable fogging fan, perfectly suited for the small curing rooms. The H-2737 conveniently sits on flat surfaces or shelves and is extremely easy to set up and operate. The nozzle-free fan can atomize ordinary water supplies into a very fine mist-like-fog, as well as pond water without the risk of clogging. Utilizing high-speed centrifugal force and air flow, these units can propel a misty-fog stream up to 20 feet away. The H-2737 is engineered to withstand humid conditions as high as 100% relative humidity. Units are constructed of impenetrable components like Nema 4 boxes and connections, all 304 stainless steel hardware, UV stabilized polyethylene housing and precision, high strength injection molded polypropylene components. Units also reuse their condensation waste water, eliminating the need of a near by drain. Bench Top units fill automatically by means of an internal float valve and come equipped with a simple garden hose connection. A quarter-turn valve controls the fogging output.

Similar to the H-2737, the H-2738 is a direct-feed, hanging unit, which receives liquid directly through a visual flowmeter control panel. This provides for fine "repeatable" control of the fogging output, as well as enhancing dependability by eliminating sump components. Direct Feed units are well suited for harsher environments or applications where standing water in a sump could become an issue. Each unit is equipped with a 5 GPH (20-300cc/min) flowmeter panel and 12' condensation drainage line. **Not available in 220V 50/60 Hz.**

H-2737 and H-2738 Specifications	
Fogging Capacity	0-3 Gallons per hour
CFM Rating	1,125 Cubic feet per minute
Energy Consumption	1.5 Amps @ 115V
Noise @ 10 ft.	62 dB(A)
Weight	10.5 lbs
Dimensions	16" in Diameter x 16" in length
Voltage	110-128 Volts, 60Hz, 1ph
Coverage	About 500 sq. ft.

Accessories for H-2737 and H-2738 fans

- Economy Mobile Floor Stand— H-2734.1
- Ceiling Support— H-2734.2
- Wall Mount Support— H-2734.3
- Humidistat Control (110-250 Volt 50/60Hz)— H-2737.1
- Thermostat Control (110-250 Volt 50/60Hz)— H-2737.2
- Cycle Timer Control (110-250 Volt 50/60Hz)— H-2737.3
- Mini 360° Oscillator For H-2738, (115 Volt 50/60Hz)— H-2737.4



H-2732



H-2736



H-2736.SW



H-2736.1



H-2736.3



H-2736.2



H-2736.4

Temperature/Relative Humidity Logger with Temp./Humidity Probe— H-2732

This temperature and relative humidity data logger is housed in a robust, waterproof (IP68-rated) case, which is designed for use in harsh applications like cylinder curing rooms. This unit features a temperature and relative humidity probe with a 1.5m cable length. The relative humidity probe features a coated RH sensor that shows good resistance to moisture and condensation, ensuring measurement reliability. The H-2732 data logger has a high reading resolution and accuracy, provides a 32,000 readings capacity, a fast off-load speed and a low battery monitor. Data is downloaded to a computer for viewing, reports and archiving. Data stored on the logger will be retained after a battery is replaced. See tables below for specific logger specifications. **Requires H-2736.SW software and a download cable for operation.**

Temperature/Relative Humidity Logger— H-2736

This self-contained, temperature and relative humidity data logger is housed in a robust, waterproof (IP68-rated) case, which is designed for use in harsh applications like cylinder curing rooms. This unit features a coated RH sensor that has good resistance to moisture and condensation, ensuring measurement reliability. The H-2736 data logger has a high reading resolution and accuracy, provides a 32,000 readings capacity, a fast off-load speed and a low battery monitor. Data is downloaded to a computer for viewing, reports and archiving. Data stored on the logger will be retained after a battery is replaced. See tables below for specific logger specifications. **Requires H-2736.SW software and a download cable for operation.**

H-2732 and H-2736 Specifications

Total Reading Capacity	32,000
Memory Type	Non-volatile 64K memory chip
Reading Types	Actual, Min, Max
Delayed Start	Relative / Absolute (up to 45 days)
Trigger Start	Magnetic Switch (H-2736.3)
Alarms	2, fully programmable
Stop Options	When full, After "n" Readings Never (overwrite oldest data)
Operational Range	-40°C to +85°C (-40°F to +185°F)
Battery	User-replaceable Lithium
Dimensions	Height 34mm / 1.34" Width 57mm / 2.25" Depth 80mm / 3.15"
Weight	110g / 3.9oz

Temperature/Humidity Logger Software— H-2736.SW

Explorer Software for operating H-2736 and H-2732 data loggers. This Windows-based program is simple and intuitive to use, allowing users to easily manage both Tinytag loggers and recorded data. A simple to use launch page that allows easy editing of a data logger's settings, while at the same time summarising them clearly. When offloaded, recorded data is initially presented as a graph but can also be displayed as a table of readings if required. These views are supplemented with an information view, that summarizes details of the data being shown, and a daily minimum/maximum view. Data can easily be exported from all four views into MS Excel and Word, either as a file or by simply copying and pasting. The software supports multiple languages, and there is also a comprehensive, illustrated help file to take the user through the basics of the software, and its more advanced features. Site licences are available for multiple installs.

Download Cable, Serial— H-2736.1

A serial PC download cable for use with H-2736 and H-2732 data logger.

Download Cable, USB— H-2736.2

A USB PC download cable for use with H-2736 and H-2732 data logger.

Trigger Start Magnet— H-2736.3

A magnet for starting loggers that have been set up for a trigger start.

Stevenson-type Screen Enclosure— H-2736.4

The Stevenson type screen, or instrument shelter, shields data loggers against precipitation and direct heat radiation from outside sources, while still allowing air to circulate freely around it.

H-2732 and H-2736 Temperature Specifications

Sensor Type	10K NTC Thermistor
Reading Range	-13 to 185°F (-25 to 85°C)
Response Time	25 mins to 90% FSD in moving air
Resolution Accuracy	0.01°C or better

H-2732 and H-2736 Relative Humidity Specifications

Sensor Type	Capacitive
Reading Range	0 to 100% RH
Accuracy	±3.0% at 77°F (25°C)
Reading Resolution	Better than 0.3% RH
Sensor Location	Externally mounted
Response Time	10 seconds to 90%



Thermo Recorder, Temperature/Humidity Logger— H-2743

The Thermo Recorder is a data logger capable of measuring, displaying and recording temperature and humidity. It features one temperature channel and one humidity channel. The measuring accuracy of $\pm 2.5\%RH$ enables more precise measurements and allows for measurement within a wider range. The data recorded into the unit can then be downloaded quickly via USB communication cable to your computer whereby with the exclusive software you can easily process the data into graphs, tables, save to files and/or print it out to help you analyze the data collected.

- Humidity Measuring Range: 0 to 99%RH. The H-2743 with the sensor included in this package can simultaneously measure and record temperature in a range of -30 to 80°C and humidity in a range of 0 to 99% RH.
- Data Recording Capacity: 8,000 readings \times 2 channels. One channel can record and hold up to 8,000 measurement readings. At the longest recording interval of 60 minutes, recording can continue consecutively for one year.
- Low energy consumption design gives you ten months of continuous operation with only one AA alkaline battery. This enables measuring and recording over long periods of time.

Extension Cable for Thermo Logger— H-2743.1

3 ft. cable for use in extending distance between logger and sensor

Circular Chart Recorder (°F), 120V 60Hz— H-2735F

Circular Chart Recorder (°C), 120V 60Hz— H-2735C

Circular Chart Recorder (°F) 220V 50/60Hz— H-2735F.4F

Circular Chart Recorder (°C) 220V 50/60Hz— H-2735C.4F

This chart recorder provides reliable and rugged trend reporting with the ability to measure 3 different temperature ranges and 4 recording speeds (6 or 24 hr. and 7 or 31 days). Large LED display shows sensor temperature and all controls are located on the front panel. Unit can be free standing or wall mounted. Battery backup provides operation during power interruptions. Comes with 2 cartridge pens and 60 assorted charts. Sensor is not designed to be fully immersible.

Masonry Saw, 230V 60Hz— HC-2970.2F

Masonry Saw, 230V 50Hz— HC-2970.5F

Saw for use in cutting concrete and mortar cylinders and blocks. Blade capacity is 20" (508mm), which allows a cutting depth of 8" (203mm). Capable of cutting 8" x 8" x 16" block. Unit features a 3hp 230 60hz 1ph Baldor motor. The saw has only two pivot points for reduced saw maintenance and longer diamond blade life. The cutting head pivots on bearings, which are sealed and lubricated for life requiring no greasing. Its ergonomically designed steel handle with molded grip bolts securely into place and the Sta-level® blade guard keeps the blade guard parallel to the cutting table for accurate cuts. Height can be controlled with a convenient crank control on foot pedal. Blade not included, order below.

Masonry Saw Blade, 20"— HC-2971

High-quality, 20" fast cutting blade for a variety of materials. Designed for dry or wet cutting. The segment height is .275", segment thickness is .125". Shipping wt. 17 lbs. (8kg)

Silent Runner Saw Blade, 20"— HC-2972

A diamond blade for medium to large jobs and maximum production at a low cost per cut. It features a laminated core for maximum noise reduction. The segment height is .390", segment thickness is .14". Shipping wt. 56 lbs. (25kg)



Charts for Chart Recorder

Description	Range	Model
6" w/display	50 to 120°F, -20 to 50°F, -40 to 30°F	H-2735F
6" w/display	10 to 50°C, -30 to 10°C, -40 to 0°C	H-2735C
6" 7-Day Chart	50 to 120°F	H-2735F.1
6" 24-Hr. Chart	50 to 120°F	H-2735F.5
6" 7-Day Chart	10 to 50°C	H-2735C.1
6" 24-Hr. Chart	10 to 50°C	H-2735C.5
SST Probe w/ lead		H-3185RT.1
Pen for H-2735	one black pen	H-3185.3A





H-2966B



H-2962

**Production Cylinder-end Grinder, 120V 60Hz— H-2966B
Production Cylinder-end Grinder, 220V 50Hz— H-2966B.5F**

The H-2966B, manually-operated production cylinder-end grinder is designed for medium production laboratories, who need a fast and precise method of preparing cylinders for compression testing. The machine's small footprint makes it perfect for most labs where space is at a premium, and, its virtually maintenance-free operation will be appreciated by the typical busy lab. The H-2966B production grinder is capable of preparing approximately 20 cylinders per hour for testing. It can handle 4" x 8" and 6" x 12" cylinders with equal ease and provide them plane and parallel within ASTM C617 tolerances. The grinder removes material at a rate of 1/32" (0.8mm) per pass, and is capable of quickly handling multiple passes while maintaining its preciseness.

The H-2966B comes complete with a simple and reliable water recirculation system. The machine requires minimal maintenance.

- Grinds the faces of concrete cylinders plane and parallel to within ASTM C617
- One pass of the diamond wheel is usually sufficient
- Compression testing can commence immediately after grinding without the use of capping materials
- Eliminates fumes and waiting time associated with capping compound

Diamond Cutting Wheel Replacement— H-2965.1

H-2966B Specifications	
Sample Size	4" x 8" (102 x 203mm) 6" x 12" (152 x 305mm) cylinders
Cut Precision	Plane and Parallel to within 0.002" (.05 mm)
Cutting Feed	Manual—right hand operation
Cutting Head	Diamond wheel
Cutting Speed	3800 rpm
Dimensions	30" D x 24" H x 22"W (764 x 610 x 559mm)
Shipping wt.	275 lb (125 kg)

***Automatic Cylinder End Grinde, 120V 60Hzr— H-2962
Automatic Cylinder End Grinder, 220V 50Hz— H-2962.5F**

Our automatic grinder quickly grinds specimen ends plane and parallel. This unit can grind three (3) 4" x 8" (100mm x 200mm) test cylinders or two (2) 6" x 12" (150mm x 300mm) test cylinders simultaneously. The adaptor for 4" x 8" (100mm x 200mm) test cylinders is easy to install on the table and requires no assembly. The machine is mounted on wheels for easy moving. Safe access to components allows for easy maintenance. The grinder's aluminum frame and stainless steel exterior assure both resistance to corrosion and light weight.

- Grinds planeness and parallelism of test cylinder ends in accordance to ASTM standards C31, C39, C192, and C617
- Planeness accuracy: 0.002" (0.05mm)
- Grinding time 90 to 120 seconds per end
- Ready to use for 4" x 8" (100mm x 200mm) test cylinders and 6" x 12" (150mm x 300mm) test cylinders
- Selectable advance speed for 4" or 6" cylinders
- Automatic bi-directional radial displacement of the table
- Aluminum Frame
- Stainless steel outer shell
- Splash guard reduces user exposure to water and dust
- Easy access to water inlet and outlet
- Diamond-grinding wheel included
- **Optional adaptor required for 3" x 6" (75mm x 150mm) test cylinders, order H-2962.2**

Diamond Cutting Wheel Replacement— H-2962.1

H-2962 Specifications	
Sample Size	4" x 8" (102 x 203mm) 6" x 12" (152 x 305mm) cylinders
Cut Precision	Plane and Parallel to within 0.002" (.05 mm)
Cutting Feed	Manual—right hand operation
Cutting Head	Diamond wheel
Cutting Speed	90 to 120 seconds per end
Dimensions	52 1/2" x 24" x 37" (1334 x 610 x 940mm)
Shipping wt.	500 lbs (235kg)



Concrete Micrometer— H-2938

Designed for accurately measuring diameters of concrete cylinders, micrometer has spindles of hardened steel. Thimble and sleeve sections are chrome finish and have black graduations and numbers. Instrument has a range of 5.5 to 6.5 inches; readings can be made to hundredths or thousandths in decimals. Shipping wt. 3 lbs. (1kg)

Core Length Measuring Device— H-2939

For determining concrete core lengths. Device accommodates either 4" or 6" diameter specimens up to 24" long. Allows measurements to be taken at the center of the specimen's upper end, as well as eight equidistant points along the circumference. Measuring rod has graduations 0.10" (2.5mm) apart. Complies with ASTM C174. Shipping wt. 19 lbs. (8.6kg)

Digital Caliper— HC-2817

This 0-20" (0-508mm) digital caliper has 5.9" long jaw blades for use in measuring cylinders. It features a large, easy-to-read LCD digit, rolling thumb wheel; plus control buttons for zero, on/off and inch/mm functions. It provides digital readout to .0005"/0.01mm for error-free reading and an accuracy of $\pm .0025"$. Complies with ASTM C174. Shipping wt. 1 lbs. (.5kg)

Precision Diameter Tape— H-2937

Precision Diameter Tape, Metric— H-2937M

Diameter tapes provide a fast, reliable method for measuring the diameter of concrete, soil and asphalt cores and cylinders. One reading provides round and out-of-round diameters within an accuracy of .001" (.03mm) by means of special graduations and vernier scale. All tapes are made from a stainless alloy and are precision engraved to ensure accuracy. Tape has diameter range of 2" to 12" (50 to 300mm). Includes certificate of calibration. Tapes are calibrated and include a NIST-traceable certification. Complies with ASTM D2166, D2850, D4767, BS 1377:8. Shipping wt. 1 lbs. (.5kg)

Cylinder Carrier (Cradle Type)— H-2945

Steel cylinder carrier is plated to resist rust. Used to carry 6" (152mm) dia. concrete cylinders in field or laboratory.

Cylinder Carrier (Gripper Type)— H-2945G

Employs a hand-grip pincer action to secure standard 6" (152mm) dia. cylinders.

Cylinder Carrier (Gripper Type)— H-2945G-4"

Employs a hand-grip pincer action to secure standard 4" (102mm) dia. cylinders.

4" Concrete Cylinder Wrap— H-2900.4

6" Concrete Cylinder Wrap— H-2900.6

Used to minimize fragment scattering and reduce cleanup time after the compression test. Made of canvas/nylon with Velcro fastening strips.

Sample Cart— H-2944

For use in handling concrete beams and cylinders, plus soil and aggregate samples in the lab or field. Ready to assemble. Cart has pan-type rolled-edge 3-1/2" (89mm) deep steel shelves. Top shelf reverses to flat working surface. Features 5" (127mm) dia. rubber casters; front casters swivel for easy steering. Dimensions: 24" x 36" x 32" (61 x 91 x 81cm). Assembly required. Shipping wt. 43 lbs. (19.5kg)

Welded Sample Cart— H-2943

Premium-grade all-welded cart has 800-lb. capacity. Features 5 x 1-1/4" casters mounted to cross-channel bolster plate for added support, convenient offset handle and 36" x 24" (914 x 609mm) tray size. Smooth finish; no rough edges. Shipped assembled. Shipping wt. 75 lbs. (34kg)



Vertical Cylinder Capper— H-2952

For capping 6" dia. x 12" high (152 x 305mm) concrete test cylinders when making compression tests. Simplifies capping process by assuring plane end surfaces are right angles to the axis of the cylinder. The upright is a guide for positioning the cylinder. Molten capping compound is poured into the mold (plate); then cylinder is placed on the capping material. After the compound is set, the capped cylinder is removed for testing. All types of capping compounds can be used with this apparatus. Capping plate is machined and finish-ground from cold-rolled steel to within .002" (.05mm) planeness. Thickness of the capping plate is 3/4" (19mm), to allow regrinding and refinishing after considerable usage should the plate become gouged. Capping plates are round, allowing circular rotation during use that results in uniform wearing down of contacting surfaces for maximum length of service. The frame is machined from high-strength aluminum alloy. Complies ASTM C31, C39, C192, C617; AASHTO T22, T23, T126, T231. Shipping wt. 27 lbs. (12.3kg)

Capping Plate— H-2952.3

Replacement ring and bottom plate for H-2952 vertical cylinder capper. Shipping wt. 16 lbs. (7.3kg)

Vertical Cylinder Capper— Universal

For 2" dia x 4" (51 x 102mm) Specimens— H-2925A

For 3" dia x 6" (76 x 152mm) Specimens— H-2925B

For 4" dia x 8" (102 x 203mm) Specimens— H-2925C

Base and capping plate are machined from cold-rolled steel. Capping plate is finish-ground within .002" (.05mm) planeness. Guide is machined from high-strength, cast-aluminum alloy. Shipping wt. 18 lbs. (8.1kg)

Capping Plates—

For 2" dia x 4" (51 x 102mm) Specimens— H-2925A.1

For 3" dia x 6" (76 x 152mm) Specimens— H-2925B.1

For 4" dia x 8" (102 x 203mm) Specimens— H-2925C.1

Replacement top and bottom plates for H-2925 vertical cylinder capper.

Durometer Ranges

50 Durometer: 1500 to 2200 psi (10.3 to 15.1MPa)

60 Durometer: 2500 to 7000 psi (17.2 to 48.2MPa)

70 Durometer: 4000 to 12000 psi (27.5 to 82.7MPa)

Econ-o-Cap

Precision-machined high-alloy steel retaining caps hold compression pads that fit over the ends of a concrete cylinder. Compression pads are made from tough elastomeric material that evens out irregularities, distributing the test load uniformly to ensure consistent breaks. Includes (2) caps and (2) pads. Meets ASTM C1231; AASHTO T22, T851.

Econ-o-Cap Cylinder Pad Sets	Part #
2" Econ-o-Cap Set	H-2946A
3" Econ-o-Cap Set	H-2946B
4" Econ-o-Cap Set	H-2946C
6" Econ-o-Cap Set	H-2946D

Includes a set of rings (2) and a set of pads (2).

Individual Econ-o-Cap Cylinder Pads	Part #
2" Pad, 60 Durometer	H-2946ACP60
2" Pad, 70 Durometer	H-2946ACP70
3" Pad, 50 Durometer	H-2946BCP50
3" Pad, 60 Durometer	H-2946BCP60
3" Pad, 70 Durometer	H-2946BCP70
4" Pad, 50 Durometer	H-2946CCP50
4" Pad, 60 Durometer	H-2946CCP60
4" Pad, 70 Durometer	H-2946CCP70
6-1/8" Pad, 50 Durometer	H-2946DCP50
6-1/8" Pad, 60 Durometer	H-2946DCP60
6-1/8" Pad, 70 Durometer	H-2946DCP70
6-3/16" Pad (Old Style), 50 Durometer	H-2946DOCP50
6-3/16" Pad (Old Style), 60 Durometer	H-2946DOCP60
6-3/16" Pad (Old Style), 70 Durometer	H-2946DOCP70

Sold individually

Individual Econ-o-Cap Cylinder Rings	Part #
2" Econ-o-Cap Replacement Ring	H-2946AR
3" Econ-o-Cap Replacement Ring	H-2946BR
4" Econ-o-Cap Replacement Ring	H-2946CR
6" Econ-o-Cap Replacement Ring	H-2946DR

Sold individually



H-2953



H-2951 Kit



H-2959



H-2958



H-0735

Compound Melting Pots

Designed for melting capping compound, paraffin and similar materials, compound melting pots feature adjustable thermostat to deliver close temperature control automatically from 100° to 320°F (37.8 to 160°C). Includes cover, pilot light, 6' (1.8m) 3-conductor grounded cord set. Inner pot is cast aluminum encased in a metal jacket with fiberglass and air insulation, keeping heat loss to a minimum. Replaceable heating elements are securely clamped to the bottom and sides of the crucible for even heat distribution. Complies with ASTM C617; AASHTO T231. Shipping wt. 10-30 lbs. (5-14kg)

Compound Melting Pots

Capacity	Amps	Shipping Wt.	Model
4 qt.	6	13 lbs	H-2953 (120V 60Hz)
3.8L	3	5.9 kg	H-2953.4F (220V 50/60Hz)
8 qt.	10	27 lbs	H-2954 (120V 60Hz)
7.6L	5	12.3 kg	H-2954.4F (220V 50/60Hz)
12 qt.	11	29 lbs	H-2955 (120V 60Hz)
11.4L	5.5	13.2 kg	H-2955.4F (220V 50/60Hz)
20 qt.	12	32 lbs	H-2948 (120V 60Hz)
19L	6	14.5 kg	H-2948.4F (220V 50/60Hz)
28 qt.	15	38 lbs	H-2949 (120V 60Hz)
26.5L	7.5	17.3 kg	H-2949.4F (220V 50/60Hz)

Vertical Cylinder Capping Kit, 120V 60Hz— H-2951

Vertical Cylinder Capping Kit, 220V 50/60Hz— H-2951.4F

Kit provides the basic components for cylinder capping and includes: (1) H-2945 Cylinder Carrier, (1) H-2952 Vertical Cylinder Capper, (1) H-2953 Compound Melting Pot, (1) H-2957 Capping Compound and (1) H-2958 Ladle. See individual components for descriptions. Complies with ASTM C31, C39, C192, C617; AASHTO T22, T23, T126, T231. Shipping wt. 140 lbs. (63.5kg)

Concrete Capping Compound, Flake-Style— H-2959

50 lb bag of Sauereisen No. 600 sulfur-based, flake-form capping compound melts and sets within minutes. Silica-filled compound has 150 psi bond strength, 9000 psi compressive strength and 605 psi tensile strength. Compound pours between 265 and 290°F (129 to 143°C). Over-heated material's viscosity is reinstated by decreasing temperature to 290°F. Complies with ASTM C307, C321, C386, C579, C617, D71. Shipping wt. 52 lbs. (24kg)

Capping Ladle— H-2958

Stainless steel ladle with 4" (102mm) dia. bowl is used in transferring capping compound from melting pot to capping fixture.

Strength Testing Video CD— H-0735

Video CD that covers ASTM concrete strength testing with presentations and test specific videos that explain and show the step-by-step procedures needed to accomplish each test.

**Compressometer-Extensometer**

Combined compressometer and extensometer for 6" dia. x 12" L (152 x 305mm) concrete cylinders is a convenient unbounded device. Apparatus contains a third yoke located halfway between the two compressometer yokes and attached to the specimen at two diametrically opposite points. Middle yoke is hinged to permit rotation of the two segments of the yoke in the horizontal plane. Indicator gives deformation readings. Second indicator is furnished for compressometer section. Unit measures changes in length and diameter. All H-2900 Series Compressometers may be ordered with dial gauges, digital indicators or strain transducers, see charts. Digital Indicators and strain transducers can be used to construct a data acquisition system, see below. Complies with ASTM C469. Shipping wt. 22 lb (10kg).

Compressometer

The Compressometer is used for evaluating deformation and strain characteristics of concrete cylinders while undergoing compression testing. The Compressometer includes two cast aluminum-alloy yokes, mounting and central points, stainless steel control rods. Models are available with a dial gauge— with a range of 0.2" (5.08mm) and minimum graduations of .0001 (.0025mm), as well as with a digital indicator or a LSCT transducer. Digital indicators and LSCT models can be used with data acquisition systems through the use of our MiniLoggers, see below. Complies with ASTM C469. Shipping wt. 22 lb (10kg).

Compressometer / Extensometer	Dial Gauge	Digital Indicator	LSCT
6" x 12" (152 x 305mm) cylinders	H-2912	H-2912D	H-2912L
4" x 8" (102 x 203mm) cylinders	H-2917	H-2917D	H-2917L
3" x 6" (76 x 152mm) cylinders	H-2919	H-2919D	H-2919L

Compressometer	Dial Gauge	Digital Indicator	LSCT
6" x 12" (152 x 305mm) cylinders	H-2911	H-2911D	H-2911L
4" x 8" (102 x 203mm) cylinders	H-2916	H-2916D	H-2916L
3" x 6" (76 x 152mm) cylinders	H-2918	H-2918D	H-2918L

Data Acquisition Setups—

You can fully automate your test data collection by using one of these MiniLoggers with any D or L model listed above. The MiniLogger is a simple-to-use, four channel, stand-alone data-logging system, which can collect data generated from digital indicators or LSCT transducers. Use model HM-2325A.3F for LSCTs and HM-2330D.3F for Digital Indicators.

Features include:

- Four channels with real-time data acquisition
- Backlit LCD display
- RS232 interface for computer or printer.
- Nonvolatile test data storage and instrument calibration
- Battery-backed real-time clock
- Auto conversation of calibration between English/Imperial units and SI/Metric units
- View logged test data via the LCD display

Data Cable for Digital Indicator— HM-4469C

Used with HM-2330D.3F MiniLogger and Digital Indicators.

USB Cable for Digital Indicator— HM-4469USB

Data cable to transfer data from digital indicator to computer.

AC Adapter for Digital Indicator— HM-4469AC

Allows digital indicator to run off AC power.



HM-2325A.3F

HM-2330D.3F



All machines feature, quiet-running, continuous-duty hydraulic pumps



HCM-4000iD machine with floor stand.

HCM-2500DIR machine with optional floor stand.

Choose from three Digital Load Indicators see page to right for information.



HCM-0135 Cylinder Loading Shelf is available for use with HCM-2500 Series machines.



How to Order:

HCM-4000iD.5F		Electrical Configuration 110V 60Hz use no suffix 220V 60Hz use .2F suffix 220V 50Hz use .5F suffix
Machine Series	Load Indicating System DIR, iD, LXI	



DIR Digital Indicator— This is a basic, easy-to-use, budget-minded load indicator. The DIR model simultaneously displays both live load and rate of load in force units per second during a test and peak load automatically at the end of a test.

The DIR is one of the easiest-to-use digital load indicating systems available, featuring automatic test reset—eliminating the need to zero between tests—and automatic peak-load display at the end of a test through the pre-set sample-break detector function. The digital's face is set on a 60° angle for easier reading of load values, and the display uses 3/8" (9.5 mm) characters protected by a non glare, scratch-resistant window. Users can select from load-value engineering units of lbs., kN, kg, and N. Designed for years of dependable service, the digital's tactile keys have a life cycle of greater than two million uses, and accuracy is $\pm .5\%$ of indicated load from 1% to 100% of machine capacity, exceeding ASTM C39 and E4 requirements. The calibration program is password protected in permanent, non-volatile memory. The DIR digital has no hardcopy test documentation capabilities.

LXI Digital System GaugeSafe Basic Download Software— HCM-0730

Unlock the power of your testing machine with GaugeSafe. The Windows XP/Vista compatible program will communicate with your testing system via a USB flash (thumb) drive or directly through a USB cable. GaugeSafe Basic will allow you to:

- Edit, Store, Upload/Download Test Methods
- Edit, Store, Upload/Download Calibrations
- Store, View, Print, Test Results and export in ASCII delimited format
- Store Raw Test Data and export in ASCII delimited format

LXI Digital System GaugeSafe Plus Download Software— HCM-0732

Allows you to do all Basic functions plus:

- View, Print, Export XY Plots



iD Digital Indicator— This is the system of choice for those demanding accuracy, ease of operation, test documentation and dependability. The iD Indicator combines an accuracy that exceeds ASTM C39 and E4 requirements and in general is better than $\pm .5\%$ of indicated load from 1% to full machine capacity with a construction designed for the harshest of laboratory applications. All information is clearly displayed on the indicators 4.6" w x 3.4" h (116 x 86 mm) back-lit VGA graphic panel display. Its 320 x 240 pixel screen with adjustable contrast is easily readable in both bright and poor lighting conditions.

During a test, the iD simultaneously displays load, stress and rate of load in the time units selected. At the end of a test it automatically displays peak stress and load, and if activated, the average loading rate applied to the specimen during the test. Large alphanumeric characters display test data in any of the selectable engineering units, force units of lb, kN, kg and N, stress units of psi, MPa, kg/cm², Kpa, size units of in, mm, cm, and time units of seconds or minutes.

Its user-friendly setup menu displays all menu option listings simultaneously, allowing the operator to quickly access the required option, and simply press a key to activate it or enter a numeric value to set the test parameter. This display feature eliminates the time consuming method of scrolling through single line menu displays to find an option or set a function. Its sample type menu lists six common specimen types to select from; cylinder, cube, beam third point and center point, cylinder split in tension and cross-sectional area. Just select and set. Test results can be automatically stored for hard copy documentation.

For test documentation the indicator can be set to automatically store test results for downloading via RS-232 or a USB port w/stick drive to a PC, or for printed reports. Up to 500 tests can be stored to memory and printed in a spreadsheet format. Information includes: Test date and time, sample ID number, sample type, specimen area and length, peak load and peak stress. Optional data includes average rate of load applied to a specimen during a test, cylinder correction factor to C39, cylinder break type, cylinder cap type, sample age and weight, and operator ID number.



LXI Digital Indicator— The LXI Digital is the system of choice for both commercial and in house testing laboratories where ease of operation, accuracy and test documentation is required. During a test, the LXI displays load, stress, rate of load or rate of stress in units of time selected— plus the type of specimen and its size, all simultaneously on the indicator's four line display. At the end of a test it automatically displays both peak stress and load, and if activated, the average rate of load applied to the specimen during the test, with an accuracy exceeding ASTM C39 and E4 requirements.

The user-friendly, scroll-through test setup menu allows the operator to simply select a menu option, enter a yes or no command to activate the option or enter a numeric value to set the test parameter field. A pre-set menu lists five common specimen types to select from; cylinder, cube, beam center, beam third point and cross sectional area, allowing you to select, display and document test data.

All test information is easily read on the indicator's back-lit LCD display, consisting of four lines, each having 20 alphanumeric characters .375" (9.5 mm) in height. Test data can be displayed in any of the selectable engineering units of; Load – lbs., kN, N or Kg, Stress – psi, MPa, Kpa or kg/cm², Size – in, mm or cm and Time – seconds or minutes. A durable membrane keypad is used to select and set all menu functions.

Accuracy exceeds ASTM C39 and 4 requirements and in general is better than $\pm .5\%$ of indicated load from 1% to full machine capacity. For hard copy test documentation, up to 1,000 tests can be stored in memory and printed directly on a parallel port printer or transferred to a PC through a standard USB port. The system also features the X-Y plotting of a load. To transfer stored test results to a PC, the optional Wincom or Wincom Plus data communications transfer program is required. The Wincom Plus program includes the added feature of allowing raw X-Y data to be transmitted directly to a PC for generating a Load/ Stress vs. Time graph. Up to 10 individual graphs stored in the PC can be plotted on a single report page.

An optional piston travel speed indicator package is available, that when activated displays travel rates in either in, mm or cm per second or minute.

HCM-2500 Series

- Perfect machine for labs, contractors and even mobile labs
- Accuracy of $\pm 0.5\%$ of indicated load from 2,500–250,000 lbs. (11–1,112 kN)
- Choice of 3 digital load-indicating systems (see page 112)
- Quiet-running, continuous-duty hydraulic pump
- Supplied with platen set for 6" (150 mm) cylinders using unbonded or sulfur-capping method

The HCM-2500 has all the features you look for in a basic compression testing machine: ruggedness, accuracy, compactness, versatility, and dependability, making it the ideal choice for either field trailer or laboratory testing operations. It is well suited for testing 6" x 12" (150 x 300 mm) concrete cylinders with strengths up to 7,000 psi (48.2 Mpa), or with optional platens, low strength beams. The load frame features a wrap-around box construction with each corner fully welded on both the inside and outside crosshead seams, providing the rugged stability needed for accurate and repeatable test results year after year. The machine's eye-level digital indicator, loading-control valve, and hydraulic pump are positioned on the right side of the load frame for easy access, increasing productivity, and safe operation. Featuring superior rate-of load control, its unique quiet-running, continuous-duty hydraulic pump and pressure-compensated loading-control valve are manufactured to ISO 9001 international quality standards. Exceeds ASTM C39, E4 and AASHTO T22 specifications.

Stand is optional, order HCM-0200, if desired.



HCM-3000 Series

- Accuracy and testing range of $\pm 0.5\%$ of indicated load from 1% to full machine capacity
- Quiet-running, continuous-duty hydraulic pumps
- Rigid load frames exceed ACI 363 frame-elongation requirements
- Choice of 3 digital load-indicating systems (see page 112)

The HCM-3000 features a rigid load frame that exceeds ACI 363 frame elongation requirements, a wide accuracy range, easy-to-use digital load indicating systems and increased testing capacity making it one of the most versatile and affordably priced compression testing machines available in its class. Its wide accuracy range allows you to test everything from 9,000 psi (62 MPa) 6" x 12" (150 x 300 mm) cylinders, to standard 6" (150 mm) concrete beams in one machine. The HCM-3000 is built to last. Comparing its many proven design features to those of lighter competitive machines, you will find that the HCM-3000 utilizes a fully-welded, unique, wrap-around frame design with crossheads that are 25% thicker than competitors, as well as a larger diameter piston with a longer stroke plus a dust shield, a thicker lower platen, hardened to HRC 55 or greater and steel fragment guard doors.

Stand is optional, order HCM-0300, if stand is desired.



HCM-4000 Series

- Accuracy and testing range of $\pm 0.5\%$ of indicated load from 1% to full machine capacity
- Quiet-running, continuous-duty hydraulic pumps
- Rigid load frames exceed ACI 363 frame-elongation requirements
- Choice of 3 digital load-indicating systems (see page 112)

Designed to meet the demands of production testing laboratories where day-to-day performance is required all HCM-4000 series machines exceed both ACI 363 frame elongation requirements and ASTM C-39 and E-4 specifications for accuracy. HCM-4000 series machines are available in three different load frame configurations: Standard model height meeting ASTM C-39 specifications, B-models featuring thicker lower platens meeting ASTM C-140 specification for testing a single full sized concrete block, P-models feature an inside vertical frame opening of 26.750" (68 cm) without upper platen installed and thicker lower platen meeting ASTM C-1314 specification for testing two full size concrete blocks in prism. All three-load frame models will test a full range of specimen types. HCM-4000 models feature thicker crossheads than competing designs and a wrap around frame design that extends the frame side members around the front and back of the crossheads, which are fully welded inside and out forming a solid one piece load frame, providing the frame stability needed for repeatable and accurate test results year after year, even when testing high strength concrete.

For easier operation and loading of specimens, all load frames feature a wide horizontal opening and a large lower compression platen for testing up to 12" (305mm) wide concrete block. The lower platen is hardened to 55 HRC or greater, plated for corrosion resistance and has concentric circles for easier centering of test specimens. A dust shield protects the load frames bottom mounted piston and hydraulic seals. Steel fragment guard doors are mounted on both frame openings for operator protection. **Includes mounting stand.**



HCM-5000 Series

- Rigid load frame exceeds ACI 363 frame-elongation requirements
- Accuracy and testing range of $\pm 0.5\%$ of indicated load from 1% to full machine capacity
- Thicker crossheads and side members than competitors'
- Choice of 3 digital load-indicating systems (see page 112)

High-capacity series compression testing machine features rigid distortion-resistant load frame designed to meet the demands of testing high-performance concrete in a production testing program where accurate and repeatable test results are required.

High-strength frame incorporates thicker crossheads and deeper side members than competitors' models. For easier operation and loading of specimens, the frames feature a wide horizontal opening, large lower platen, bottom-mounted piston with dust shield, heavy-duty load-frame mounting stand that positions the lower platen at a convenient height for loading heavy test specimens, and steel front and rear safety guard doors. The lower platen is through-hardened to 55 HRC or greater, ground plane, plated for corrosion resistance, and has concentric circles for easier centering of test specimens.

Includes mounting stand.

A quick-change platen system is available to assist in fast and easy switching of test platens, order: HCM-0190P.



Humboldt Compression Machine Specifications

	HCM-2500	HCM-3000	HCM-4000	HCM-5000
Maximum Compression Capacity	250,000 lbs (1,112kN)	300,000 lbs (1,334kN)	400,000 lbs (1,780kN)	500,000 lbs (2,224kN)
Vertical Opening	19.375 in. (492mm)	18.5 in. (470mm)	18.375 in. (467mm)	18.375 in. (467mm)
Horizontal Opening	9.25 in. (235mm)	9.5 in. (241mm)	13.312 in. (338mm)	14 in. (356mm)
Piston Stroke	2.5 in (63.5mm)	3 in (76mm)	2.5 in (63.5mm)	2.5 in (63.5mm)
Dimensions W x D x H (w/Opt. Stand)	27 x 17 x 56.312 in. (686 x 432 x 1430mm)	31.5 x 17 x 58.8 in. (800 x 432 x 1486mm)	39.9 x 20 x 61.3 in. (1013 x 508 x 1556mm)	30 x 23.75 x 60.63 in. (762 x 603 x 1540mm)
Lower Platen Dimensions	33.2 sq in. (214 sq mm)	9 x 12 in. (229 x 305mm)	12 x 18 in. (305 x 457mm)	13 x 18 in. (330 x 457mm)
Upper Platen Dimensions	6.5 in. (165mm)	6.5 in. (165mm)	6.5 in. (165mm)	6.5 in. (165mm)
Pump	.5 hp* (.4kw)	.5 hp* (.4kw)	.75 hp (.6kw)	.75 hp (.6kw)
Oil Reserve Capacity	2 gallon (7.6 liter)	2 gallon (7.6 liter)	2 gallon (7.6 liter)	2 gallon (7.6 liter)
Electrical Configuration	110V 60Hz 220V 60Hz 220V 50Hz	110V 60Hz 220V 60Hz 220V 50Hz	110V 60Hz 220V 60Hz 220V 50Hz	110V 60Hz 220V 60Hz 220V 50Hz
Shipping Weight	780 lbs (353kg)	975 lbs (442kg)	1620 lbs (734kg)	2500 lbs (1134kg)

*Optional .75 hp motor available.

Block and Prism Compression Machines

- Test block, masonry prisms, pavers, and wall retainer units
- Testing range from 1% to 100% of machine capacity, with an accuracy of $\pm .5\%$ of indicated load
- Accessories for testing a full range of concrete and cement specimens available.

Block Compression Testing machines are available in two load frame configurations for testing single- or two-block masonry prisms of full-sized block up to 12" (304 mm) wide. The heavy-duty load frames use the same proven design and manufacturing process found in all our machines, with a wide horizontal opening and large lower compression platen for easier loading of test specimens. The machine's mounting stand also places the lower platen at a convenient height for easier loading of heavy specimens. The unique lower dual-platen system features a wear platen through-hardened to 60 HRC or greater and is designed for fast and easy maintenance without the need for expensive rental equipment to remove the platen, unlike the cumbersome singleplate systems used in competitive units. Changing test platens and spacers is quick, easy, and safe with our draw rod, used to adjust the load frame's inside vertical working height, and optional carrier bracket system, which features a heavy-duty arm mounted on the rear left corner of the load frame that pivots on two hinged joints. When the block platen is not being used, it can be conveniently stored on the bracket's arm. **Includes mounting stand.**



shown with optional quick-change platen system

HCM-5000P

Ships with platens and spacers for 6" x 12" cylinders. Order block platen separately

Draw Rods are provided with all Prism Load Frame model machines. The Draw Rod is used by the operator to quickly and easily mount a wide range of test platens and spacers securely to the machines upper crosshead.



Humboldt Block and Prism Compression Machine Specifications

	HCM-4000B	HCM-4000P	HCM-5000B	HCM-5000P
Maximum Compression Capacity	400,000 lbs (1,780kN)	400,000 lbs (1,780kN)	500,000 lbs (2,224kN)	500,000 lbs (2,224kN)
Vertical Opening	18.375 in. (467mm)	26.750 in. (679mm)	18.375 in. (467mm)	26.750 in. (679mm)
Horizontal Opening	13.312 in. (338mm)	13.312 in. (338mm)	14 in. (356mm)	14 in. (356mm)
Piston Stroke	2.5 in (63.5mm)	2.5 in (63.5mm)	2.5 in (63.5mm)	2.5 in (63.5mm)
Dimensions w/ Opt. Stand (W x D x H)	39.9 x 20 x 63.625 in. (1013 x 508 x 1616mm)	39.9 x 20 x 71.625 in. (1013 x 508 x 1819mm)	30 x 23.75 x 60.63 in. (762 x 603 x 1540mm)	30 x 23.75 x 68.875 in. (762 x 603 x 1749mm)
Lower Platen Dimensions	12 x 16 in. (305 x 407 mm)	12 x 16 in. (305 x 407 mm)	12 x 16 in. (305 x 407 mm)	12 x 16 in. (305 x 407 mm)
Upper Platen Dimensions	6.5 in. (165mm)	6.5 in. (165mm)	6.5 in. (165mm)	6.5 in. (165mm)
Pump	.75 hp (.4kw)	.75 hp (.4kw)	.75 hp (.6kw)	.75 hp (.6kw)
Oil Reserve Capacity	2 gallon (7.6 liter)	2 gallon (7.6 liter)	2 gallon (7.6 liter)	2 gallon (7.6 liter)
Electrical Configuration	110V 60Hz 220V 60Hz 220V 50Hz	110V 60Hz 220V 60Hz 220V 50Hz	110V 60Hz 220V 60Hz 220V 50Hz	110V 60Hz 220V 60Hz 220V 50Hz
Shipping Weight	1700 lbs (771kg)	2375 lbs (1077kg)	2800 lbs (1270kg)	2960 lbs (1342kg)



Shown with Optional HCM-0112 2" Platen Set, order separately. Stand is optional with stand-alone models, order HCM-0200, if desired.

HCM-1000 Series

- Machine custom-configured for 2" cube testing
- Accuracy of $\pm 0.5\%$ of indicated load from 2,500 to 100,000 lbs. (11 to 445kN)
- Choice of 3 digital load-indicating systems (see page 112)
- Quiet-running, continuous-duty hydraulic pump

The HCM-1000 is based on our HCM-2500 machine, custom-configured for use as a cube machine. It has all the features you look for in a basic compression testing machine: accuracy, compactness, portability, versatility, and dependability.

The load frame features a wrap-around box construction with each corner fully welded on both the inside and outside crosshead seams, providing the rugged stability needed for accurate and repeatable test results year after year. The load frame is also protected with a unique baked-on, powder-coated painting process for a durable, long-lasting finish that keeps it looking good for years to come. The machine's eye-level digital indicator, loading-control valve, and hydraulic pump are positioned on the right side of the load frame for easy access, increasing productivity, and safer operation. Featuring superior rate-of load control, its unique quiet-running, continuous-duty hydraulic pump and pressure-compensated loading-control valve are manufactured to ISO 9100 international quality standards. Exceeds ASTM C39, E4 and AASHTO T22 specifications.

	HCM-1000
Maximum Compression Capacity	100,000 lbs (445kN)
Vertical Opening	19.375 in. (492mm)
Horizontal Opening	9.25 in. (235mm)
Piston Stroke	2.5 in (63.5mm)
Dimensions W x D x H (w/Opt. Stand)	27 x 17 x 56.312 in. (686 x 432 x 1430mm)
Lower Platen Dimensions	33.2 sq in. (214 sq mm)
Upper Platen Dimensions	6.5 in. (165mm)
Pump	.5 hp* (.4kw)
Oil Reserve Capacity	2 gallon (7.6 liter)
Electrical Configuration	115V 60Hz 220V 60Hz 220V 50Hz
Shipping Weight	780 lbs (353kg)



Shown with Optional Flexural Attachment for Beams, order separately. Stand is optional with stand-alone models, order HCM-0200, if desired.

HCM-0030 Series

- Accuracy of $\pm 0.5\%$ of indicated load from 300–30,000 lbs. (1.3–133.5 kN)
- Choice of 3 digital load-indicating systems (see page 112)
- Compact design requires minimal floor space

The HCM-0030 was developed for testing concrete beams where accuracy and maintaining their required load pacing rate is an essential part of the testing procedure. The load frame incorporates solid steel crossheads and four structural steel side members fully-welded together to form a rigid one-piece load frame. The frame's rigidity is further enhanced by our unique method of mounting the hydraulic cylinder/piston assembly through the center of the top crosshead, fully supporting it and eliminating lateral movement of the piston under load extension, for accurate and repeatable test results, unlike the lighter dual post hollow frames used in competitive units.

The frame features a wide horizontal opening and floor-to-lower crosshead height of 26" (66 cm) when mounted on its stand. Optional accessories include test platen sets, spacers and machine mounting stand. Complies with ASTM C-39, E4 and AASHTO T22 specifications.

	HCM-0030
Maximum Compression Capacity	30,000 lbs (133kN)
Vertical Opening	18.5 in. (467mm)
Horizontal Opening	9.25 in. (235mm)
Piston Stroke	2.125 in (54mm)
Dimensions W x D x H (w/Opt. Stand)	28.625 x 16 x 51.5 in. (727 x 406 x 1308mm)
Pump	.5 hp* (.4kw)
Oil Reserve Capacity	2 gallon (7.6 liter)
Electrical Configuration	115V 60Hz 220V 60Hz 220V 50Hz
Shipping Weight	400 lbs (182kg)

Auxiliary Machine Configuration— HCM-0030RT

Available as an auxiliary load frame mated to a higher capacity machine. The benefit to this would be the cost savings of utilizing the digital indicator and hydraulic system of the host machine. This model includes the stand.

Cylinders	Item	HCM-2500	HCM-3000	HCM-4000	HCM-5000	Ship Wgt.
6 x 12 in.	Platen	Supplied	Supplied	Supplied	Supplied	39 lb/17.7kg
	Spacer	NR	NR	NR	NR	
4 x 8 in.	Platen	Supplied	Supplied	Supplied	Supplied	39 lb/17.7kg
	Spacer	HCM-0612	HCM-0662	HCM-0653	HCM-0653	12 lb/2.5kg
3 x 6 in.	Platen	HCM-0023L	HCM-0023N	HCM-0023	HCM-0023	12.6 lb/5.7kg
	Spacer	HCM-0612	HCM-0661	HCM-0654	HCM-0654	5.5 lb/2.5kg
2 x 4 in.	Platen	HCM-0023L	HCM-0023N	NR	NR	5.5 lb/2.5kg
	Spacer	HCM-0615	HCM-0666	NR	NR	5.5 lb/2.5kg

Supplied: Item comes with machine, NR: Not required



HCM-0612



HCM-0113

Cubes	HCM-2500	HCM-3000	HCM-4000	HCM-5000
6 in. Set	HCM-0113	HCM-0111	HCM-0116	HCM-0116
shipping wgt.	118 lb/53.5kg	97 lb/44kg	97 lb/44kg	97 lb/44kg
2 in. Set	HCM-0112	HCM-0114	HCM-0115	HCM-0115
shipping wgt.	48 lb/21kg	46 lb/21g	46 lb/21kg	46 lb/21kg

Set includes platen and pedestal. Cube pedestal (11 in.) only, order HCM-0022

Beams	HCM-2500	HCM-3000	HCM-4000	HCM-5000	Ship Wgt.
Flexural Attachment	HCM-0119	HCM-0117	HCM-0119	HCM-0119	156 lb/71kg



HCM-0112

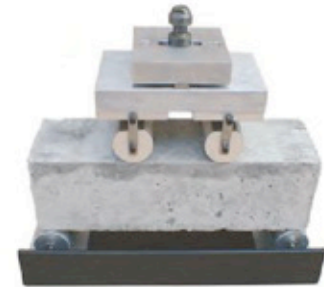
Blocks	HCM-2500	HCM-3000	HCM-4000	HCM-5000
Platen Assembly	HCM-0106	HCM-0106.3	HCM-0107P	HCM-0107P
shipping wgt.	300 lb/136kg	300 lb/136kg	450 lb/204.1kg	450 lb/204.1kg

Block set-ups on HCM-2500 and HCM-3000 do not meet ASTM Specifications

Platen carrier bracket for loading platen into 400K machine: HCM-0190SP

Platen carrier bracket for loading platen into 500K machine: HCM-0190P

Split Cylinders	HCM-2500	HCM-3000	HCM-4000	HCM-5000
Splitter Attachment	HCM-0120	HCM-0124	HCM-0123	HCM-0123
shipping wgt.	120 lb/54.4kg	80 lb/36.2kg	80 lb/36.2kg	80 lb/36.2kg



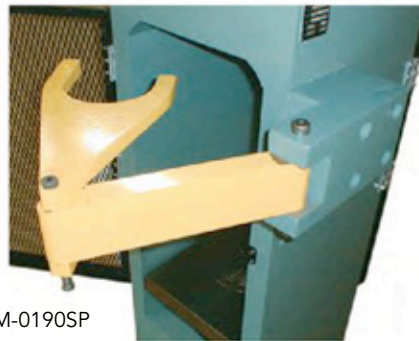
HCM-0119

Platen Carrier Brackets—

Changing block platens and spacers is quick, easy, and safe with the carrier bracket, which features a heavy-duty arm mounted on the rear left corner of the load frame that pivots on two hinged joints. When the block platen is not being used, it can be conveniently stored on the bracket's arm.

400K machine: HCM-0190SP

500K machine: HCM-0190P



HCM-0190SP



HCM-0107P



HCM-0120

Draw Rod Assembly— HCM-0802

Designed for quick and easy installation of test platens and spacers. The Draw Rod is used by the operator to quickly and easily mount a wide range of test platens and spacers securely to the machines upper crosshead. The assembly incorporates an easy to turn handwheel with a ball bearing mounting system and a threaded rod. The hand wheel is used to raise and lower the rod inside the load frame. Spacers used for height adjustments slide over the rod and the rod is then threaded into the test platen and tighten against the crosshead.



Concrete Test Hammers

We only carry the Proceq Concrete Test Hammers. We have found that the Proceq Schmidt hammers are the most accurate and dependable rebound hammers available. Rebound hammers can be used to determine in-place strength of concrete. All the Schmidt hammers below accurately measure compressive strength, which directly determines the load-bearing capacity and durability of concrete structures.

All Schmidt hammers Comply with
ASTM C805, D5873; BS 1881: Part 202;
ISO/DIS8045; ENV 206; IGJ/T 23-2001



H-2971STN
H-2971U

H-2975

H-2975NR

H-2976

Silver Schmidt Hammer— H-2971STN

The Proceq Silver Schmidt Test Hammer has been redesigned to provide unmatched accuracy, repeatability and easy, intuitive operation. The Silver Schmidt features quicker and more accurate testing while addressing the previous insufficiencies of the traditional hammers. With the Silver Schmidt impact direction no longer has an impact on values; values are not affected by internal friction of the hammer operation, and, loss of accuracy because of seal problems is not affected.

In use, the Silver Schmidt eliminates cocking the hammer for each blow and recording the results, the Silver Schmidt allows you to do all your test blows in rapid succession, while it records the results. These results can then be reviewed. Intuitive User Interface is language independent through the use of easy-to-understand icons. The interface menu structure is similar to a mobile phone's. Practically every command can be activated either directly or via no more than 2 consecutive steps.

All data is automatically saved and may be reviewed via the data list. The memory capacity is dependent of the length of tests in a series, but roughly 400 series with 10 readings each can be accomplished with the Silver Schmidt. The Silver Schmidt hammer includes these standard accessories: battery charger with USB cable, data carrier with software, carrying strap, grinding stone, chalk, documentation and carrying bag. Software provided for performing firmware upgrades and selecting presets only. Ship wt. 5lb. (2.3kg)

Silver Schmidt Hammer with Hammerlink Software— H-2971U

Same as H-2971STN, but includes complete Hammerlink software. Hammerlink software features include: extended memory usage; rapid uniformity assessment with summary view; sorting of data; user-defined conversion curves (polynomial and exponential); user-defined statistical methods; highlighting of mean, median and outliers; carbonation correction; print outs, and export to third party software. Ship wt. 5lb. (2.3kg)

Schmidt Hammer, Type N— H-2975

The Original Schmidt® Hammer, Type N, is designed for non-destructive testing of concrete items 4" (100mm) or more in thickness, or concrete with a maximum particle size less than or equal to 1.25" (32mm). It is designed for testing concrete within a compressive strength range of 1,450 to 10,152 psi (10 to 70 N/mm²) and impact energy of the test is 1.6 ft-lbs (2.207 Nm). The (Type N) Schmidt hammer is pressed against the concrete structure and the rebound values are displayed on a mechanical sliding scale. These values can then be correlated to compressive strength by using the conversion table chart affixed to the hammer. The Original Schmidt Hammer is known for its durability and accuracy. Ship wt. 5lb. (2.3kg)

Schmidt Hammer, Type N (N/mm²)— H-2975M

The Original Schmidt Hammer, Type N with a N/mm² scale instead of psi. Ship wt. 5lb. (2.3kg)

Schmidt Hammer, Type NR— H-2975NR

The H-2975NR hammer utilizes the same mechanism as the H-2975, but includes an integral paper strip recorder, which provides rebound values as a bar chart on a paper strip, providing a hardcopy record of the test data. One roll of paper can document 4,000 test impacts. Ship wt. 8lb. (3.6kg)

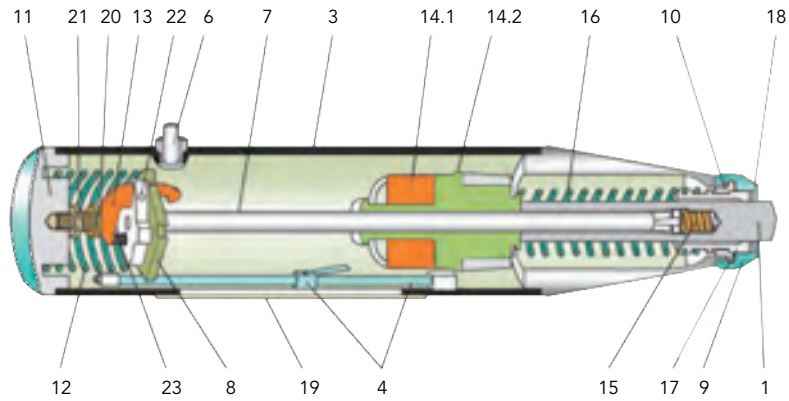
Schmidt Hammer, Type L— H-2975LM

The H-2975L hammer is designed for testing thin-walled structural components with a thickness of less than 4" (100mm) or rock cores. This hammer features an impact of 0.74 Nm, which is 1/3 less energy than Type N hammers and uses a N/mm² scale. Ship wt. 5lb. (2.3kg)

All models include a grinding stone, carrying case and instruction booklet with conversion charts.

H-2975N Replacement Parts

Key	Description	Part#
1	Impact Plunger	H-2975.1
3	Housing, complete	H-2975.3
4	Rider with Guide Rod	H-2975.4
6	Push-button, complete	H-2975.6
7	Hammer Guide Bar	H-2975.7
8	Guide Disk	H-2975.8
9	Cap	H-2975.9
10	Two-part Ring	H-2975.10
11	Rear Cover	H-2975.11
12	Compression Spring	H-2975.12
13	Pawl	H-2975.13
14	Hammer Mass	H-2975.14
15	Retaining Spring	H-2975.15
16	Impact Spring	H-2975.16
17	Guide Sleeve	H-2975.17
18	Felt Washer	H-2975.18
19	Plexiglass Window	H-2975.19
20	Trip Screw	H-2975.20
21	Lock Nut	H-2975.21
22	Pin	H-2975.22
23	Pawl Spring	H-2975.23



Calibration and Repair Services

Humboldt provides complete calibration and repair services for all Concrete Test Hammers. We maintain an extensive inventory of parts for fast turnaround of repairs. Call 1.800.544.7220 for pricing and/or to schedule repairs or calibration.

Digi-Schmidt Concrete Test Hammer— H-2976

The Digi-Schmidt Concrete Test Hammer couples the original Schmidt Hammer with rebound measuring sensors and microprocessor technology to provide an instrument designed for applications requiring numerous measurements. The method is rapid, reproducible, and has resolution previously unattainable by manual models.

The hammer is connected to a control and display unit by means of a connecting cable. Strength values are shown digitally as they are taken and also displayed as groups of bars on the 128 x 128 pixel graphic LCD. Mean value and standard deviation for a preset number of measurements are computed and displayed. Via the menu display, the user can select: hammer impact direction (up, down, horizontal, etc.); desired engineering units (psi, MPa, kg/cm², or N/mm²), and indicate the specimen size and type (cylinders, cubes, etc.) for the strength data to be predicted.

The Instrument measuring range is 1,450 to 10,150 psi (10-70 N/mm²) using 2.207 Nm impact energy. Accuracy is ±0.2R with 0.5R reproducibility. Rebound vs. strength correlation curves for 7 and 28 day strengths are installed in memory, or the users own data may be installed via keyboard entry. The Internal memory holds 5000 measurements, each with date and time. Data can be transferred via the RS-232C interface to a PC in Microsoft Excel using the included cable and software. Direct printing is possible.

The Digi-Schmidt consists of the test hammer, control and display unit, connecting cable, PC cable, carrying strap, rubbing stone, instruction manual and a plastic carrying case. Complies with ASTM C805. Ship wt. 12lb. (5.4kg)

Optional Printer Cable— H-2976C

All models include a grinding stone, carrying case and instruction booklet with conversion charts.



Replacement Paper for NR Hammer— H-2975NRP

Five-pack of chart paper used with the Type NR Schmidt Hammers

Grinding Stone— H-2975.27

Replacement grinding stone

Calibration Anvil— H-2972

Calibration anvil ensures continued test accuracy. For use with all test hammers. Hammers should be periodically checked to determine correct performance. Ship wt. 40lb. (18.1kg)

Conversion Chart Label (psi)— H-2975.25

Conversion Chart Label (N/mm²)— H-2975.25N



H-2978

HC-2978



HC-2997

HC-2995

H-3422

Windsor HP Probe System— H-2978

The Windsor HP Probe System is used to evaluate the compressive strength of in-place concrete. This non-destructive test can be used on fresh or mature concrete with equal effectiveness. The system features an electronic measuring device for accuracy and efficiency. Three individual tests can be automatically averaged and displayed on the LCD in compliance with ASTM procedures. The data, together with time and date of the test can be stored in the memory for uploading to a PC. Two probe and power load types are available: silver probes are used for high performance concrete with strengths up to 17,000 psi (110 MPa) and gold probes for test applications on concrete with less than 3,000 psi (19.4 MPa) strength. The system consists of the drive unit, electronic measuring device, templates, measuring caps, gauge plates and carrying case. Complies with ASTM C803 and BS-1881. Shipping wt. 115 lb (52kg).

Probes are not included and must be ordered separately.

Silver Probe Kit— H-2978.01**Gold Probe Kit— H-2978.03**

Each certified probe kit includes 3 probes and 3 matched, nickel-plated power loads. Silver probe kit is for natural stone or coarse aggregate (density greater than 125 lbs/cu ft). Gold probe kit is for lightweight aggregate (less than 125 lbs/cu ft density)

Shipping restrictions prohibit overseas sales.

Windsor HP Pin System— HC-2978

Measures the compressive strength of concrete, mortar and brick in-situ, quickly, accurately. A non-explosive instrument, the Windsor Pin™ System uses a spring-loaded device to drive a steel pin into the concrete or mortar. The depth of penetration of the needle correlates to the compressive strength of the material under test. A removable chuck and a small pin size facilitate the testing of mortar joints; this is the only system for testing the in-place strength of brick mortar joints. Complies with ASTM C803. **Purchase pins separately.**

Steel Pins for Windsor Pin System— HC-2978.1

Box of 40 pins.

Replacement Micrometer— HC-2978.2**Moh's Scale of Hardness of Minerals— H-3422**

Set includes 9 specimens, from talc to Carborundum, to determine mineral hardness by scratch test. Numbered specimens are keyed to descriptions inside box cover. Shipping wt. 2 lb (1kg).

Dyna Z Pull-off Tester, 1350 lbf (6kN)— HC-2995**Dyna Z Pull-off Tester, 3600 lbf (16kN)— HC-2996**

Used to determine the adhesive and tension strength of concrete structures. Testing is carried out directly on the structure and can be measured on any point of the structure. For the determination of the tension strength it is not necessary to install test devices prior to the casting of the concrete. It is ideal for the evaluation of strength in concrete renovation. Does not require power and can be used in any location. Easy-running crank drive provides constant jerk-free load increase. Can also be used to measure the adhesive strength of applied coatings, such as plastic coatings, concrete coats, mortars and plasters, bituminous coats and paint finishes and coatings on metal. Indispensable for diagnosing damage to building structures and checking of completed renovation/repair work. The legs can be moved and/or lengthened on all models to adapt the positioning to the different test situations. Dyna Z models include digital manometer. Manometer battery provides up to 150 hrs. of operation. Standards: ISO 4624, EN 1015-12, EN 1348, BS 1881 Part 207, ASTM C1583, D4541, ACI 503-30, DIN 1048 Part 2. Shipping wt. 26 lb (12kg).

Dyna ZE Pull-off Tester, 1350 lbf (6kN)— HC-2997**Dyna ZE Pull-off Tester, 3600 lbf (16kN)— HC-2998**

DYNA ZE Pull-off Testers include an electronic display device and pressure sensor. The Dyna ZE provides non-volatile memory for 1000 measured values and provides a 128 x 128 pixel graphic LCD display. These units also provide an RS232 port for downloading information to a computer. Integrated software provides transmission of all measured values to a printer or PC. Uses a 1.5V battery for up to 60 hrs. of operation. Shipping wt. 20 lb (9kg).

Model	Tensile force	Resolution	Accuracy	Permissible Stroke
HC-2995 HC-2998	6kN	0.01N/mm ²	<2%	4.0 mm
HC-2996 HC-2997	16 kN	0.01 N/mm ²	<2%	3.5 mm

Test Disks, Aluminum— HC-2995.1

50mm tests disks for use with Dyna Pull-off Testers, set of 10.

Test Disks, Steel— HC-2995.3

50mm tests disks for use with Dyna Pull-off Testers, set of 10.

Replacement Draw Bolt— HC-2995.2

Steel replacement draw bolt for Dyna Pull-off Testers.

Rebar Locators/Covermeters

Humboldt offers a large selection of rebar locators and concrete covermeters, from basic models to the latest in digital technology. We have rebar locators and covermeters to fit almost any application and budget. If you need to know bar size or are concerned with mapping bar orientation or depth of cover over a large area, one of the digital models would be called for. We also have a rebar locator/covermeter that includes the ability to do half cell corrosion detection.



H-2981



H-2974

Profometer 5+— H-2981

The H-2981 Rebar Locator features a universal probe that allows you to measure both shallow and deep ranges at the push of a button. This gauge will locate, size and show bar orientation, as well as indicate concrete cover. In areas where adjacent and parallel bars effect readings, the operation can include a correction to isolate bars for more accurate diameter determinations.

The operator can also include a correction factor for determining cover depth in congested bar arrangements. The H-2981 includes several optical and acoustical locating aids, one of which is a variable tone level that can be heard over the internal loudspeaker or on a headset. Highly accurate measurements and single-probe design makes this rebar locator an easy-to-use workhorse. Includes processing and report generation software. Complies with ACI 318, BS 1881 Part 204. Also see Profometer 5+ ScanLog— H-2982 on page 122

See Accessories on page 122.

MKIII Rebar Locator— H-2974

The H-2974 Rebar Locator is the digital version of a classic rebar locator, rebar finder, which enables the user to locate reinforcement bars and determine their location and size. This gauge uses a single sensor for all depth ranges and can determine bar size with the use of the included spacer block. The unit can statistically analyze data, searching automatically for minimum cover points, and the least cover of a group of points. Cover points can be displayed as a symbolic map of a structure to assist the user in finding problematic areas. Built in memory can store over 80 thousand individual data points for processing and the LCD can be changed to daylight mode for easier viewing in bright sunlight. The optional scan cart and software can be used to graphically display a cross section of the concrete and the location of the metal objects within. With its built in encoder objects can be located with both distance and depth recorded. Basic unit includes: rebar locator, probe with 8 foot cable, spacer block, sizing template, charger, and headphones. Complies with ACI 318, BS 1881 Part 204.

See Accessories on page 122.

	H-2981	H-2974
Range (depends on bar size)	Shallow: up to 3.94" (100mm) Deep: up to 7.28" (185mm)	Standard: up to 3.75" (95mm) Deep: up to 7.00" (180mm) Narrow: up to 3.10" (80mm)
Accuracy	Better than $\pm 0.08"$ (2mm) or $\pm 5\%$ for cover	
Bar Sizing	#3-12 (8-40mm) better than ± 1 bar size	#2-18 (5-50mm) better than ± 1 bar size
Display	LCD w/ backlight	LCD w/backlight
Memory	160,000 objects with 60 measurements	10 linear batches of 1,000 readings each
Data Output	RS232 or USB adapter	RS232 interface
Power Supply	1.5V (6), 45 hr operation; 30 with backlight	7.4V lithium ion, 32 hrs/4 hr charge
Dimensions	16.3 x 19.7 x 4.9" (415 x 500 x 125mm)	9 x 5.1 x 4.9" (230 x 130 x 125mm)
Weight	12 lb (5kg)	45 lb (20kg) (does not include head)



HC-2983A

Profoscope+— HC-2983A

The Profoscope+ is a fully integrated rebar locator, which includes data storage and the ability to download data to a PC through the included Profolink software. The HC-2983A is a one-piece instrument that provides quick and accurate location of rebar and is ideally suited for those who are using rebar location for drilling and cutting operations. The unit's unique feature of being able to quickly find the center point between two bars allows operators to quickly locate a drilling location. The unit's memory provides two modes of operation: The manual data storage allows the user to save concrete cover and rebar diameter on individually chosen spots. The automatic data storage is especially designed for surface scans. Every time a rebar is detected, the cover value is stored automatically. The unit provides the storage of 49,500 total measurements. Complies with ACI 318, BS 1881 Part 204. Shipping wt. 13 lb (6kg).



HC-2974

Mini R Rebar Locator— HC-2974

The HC-2974 is a rugged, digital, hand-held field instrument for finding the location and depth of reinforcement bars. The device is light weight and inexpensive, and an easy-to-use unit for locating rebar. Rebar detection of up to 10" (250mm) can be accomplished when locating large diameter rebar. An easy-to-read display and a 4 hr battery life are just a few advantages that make the HC-2974 one of the most advanced hand held units in the field today. The system allows the user to select between Imperial and Metric units, and the data can be saved in the instrument for later uploading to a computer. Data is saved in the unit with the date and time of the record to help identify prior tests. The eddy current sensor provides the ability to not only locate steel reinforcing bars accurately, but also tendons, copper tubing, conduit, and more. Built in memory can store over 150 individual data points for later processing. Complies with ACI 318, BS 1881 Part 204.



H-2982

Profometer 5+ ScanLog— H-2982

The H-2982 ScanLog system takes the H-2981 Profometer 5+ and adds the Cyberscan function used to visualize reinforcing bars on the display, a "measuring with grid" function for grayscale display of concrete cover and the ScanCar probe cart with an integrated path measuring device for scanning. Memory capacity: 120,000 values in function measurement with grid and a total of 60 objects. Complies with ACI 318, BS 1881 Part 204.

Rebar Locator Accessories

H-2981/H-2982/HC-2983A Accessories

Telescopic Extension Rod— H-2981.1

5 ft telescoping rod for use with Profometer probe

Marking Pen— H-2981.2

Pen with three refills, for use with universal probe.

Calibration Test Block— H-2981.3

Test block for ensuring proper operation

Probe Cable— H-2981.4

5 ft. (1.5m) cable for connecting probe

Path Measuring Device Cable— H-2981.5

5 ft. (1.5m) cable for use with ScanCar

ScanLog Upgrade Package— H-2981.7

Probe carriage ScanCar complete with path measuring device cable 5 ft. (1.5m) for H-2981.

H-2974 Accessories

Optional Software— H-2974.1

Includes the following: scan cart, 2-piece extension rod, 12 ft cable, scanning software. Turns your Basic Unit into a complete system

Replacement Probe— H-2974.3

Standard probe replacement

Probe Cable— H-2974.4

8 ft cable for connecting probe to unit.

Extension Rod— H-2974.5

2-piece extension rod for use with scan car.



H-2981.1



H-2981.2



H-2981.3



H-2981.4



H-2981.7



H-2981.4



H-2974.1



H-2974.2



H-2876A



H-2879



H-2872



H-2873A

CANIN+ with rod electrode— H-2873A

CANIN+ with rod electrode for half-cell corrosion measurement — consisting of: Indicating device Canin+, adjustable, padded carrying strap, protection sleeve for display instrument, transfer cable, USB-serial adapter, operating instructions, carrying case Canin+ Rod Electrode with spare parts, electrode cable 1.5m (4.9 ft.), cable coil 25m (82 ft.), bottle with copper sulphate (CuSO4) 250g, Canin ProVista PC software on memory stick.

CANIN+ w/ Rod & Wheel Electrodes— H-2875A

CANIN+ with rod and wheel electrodes for half-cell corrosion potential measurements — consisting of: Indicating device Canin+, adjustable, padded carrying strap, protection sleeve for indicating device, transfer cable, USB-serial adapter, operating instructions, carrying case Canin+ Rod Electrode with spare parts, electrode cable 1.5m (4.9 ft.), cable coil 25m (82 ft.), bottle with copper sulphate 250g, 1-wheel electrode system, tool kit to wheel electrode system, bottle with citric acid 250g Canin ProVista PC software on memory stick.

CorMap Rebar Corrosion Mapping System— H-2872

The CorMap is a simple and economical instrument for use in identifying areas of probable rebar corrosion. The system consists of the voltmeter, two electrode extensions, reference electrode with copper sulfate reservoir, copper sulfate, wetting agent reservoir, dispensing sponge, 250 ft. (80m) cable reel, and a heavy-duty carrying case. In operation, the high impedance voltmeter is connected between the reinforcing steel and the reference electrode on the concrete surface where a measurement can be made for the half-cell potential. This measurement is then used to determine the probability of corrosion activity. By testing at a fixed distance apart, a grid of half-cell potentials can be developed and areas delineated. Complies with ASTM C876; BS 1881 Part 201.

Copper Sulfate, 8.5 oz (400ml) container— H-2872.1

Resipod Concrete Resistivity Meter, 1-1/2" (38mm)— H-2879

Resipod Concrete Resistivity Meter, 50mm— H-2879.50

The Resipod is the fastest and most accurate concrete surface resistivity meter available. The 38mm (1-1/2") model is the only known meter available commercially to meet the new AASHTO provisional standard TP95-11. Concrete surface resistivity testing is a non-destructive and simple method for on-site evaluation of concrete. The Surface Resistivity (SR) test is a quick, proven method for estimating concrete permeability, and can replace the laborious rapid chloride permeability test. In other applications, measurements can show likelihood of corrosion, estimation of corrosion rate, curing efficiency, and predict structure durability.

Features and Benefits

- DOT tested and field proven through highway department studies
- Shows variations of water/cement ratios within concrete structures
- Identifies areas within a structure most susceptible to chloride penetration.
- Automatically detects a good connection between the instrument and concrete surface, with an alert to the user of a poor connection
- Hold, save and delete functions, with onboard memory
- Supplied with a USB connection and dedicated Resipod Link PC software
- Waterproof and designed to float
- Supplied with a rugged carrying case, test block and documentation

Dimensions: 7.8 x 2.1 x 2.7" (197 x 53 x 69.7mm)

Power Supply: 50+ hours autonomy

Operating Temperature: 32° to 122°F (0° to 50°C)

Shipping Wt. 1 lb. (454g)



H-2854

V-Meter, Ultrasonic System with Software— H-2854S

The V-Meter™ is an advanced ultrasonic, pulse-velocity test system widely used for quality control and evaluation of concrete structures. It can identify non-homogeneous conditions such as voids, cracks, honeycombs and frozen concrete. The V-Meter comes with standard 54kHz transducers, and its large easy-to-read display is perfect for field use. The battery will last up to 10 hrs. on a single charge, and the unit is capable of storing over 1800 readings for later processing. Conforms to ASTM C597, BS1881-203 and other international standards. Frequency Range 24-500 KHz, based on transducers Selected sensitivity 250 micro volts, between 30 KHz and 100 KHz Input impedance approximately 2 M OHMS. Transit Time 0.1 to 6400 microseconds, direct digital display. Accuracy + 0.1 microseconds. Pulse Rate selectable 1, 3 or 10. Transmitter output pulse 1000/500V, 2 microseconds. Display 240 x 64 pixel graphic LCD. Storage 1 K byte Data Transfer RS-232C. Temp. Range 0° to +40°C. Battery NI-CAD batteries, 9 hours operation. Dimensions 7.5" x 4" x 8" 190 x 100 x 203mm. Shipping wt. 6 lb (3kg).

V-Meter, Ultrasonic System without Software— H-2854

The V-Meter comes with standard 54kHz transducers, and its large easy-to-read display is perfect for field use. The battery will last up to 10 hrs. on a single charge. Conforms to ASTM C597, BS1881-203 and other international standards. Frequency Range 24-500 KHz, based on transducers selected. Sensitivity 250 micro volts, between 30 KHz and 100 KHz. Input impedance approximately 2 M OHMS. Transit Time 0.1 to 6400 microseconds, direct digital display. Accuracy + 0.1 microseconds. Pulse Rate selectable 1, 3 or 10. Transmitter output pulse 1000/500V, 2 microseconds. Display 240 x 64 pixel graphic LCD. Storage 1 K byte Data Transfer RS-232C. Temp. Range 0° to +40°C. Battery NI-CAD batteries, 9 hours operation. Dimensions 7.5" x 4" x 8" 190 x 100 x 203mm. Shipping wt. 6 lb (3kg).

V-Meter, Ultrasonic System Software Upgrade— H-2854.1

Software to upgrade H-2854 V-meter to H-2854S V-meter system.



H-2984

Pundit Lab, Ultrasonic Test Device— H-2984**Pundit Lab+, Ultrasonic Test Device— H-2983**

Pundit Lab Ultrasonic Testers can be used to detect the presence of cracks, voids and other imperfections in concrete, as well as the determination and monitoring of concrete strength and deterioration of concrete, which may have occurred due to age, fire, frost or chemical attack. Comply with the following standards: EN12504-4 (Europe), ASTM C597-02 (North America), BS 1881 Part 203 (UK), ISO1920-7:2004 (International), IS1311 (India)

Pundit Lab Features:

Measurement performance: Optimized pulse shaping, automated transmission settings and a range of powerful transducers.

Integrated waveform display: Allows analysis of the received signal and manual triggering directly on the instrument.

On-line data acquisition: Full remote control of all transmission parameters, data logging function and functionality that turns your PC into an oscilloscope.

USB interface and data analysis software: Data analysis and export to third party programs through Open Interface such as LabVIEW.

Pundit Lab+ Additional Features:

Integrated gain stage: Removes the need for an external amplifier when using exponential transducers and long cables.

Compressive strength measurement: Conversion curves for strength estimation can be created in the software and uploaded to the instrument to give instant strength estimations on site.

Combined estimates with rebound hammer: SONREB curves may also be uploaded into the Pundit for improved compressive strength estimates in combination with rebound hammer measurements.

Time stamp: A real time clock can record every measurement.

Review list: Saved measurements may be reviewed directly on site without the need for a PC connection.

H-2984 Pundit Lab ships with: Display unit, 2 transducers (54kHz), 2 BNC cables 1.5 m, couplant, calibration rod, battery charger with USB-cable, 4x AA (LR6) batteries, data carrier with software, documentation and carrying case

H-2983 Pundit Lab+ ships with: Display unit, 2 transducers (54kHz), 2 BNC cables 1.5 m, couplant, calibration rod, battery charger with USB-cable, 4x AA (LR6) batteries, data carrier with software, documentation and carrying case

H-2984.1— 24 kHz Transducer (Two required for operation)

H-2984.2— 54 kHz Transducer (Two required for operation)

H-2984.3— 150 kHz Transducer (Two required for operation)

H-2984.4— 250 kHz Transducer (Two required for operation)

H-2984.5— 500 kHz Transducer (Two required for operation)

H-2984.6— (2) 54 kHz Exponential Transducers (include calibration rod)

H-2984.7— (2) 250 kHz, Shear Wave Transducers (include couplant)



H-2878

H-2877

H-2874

H-2877.1

ASR Detect™— H-2878

ASR Detect™ is both a practical and a scientific tool. It's principal application is analyzing existing concrete structures. By identifying ASR deterioration in its earliest stages, ASR Detect facilitates the problem being identified when remediation techniques can be applied; for example, treating the concrete with a lithium-bearing solution to inhibit further deterioration. Where deterioration is advanced, ASR Detect provides a clear picture of the extent and depth of the damage.

As a scientific tool, ASR Detect can be applied to improving the understanding of where, how and why ASR occurs. That understanding is basic to developing ASR preventatives that allow high-alkali cements or poor-quality aggregates to be used in concrete mixes without risking the development of ASR.

To identify Alkali Silica Reaction (ASR) in concrete, two reagents are applied to the broken surface of a concrete core and the excess rinsed off. On contaminated concrete, the resultant stains reveal the presence of ASR. The stains also reveal the extent of the ASR in the concrete and indicate the stage of ASR progression. Yellow indicates that degradation has begun; pink warns that degradation is advancing.

Carbo Detect™— H-2874

Carbo Detect™ is a simple colored dye field test for detecting carbonation. The single reagent is sprayed on the surface to be checked. The reagent will change to pink in uncarbonated concrete and remain colorless when sprayed on carbonated concrete.

The Chlorimeter Chloride Test System— H-2877

A field kit for the determination of chloride ion content in concrete, fresh cement, masonry, most other construction materials, and water. The determination of the chloride ion concentration in concrete is essential in assessing the need for maintenance on, for example, bridge decks and parking structures. The test can also be used to ensure that materials used in new construction are free from potentially harmful chloride ion levels. The Chlorimeter produces results on-site, within minutes that are accurate and comparable to expensive laboratory tests. With this method, the concentration of acid soluble chlorides is measured. In most cases, this is equivalent to total chloride concentration. It measures the electrochemical reaction of a weighted sample placed in an extraction liquid. It automatically shows a temperature compensated reading of percent of chlorides on its digital display. A wide range— from 0.002 to 2% chloride by weight— is covered.

Kit does not include required hand drill or extraction and calibration liquids, which can be ordered below.

Consumables:**Extraction and Calibration Liquid, small kit— H-2877.1**

Pack of 12 jars, extraction liquid and calibration liquid

Extraction and Calibration Liquid, large kit— H-2877.2

Pack of 100 jars, extraction liquid and 20 jars of calibration liquid



Concrete RH/Moisture Meter Kit with BluePeg Sensor— HC-3000

Concrete RH/Moisture Meter Kit with BluePeg Sensor Relative Humidity and Moisture Meter Test Kit for concrete slabs provides compliance with ASTM F2170-02 standard. Kit consists of Meter, (1) Reusable RH Blue Peg Sensor, (10) RH sleeves, RH cable and case.

Experts recommend the RH test as the most reliable in-depth measuring method for concrete moisture available today. The RH BluePeg System Measures relative humidity, temperature and dew point. The RH Blue-Peg uses a single microchip, factory calibrated to NIST standards. Each BluePeg comes with a NIST traceable certificate.

In Scan Mode, the Meter has a calibration built-in for comparative readings of concrete and sheetrock. For all other building materials the reference scale can be used to identify moisture.

In RH Mode, this meter can also be connected to the RH BluePeg sensor for in-situ measurements that conform to ASTM F2170.

Scan Mode Properties:

Resolution: 0.1% for entire measuring range

Measuring Depth: 1/4 or 3/4" deep (7mm and 20 mm)

Reference Scale: 0-99 for non-wood building materials, 0-99 for concrete, 0.4-2.0 for gypsum

RH Mode Properties:

RH Range: 0-99%, Temp: 0 to 200 degrees F or -15 to 95 degrees C.

RH BluePeg Sensors, 5-Pack— HC-3000.1

Reusable RH BluePeg Sensors for use with HC-3000 Meter for testing concrete to ASTM F2170, ASTM F2420, BS 5325 and BS 8203 standards.

RH Sleeves, 20 sets— HC-3000.4

RH Sleeves, 20 sets— HC-3000.5

Relative Humidity Sleeves for use with HC-3000 BluePeg Meters. Includes Liner Sleeve and Top Seal Cap.

Moisture /Thermo-Hygrometer—HC-2991

Advanced Moisture/Humidity meter measures the moisture content, relative humidity, temperature and dew point of concrete and gypsum flooring. The meter enables you to carry out four individual tests:

- Moisture content of concrete or gypsum flooring Relative humidity, temperature and dew point of floor environment
- Below surface, In-situ measurements of Relative humidity, temperature and dew point per ASTM F2170
- Relative humidity, temperature and dew point above floor surface using RH hood test method BS 5325-2001 & 8202-2001
- Moisture Mode: Measures concrete from 0 to 7% moisture, 0 to 12 (comparative) for anhydrite and gypsum screeds and 0 to 100 reference.

Hygrometer Mode/RH Mode: Measures 5 to 98% RH, 14 to 120°F (-10 to 50°C) and 0.1% RH 1°C/F. Can store 900 readings in 30 files, large LCD display, RS232 port. Power supply is 9 volt PP3 lithium manganese battery. Includes meter, software and PC cable.

RH Probe for HC-2991— HC-2991.3

Relative Humidity Probe for use with HC-2991 Meter for testing concrete to ASTM F2170, ASTM F2420, BS5325 and BS8203 standards.

Moisture/Hygrometer Kit— HC-2992

Kit includes: a HC-2991 Moisture and Humidity Meter with Software and PC Cable, Two Relative Humidity Probes, RH Probe Calibration Check Solution with Sleeve, Pack of twelve RH Sleeves, and optional instant-read Infrared Surface Thermometer. Use to perform ASTM F2170 and ASTM F2420.

Concrete Moisture Meter—HC-2994

The HC-2994 is a digital, upgraded version of the original Concrete Encounter (HC-2990). It measures moisture to 7% and complies with BS Standard BS 5325 and BS 8203 for above surface readings of Relative Humidity. It will also accept a relative humidity probe (HC-2994.1) for compliance with ASTM F2170 readings.

RH Probe for HC-2994— HC-2994.1

Relative Humidity Probe for use with HC-2991 Meter for testing concrete to ASTM F2170, ASTM F2420, BS5325 and BS8203 standards.

RH Sleeves, 12 sets— HC-2991.1

RH Sleeves, 50 sets— HC-2991.2

Relative Humidity Sleeves for use with HC-2991 and HC-2994 Meters. Includes Liner Sleeve, Seals and Stops.

Concrete Encounter (Moisture)—HC-2990

The Concrete Encounter is a hand-held electronic moisture meter, which uses non-destructive impedance measurement to determine moisture levels in concrete floors. The Concrete Encounter will give you an instant reading of moisture content to over 6% for concrete and 0-10 comparative for gypsum floor screeds, enabling you to make an informed decision on when to install floor coverings. Designed to be used on clean, dust-free slabs, just switch on and press the instrument firmly against the floor surface. Readings are read directly from the analog meter. Coplanar electrodes with spring-loaded contacts enhance signal depth and sensitivity to a depth of .5" (12.5mm).

Vapor Emission Test Kit, 12-Pak

(10,000 sq. ft.)— HC-2993B

Vapor Emission Test Kit, 3-Pak

(1,000 sq. ft.)— HC-2993A

Vapor Emission Test Kit, 12-Pak (10,000 sq. ft.) The vapor emission test is used for determining the moisture acceptability for the placement of floor coverings and coatings over concrete slab surfaces. Using this method, users can easily quantify the volume of water vapor emitting from a 1,000 square foot concrete slab over a 24-hour period. Commonly known as the Anhydrous Calcium Chloride Vapor Emission Method, the test is directly specified by the vast majority of the Floor Covering Industry as the primary measure of moisture acceptability for floor covering or coating installations. The kit consists of a calcium chloride container, a specifically designed dome cover with seal and step-by-step instructions. A balance or scale readable to 0.1 grams is required, but must be purchased separately. Complies with ASTM E1907 and F1869 specifications.



HC-2940

H-2936A

HC-2937

HC-2938

HC-2939

HC-2942A

HC-2943

HC-2944

HC-2941

Crack Width Gauge— HC-2940

The Crack Width Gauge is designed specifically to measure widths and locations of cracks prior to beginning a monitoring program. The Crack Width Gauge is suitable for internal and external use. It is made of polycarbonate, which has a coefficient of linear thermal expansion of 7.0×10^{-5} cm/cm/°C for ambient temperatures between -30°C and 30°C. The scale is calibrated from the end of the gauge to facilitate measuring cracks in corners. Supplied in protective case. Conforms to BS EN ISO 9001:2000.

Standard Crack Gauge— H-2936A

Crack Gauges can be used to monitor horizontal or vertical movement across a crack on a flat surface. The H-2936A Standard Crack Gauge is a precision device that consists of two plates, which overlap for a part of their length. The bottom plate is transparent and marked with a hairline cursor in the form of a cross. Can be fixed to the surface with screws or adhesive (not included). Supplied with instructions and record sheet.

Crack Gauge Plus— HC-2937

The Crack Gauge Plus can be used to monitor horizontal or vertical movement across a crack on a flat surface. The plus offers to upgrades to the standard design. Rather than presetting the two measuring plates together at zero with tape, the plus uses four small pegs, which ensure alignment during installation and then removed during monitoring. The Plus also provides measuring flats, which allow accurate readings to be taken with calipers during monitoring. Can be fixed to the surface with screws or adhesive (not included). Supplied with instructions and record sheet.

Corner Crack Gauge— HC-2938

The Corner Crack Gauge uses a hinged mounting bracket to allow monitoring of cracks in corners with angles between 70° and 180°. Monitors both internal and external corners. Corner gauges use the design of the plus gauge using four small pegs, which ensure alignment during installation and are then removed during monitoring. The corner gauge also provides measuring flats, which allow accurate readings to be taken with calipers during monitoring. Can be fixed to the surface with screws or adhesive (not included). Supplied with instructions and record sheet.

Displacement Crack Gauge— HC-2939

The Displacement Crack Gauge monitors horizontal and displacement movement where there is a step across a crack due to displacement of "out-of-plane" movement. The gauge consists of a base plate (not calibrated), a top plate (calibrated) and a graduated ruler. The ruler is removed from the gauge when not taking a measurement, but used to measure the relative movement in the plates. Can be fixed to the surface with screws or adhesive (not included). Supplied with instructions and record sheet.

Crack Monitoring Kit— HC-2941

A kit designed to provide all the products needed to set up a crack monitoring program. Supplied with a courier bag with shoulder strap, the kit includes: (1) Crack Width Gauge; (5) Crack Gauge plus (1) pair of Corner Crack Gauges; (7) packs of fixing screws; (1) Crack Monitor Adhesive; instruction booklet and record sheets.

Crack Monitor Adhesive— HC-2942A

Crack Monitor Adhesive is a fast-hardening 2-component Epoxy Adhesive for use in affixing crack monitors to concrete surfaces. Comes in a one ounce dual-tube syringe for easy application.

Caliper Marks— HC-2943

Caliper Marks can be affixed with plastic padding to either side of a crack to be monitored and then used to measure crack movements with a caliper.

Screws and Plugs— HC-2944

Package of (4) four zinc-plated screws and four plastic plugs, suitable for affixing a crack gauge to a flat surface.



Digital Caliper (0-200mm)— H-2816.8

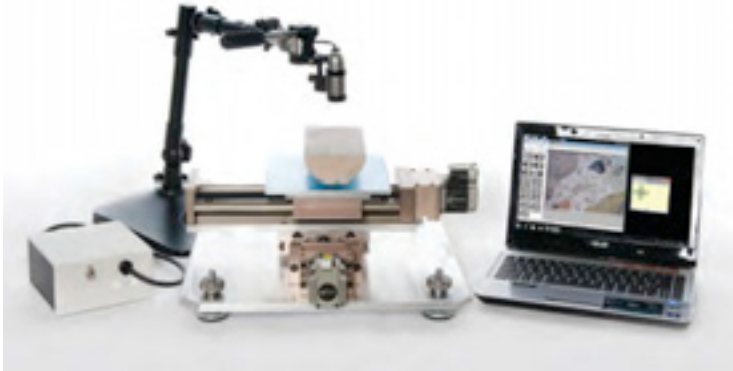
Provides accurate outside, inside, depth and step measurements and features large, easy-to-read LCD digits, rolling thumb wheel; plus control buttons for zero, on/off and inch/mm functions.



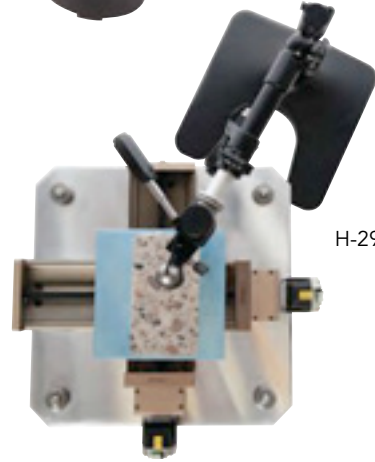
H-3230



H-2851



H-2964A (shown with computer, not included)



H-2964A

Multi-Length Strain Gauge Set— H-3230
Digital Multi-Length Strain Gauge Set— H-3230D
Metric Multi-Length Strain Gauge Set— H-3231
Digital Metric Multi-Length Strain Gauge Set— H-3231D

Mechanical gauge is recommended as a substitute for the Whittemore strain gauge for many applications. Designed to measure strain in masonry-type materials, structural components under load, opening or closing of structural cracks, measuring relative structural displacements, rock mechanics testing and drying shrinkage of concrete block testing. Instrument frame is cast aluminum alloy with 5 master settings of 2, 4, 6, 8 and 10 inches, easily set for gauging. Dial indicator has .0001" minimum graduation; effective strain range is 0.3". Maximum linear measurement is 0.4". Set includes: strain gauge, dial indicator, 8 brass inserts, 2 contact seats, 2 mounted contact points, invar master bar, punch bar and one compartmented wood storage case. Metric model has 5, 10, 15, 20 and 25cm settings and dial indicator with 002mm graduations. Complies with ASTM C426.

Linear Traverse Machine (ASTM C457), 120V 60Hz— H-2964A
Linear Traverse Machine (ASTM C457), 220V 50/60Hz— H-2964A.4F

The Linear Traverse Machine is used to facilitate the counting of microscopic voids in concrete. The H-2964A complies or exceeds ASTM C457 specifications. Computer software controls the motorized specimen table with solid-state positioning motors. The software controls the traverse patterns and distances between measurements based on test sample parameters. The software also provides counting determinations to be made to material-type categories. Test results can be exported to Microsoft Excel for analysis and printing. Printable reports can be configured to M.O.T. or ASTM requirements. Shipping wt. 99 lb (45kg)

Unit includes:

- Digital microscopic video camera with integral light source.
- Computer-controlled motorized specimen table with solid-state positioning motors.
- Software CD with controller
- Multi-adjustable camera stand.

Computer is not included.

Impact Echo Concrete Test System— H-2851

System includes one pistol-grip transducer and one dual-head wave speed transducer. This will cover all possible testing needs. For determining the depth of surface-opening cracks, one end of the dual-head transducer can be used in conjunction with the pistol grip transducer. By its self, the dual-head transducer is used for independent measurements of wave speed. The system also includes a laptop computer and the necessary software to operate the system.

The Pistol Grip transducer is used for routine impact-echo testing. When the transducer is put in place on the test surface it is armed by depressing a trigger or button. The pistol grip transducer is armed with a trigger on the underside of the handle. It is especially well suited to flat surfaces.

The Dual-Head provides accurate measurements of depth and thickness by measuring the wave speed (speed of sound) in concrete, which can vary from about 3000 to 6000 meters/sec, depending on concrete quality and type of aggregate. The dual-head transducer shown below is used only for independent measurements of wave speed (required for determining plate or slab thickness in accordance with ASTM Standard C1383-98a). It cannot be used for impact-echo testing. Wave speed can be measured using a single cylindrical or pistol grip transducer only if tests can be performed on a slab of precisely known thickness in the region of the structure where testing will be carried out (not acceptable under ASTM Standard C1383-98a).

Other configurations are available, please contact Humboldt for information.



H-3185B



H-3185SD

Rapid, Freeze-Thaw Cabinet—

The Rapid Freeze-Thaw Cabinet is used to measure the resistance of concrete to deterioration caused by repeated cycles of freezing and thawing in water. The system is designed to test up to eighteen 3" x 4" x 16" (76 x 102 x 406cm) concrete specimens simultaneously, with one being a control. Key features of system include:

- Fully automatic operation frees operator to perform other lab duties.
- Allows users to establish field control using correlations between concrete strength and durability
- Permits the evaluation of variables in concrete properties and conditioning.
- Useful in the evaluation of the durability of aggregates, as well as the properties of admixtures.

Up to eight freeze-thaw cycles are possible within a 24-hour period. But the exact number of cycles is dependent upon the time required for the temperature at the center of the control prism to fall from 40 to 0°F (4.4 to -17.8°C) and then back to 40°F (4.4°C). The temperature at the center of the control specimen is cycled by means of a 3/4 HP (0.6KW) refrigeration unit and electric resistance heaters with fully automatic controls. An electric temperature recorder with 24-hour, 7-day week chart is incorporated into the unit to accurately maintain a record of the control specimen temperature throughout the testing period. For corrosion resistance and long service life, the system features a stainless steel, 84" x 34" x 11" (213 x 86 x 30cm) cabinet construction with 3" (76mm) insulation on all sides. The internal test compartment measures 6" x 26" x 74" (15 x 66 x 188cm). A 30-amp circuit is required for operation. Complies with ASTM C666, procedure A; and AASHTO T161, procedure A. Shipping wt. 1200 lbs. (544kg); 29 cu. ft.

Rapid, Freeze-Thaw Cabinet, 120V 60Hz— H-3185B

Rapid, Freeze-Thaw Cabinet, 220V 50/60Hz— H-3185B.4F

The H-3185B uses on/off control of heating and cooling devices to cycle between two temperatures. It can be set to cycle continuously between two temperatures for a finite number of cycles and then stop. When set to run for a finite number of cycles, ramp rate between temperature extremes can be adjusted, as well as soak duration at each extreme.

- Set temperature min/max for cycles
- Select number of cycles
- LCD temperature display
- analog temperature vs. time graph

Rapid, Freeze-Thaw Cabinet, 120V 60Hz— H-3185SD

Rapid, Freeze-Thaw Cabinet, 220V 50/60Hz— H-3185SD.4F

The H-3185SD goes beyond the basic capabilities of the B model above and provides the following capabilities:

- User-created test capabilities are possible, to change freeze time, temperature minimum, temperature maximum and the number of cycles to run.
- Real-time, on-screen testing with graphing, allowing different data views to be chosen.
- Test data can be reviewed after a test is completed, which includes tabulation and graph views.
- Touch-screen interface for easy navigation.
- Export test data to a PC using Humboldt IR Download. This includes report creation for internal or customer usage.
- Connect to the Freeze-Thaw Cabinet remotely for control and/or observation.

Order H-3195 freeze-thaw molds separately, from page 130.

Replacement Thermocouple Assemblies	Part #
Thermocouple Replacement for H-3185B	H-3185B.3
Thermocouple Replacement for H-3185SD	H-3185SD.3



**Sonometer, 115V 60Hz— H-3175****Sonometer, 230V 50Hz— H-3175.5F**

The Sonometer (ASTM C215, C666) determines changes in resonant frequency of concrete specimens subjected to alternate cycles of freezing and thawing with the Humboldt Freeze-Thaw Cabinet. This apparatus closely follows design parameters set up over 40 years ago by the Portland Cement Association research laboratories. The original PCA design has been modified by changing to solid state circuitry and addition of a built-in cathode ray oscilloscope. No other resonant frequency system includes an oscilloscope despite being strongly recommended in ASTM C215 paragraph 4.2. Other systems offer an oscilloscope connection. The oscilloscope confirms that peak reading on meter is actual resonance and not a harmonic.

The apparatus consists essentially of a driver and pickup circuit. Electrical power is converted by the driver into mechanical vibrations and these vibrations are imparted to the specimen under test. The amplitude and frequency of vibrations are controllable having respective ranges of 0 to 30 watts power and 400 to 12,000 cycles per second frequency with an accuracy of better than $\pm 2\%$. The actual frequency is displayed on a built-in digital counter. The driver is completely portable and comes with 6' plug-in connecting cable.

Resonant frequency can be determined by watching the voltmeter reach its highest point. The oscilloscope verifies resonance because the meter alone also reaches high points on harmonics. When resonance occurs, the actual number is digitally displayed on the frequency counter.

The H-3175 Sonometer is the only system using a phono-type cartridge as a pickup. All other units use accelerometers, which require intimate contact with the test specimen. Changing accelerometer positions on the test specimen is time consuming. With the pickup and driver mounted on portable stands, it is not necessary to use a test bench, which is mandatory on other apparatus. This allows for greater flexibility in testing.

A very detailed instruction manual accompanies each sonometer. The chassis measures 17 x 14 x 11" (43 x 36 x 28cm). Standard voltage characteristics are 115/60/1. Shipping Weight: 55 lb (25kg); 8 cu. ft.

Freeze-Thaw Replacement Parts

Replacement Heating Element— H-3185SH (Specify 115 or 230V)

7-Day Chart Paper (100/Bx), -20 to +80°F— H-3185.1

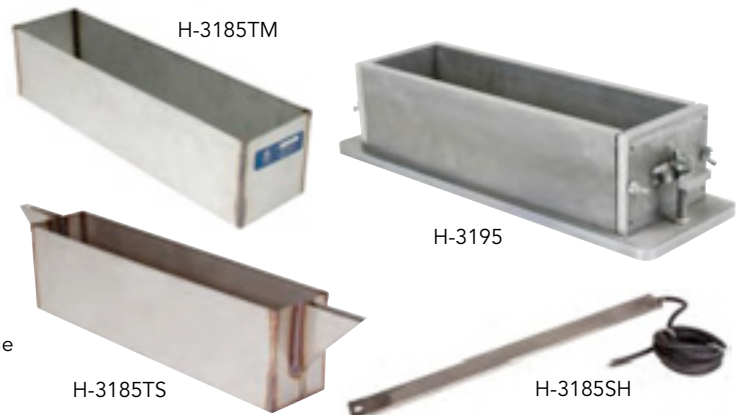
7-Day Chart Paper (60/Bx), -30 to +10°C— H-3185.1AC

7-Day Chart Paper (60/Bx), -20 to +50°F— H-3185.1AF

Pen Replacement Kit, (2) per kit— H-3185.3

**E-Meter for Flexural Resonance of Concrete— H-3176**

The E-Meter can determine flexural resonance of concrete under accelerated freezing and thawing cycles and aggressive environments, conforming to ASTM C215 and C666. It determines the resonant frequencies of the three modes of vibration and is the only method of calculating the following material parameters non destructively: such as Youngs Modulus of Elasticity, Modulus of Rigidity, Poissons Ratio and Damping Constant. Frequencies are automatically scanned in one of four ranges. It can handle specimen sizes up to 6 inches (150mm) in cross section and from 1.75 inches (45mm) to 28 inches (711mm) in length. A semi-automatic feature facilitates the fast identification of resonance. Oscillator frequency range: 10 Hz to 100 kHz in 4 switched range Frequency indicator display: 6 digit LED Gate times: 1 sec. or 10 sec. switch selected, LED indicated accuracy: 20 ppm + 1 count over full operating temperature range

**Freeze-Thaw Specimen Mold— H-3195**

For 3 x 4 x 16" (76 x 102 x 406mm) specimens exposed to rapidly repeated freeze-thaw cycles in water or air. Mold is cold-rolled steel with detachable base plate. Complies with ASTM C233, C666; AASHTO T157, T161.

Freeze-Thaw Specimen Mold— H-3198M

Mold for 100 x 100 x 400mm specimens.

Stainless Steel Sample Tray— H-3185T

Tray for 3 x 4 x 16" (76 x 102 x 406mm) specimens.

Stainless Steel Sample Tray— H-3185TM

Tray for 100 x 100 x 400mm specimens.

Stainless Steel Sample Tray with spout— H-3185TS

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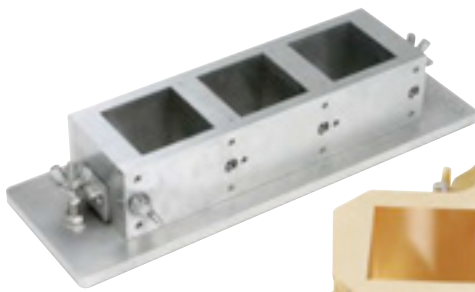
Testing Equipment for



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H-2810



H-2820



H-2823



H-2804

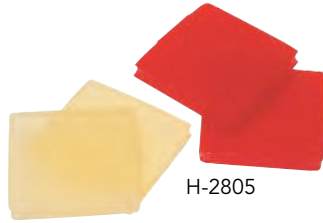


H-2822



H-3820

H-3825



H-2805



H-2809



H-2800

Cube Molds

For Compression strength tests of Portland cement, mortars, lime and gypsum. ASTM C87, C91, C109, C141, C267, C307, C311, C472, C617, C618, C1073; AASHTO T71, T106.

2" Cube Mold, parallel arrangement— H-2810

2" Cube Mold, parallel arrangement, 316 stainless steel. Fitted with angles for attaching to studs threaded into detachable baseplate. Shipping wt. 15lbs (6.8kg)

50mm Cube Mold, parallel arrangement— H-2810M

50mm Cube Mold, parallel arrangement, 316 stainless steel. Fitted with angles for attaching to studs threaded into detachable baseplate. Shipping wt. 15lbs (6.8kg)

2" Cube Mold, diagonal arrangement— H-2820

2" Cube Mold, diagonal arrangement, forged bronze. Reinforcing rib prevents spreading. Detachable base plate. Shipping wt. 15lbs (6.8kg)

50mm Cube Mold, diagonal arrangement— H-2820M

50mm Cube Mold, diagonal arrangement, forged bronze. Reinforcing rib prevents spreading. Detachable base plate. Shipping wt. 15lbs (6.8kg)

Cover Plate for H-2820 Cube Mold— H-2822

Cover plate for slowing the cooling rate as compound is poured. Shipping wt. 7lbs (3.2kg)

Expansive Grout Cube Mold— H-2823

2" Cube Mold for expansive grout with diagonal arrangement, forged bronze. Reinforcing rib prevents spreading. Detachable base plate and top plate. Shipping wt. 19lbs (8.6kg)

Stamped Cube Mold— H-2809

2" Cube Mold with diagonal arrangement. Used with cement, gypsum, lime, mortars, etc. These molds do not meet ASTM or AASHTO specifications and must be individually measured. Shipping wt. 3 lb (1kg)

Briquette Mold— H-2800

Cast bronze briquette mold for hydraulic cement mortar tensile strength tests. Bronze clamps with pins hold the two mold halves securely. Designed to prevent spreading during molding. Complies with ASTM C307. Shipping wt. 5 lb (2kg)

ASTM 20-30 Test Sand— H-3820

Sand is specially graded natural silica sand to pass a No. 20 (850 μ) sieve. Specific gravity is 2.65. Packed in 50 lb. (22.7kg) bags. Complies with ASTM C91, C141, C185, C359, C778; AASHTO T132, T137, T185. Shipping wt. 50 lbs. (22.7kg)

Cube Test Ottawa Sand C109— H-3825

Sand is specially graded natural silica sand graded to retain 98% on a No. 100 (150 μ) sieve, 75% on a No. 50 (300 μ) 30% on a No. 40 (425 μ) and 2% on a No. 30 (600 μ). Specific gravity is 2.65. Packed in 50 lbs. (22.7kg) bags. Complies with ASTM C87, C109, C348, C359, C593, C778; AASHTO T71, T106, T185. Shipping wt. 50 lbs. (22.7kg)

2" Retainer Caps— H-2804

Stainless steel retainer caps for use with 2" cube specimens. Use with 2" compression pads to eliminate the need for capping compound. Sold in sets of 2. Shipping wt. 2.5lbs (1kg)

2" Compression Pads— H-2805

Compression pads used with H-2804 Retainer Caps. Sold in sets of 4, 2 red (70 duro) and 2 amber (85 duro). Shipping wt. .5lbs (.3kg)



ASTM-Compliant Mixer, 5-Qt. (4.73L), 120V 60Hz— H-3841
 ASTM-compliant mixer for mixing hydraulic cement pastes and mortars of plastic consistency. Mixer includes H-3844 Bowl Positioning Adapter, a 5-qt. (4.73L) stainless steel bowl and 1 flat, stainless steel beater for mixing heavy materials. Hobart Model No. N-50 operates on principle of planetary action—beater reaches every part of the batch, rotating on its axis in opposite directions as it moves around the bowl. Thoroughly blends, mixes and aerates all ingredients for consistent, predictable finished batches. Selective agitator transmission has 3 speed settings: 139, 285 and 591 RPM. Base dimensions: 10-3/8 x 15" (264 x 381mm). Height: 17" (432mm). Features U/L listed cord and plug. Complies with ASTM C227, C305; AASHTO T162. Shipping wt. 55 lb (25kg)

Mixer, 5-Qt. (4.73L), 230V 60Hz— H-3841.2F
Mixer, 5-Qt. (4.73L), 230V 50Hz— H-3841.5F
 Identical to H-3841 mixer above, except that the electrical configurations cause the mixer to run at a slightly slower speed, which renders them non-ASTM compliant.

Mixer Components	Part #
Bowl Positioning Adapter	H-3844
Bowl Lid, acrylic	H-3846L
Beater—Stainless Steel, Flat-type	H-3841.1
Bowl—Stainless Steel, 5 qt. (4.73L)	H-3841.2
Wire Loop Whip—Stainless Steel	H-3841WW
Wire Loop Whip—Stainless Steel, 1/4" dia. wire	H-3841HW

Humboldt Extreme-Duty 12 Qt. Whisk— H-3842HW
Humboldt Extreme-Duty 20 Qt. Whisk— H-3843HW
 Custom, hand-made extreme duty whisks are formed from 1/4" dia. stainless steel rod. Designed to stand up to the abuse of mixing heavy aggregate asphalt mixes in the Mixers listed above.

Humboldt Extreme-Duty Whisks

Description	Model
For H-3842A (Hobart HL-120 1/2HP) Current	H-3842AHW
For H-3843A (Hobart HL-200 1/2HP) Current	H-3843AHW
For H-3841 (Hobart N-50A-10) Current	H-3841HW
Hobart 20-Quart Mixer Old Model (prior to 2007)	H-3843HW
Hobart 12-Quart Mixer Old Model (prior to 2007)	H-3842HW

Tamper, Rubber Compound— H-2860
 Rubber compound tamper is 6" (152mm) long with 1/2 x 1" (13 x 25mm) cross section.

Tamper, Wood— H-2860W
 Wood tamper is 6" (152mm) long with 1/2 x 1" (13 x 25mm) cross section. H-2860W complies with ASTM C87, C109, C157, C185, C596; AASHTO T106, T137, T160.

Tapping Stick— H-3855
 Maple wood with 5/8" (16mm) dia. and 6" (152mm) length. Complies with ASTM C185; AASHTO T137.

Rubbing Block— H-2812
 Ground steel block 3" dia. x 1" (76 x 25mm) for removing loose sand grains and encrustations from concrete specimen surfaces before compressive testing.

Digital Caliper (0-200mm)— H-2816.8
 Provides accurate outside, inside, depth and step measurements and features large, easy-to-read LCD digits, rolling thumb wheel; plus control buttons for zero, on/off and inch/mm functions.

Stainless Steel Dial Caliper 6" (150mm)— H-2817M
 Easy to read black face dial caliper with combination inch and metric scales features 0.001" / 0.1mm graduations, hardened and ground stainless steel main beam with hardened, ground and lapped measuring faces.

Stainless Steel Dial Caliper (6 inch)— H-2817
 Similar to above, features a 6" measuring range with .001" graduations and .100" per revolution.

See all Caliper offerings on page 263





H-3250D



H-3250



H-3250.8



H-3260

Length Comparators

Length comparators measure length changes of hardened cement paste, mortar and concrete prismatic specimens. Indicators are mounted on a sturdy upright support attached to a solid triangular base. All units include stationary and movable anvils designed to fit H-3260 gauge studs, which are cast into test specimens and an invar reference bar. Complies with ASTM C151, C157, C227, C311, C341, C342, C452, C490, C596; AASHTO M210, T107, T160.

Custom lengths are also available, contact us for details.

10" Effective Length Comparator/dial indicator— H-3250

16" Effective Length Comparator, dial indicator— H-3248

Comparators for 10" (254mm) or 16" (406mm) effective length samples with 3-5/8" (92mm) dia. dial gauge with a range of .400" and gradations of .0001". The Dial is marked 0-10. Includes stationary and movable anvils designed to fit the H-3260 gauge studs that are cast on test specimens and an invar reference bar. Unit accommodates test specimens up to 4 x 4" (102 x 102mm) cross section.

Shipping wt.: H-3250: 32 lb (14.5kg), H-3248: 38 lb (17.2kg).

Gauge Studs— H-3260

Gauge Studs have stainless steel contact points and are knurled and threaded for use with cement prism molds. Packaged 10 per bag. Complies with ASTM C151, C157, C227, C490; AASHTO M210, T107.

10" Effective Length Comparator, digital indicator, 120V 60Hz— H-3250D

10" Effective Length Comparator, digital indicator, 220V 50Hz— H-3250D.4F

16" Effective Length Comparator, digital indicator, 120V 60Hz— H-3248D

16" Effective Length Comparator, digital indicator, 220V 50Hz— H-3248D.4F

Comparators for 10" (254mm) or 16" (406mm) effective length samples with digital indicator with a range of .600" and resolution of .0001". Measures inches and millimeters includes batteries and AC adapter. Unit can be zeroed at any point on the range and can be switched from inches to mm by pressing a button. Includes stationary and movable anvils designed to fit the H-3260 gauge studs that are cast on test specimens and an invar reference bar. Unit accommodates test specimens up to 4 x 4" (102 x 102mm) cross section.

Shipping wt.: H-3250: 32 lb (14.5kg), H-3248: 38 lb (17.2kg).

Replacement Components

Description	Model
Invar Reference Bar for use with H-3250 and 10" (254mm) specimens	H-3249A
Invar Reference Bar for use with H-3248 and 16" (406mm) specimens	H-3249A.16
Dial Indicator	H-3250.3
Digital Indicator, 120V 60Hz	H-3250.3D
Digital Indicator, 220V 50Hz	H-3250.3D.4F
Anvil with collar (one each)	H-3250.4
Anvil only	H-3250.4.4
Collar only	H-3250.4.3
Elevating Screw, nut collar & anvil assembly	H-3250.7
Adapter for 5" specimens	H-3250.8



H-3251



H-3267



H-3265



H-3252



H-3256



H-3251RC

Prism Molds

Designed to produce required 10" effective gauge length, prism test bars. Molds feature removable partitions, base and end plates. Effective gauge length is measured from inside end of the studs. Molds produce cement prism specimens 11-1/4" long. Including studs, outside to outside length of specimen is 11-5/8". See table for product specifications.

Description	Ship wt.	Model
Application: Volume change tests of mortars		
2" x 2" x 10" (51 x 51 x 254mm), 2-mold, cold-rolled steel	27 lb (12.2kg)	H-3251
1" x 1" x 5" (25 x 25 x 127mm), 2-mold, cold-rolled steel	25 lb (11.4kg)	H-3255
Application: Autoclave expansion of Portland cement; length change of mortar and concrete; potential alkali reactivity of cement/aggregate combinations; linear change of magnesium and oxychloride cements; volume change of cement paste		
1" x 1" x 10" (25 x 25 x 254mm), 1-mold, cold-rolled steel	10 lb (4.5kg)	H-3252
1" x 1" x 10" (25 x 25 x 254mm), 2-mold, cold-rolled steel	10 lb (4.5kg)	H-3253
1" x 1" x 5" (25 x 25 x 127mm), 2-mold, stainless steel	25 lb (11.4kg)	H-3255S
Application: Volume change of cement past; length change of mortar and concrete		
3" x 3" x 10" (76 x 76 x 254mm), 1-mold, cold-rolled steel	25 lb (11.4kg)	H-3254
Application: Volume change tests		
4" x 4" x 10" (102 x 102 x 254mm), 1-mold, cold-rolled steel	35 lb (15.8kg)	H-3256
40 x 40 x 160mm (1.6 x 1.6 x 6.3"), 3-gang mold, cold-rolled steel	35 lb (15.8kg)	H-3270

Tamping Rod— H-2905.1

Round, straight steel 3/8" dia. x 12" (10 x 305mm). Both ends rounded to a hemispherical tip the same diameter as the rod. Complies with ASTM C157, C192; AASHTO T160.

Rectangular Mortar Bar Container— H-3265

Stainless steel container for storing test specimens has tight-fitting cover that prevents moisture loss. Supports up to 36 bars vertically. Dimensions: 9" x 11" x 15-1/2" (229 x 279 x 394mm). Complies with ASTM C227 and C1260. Shipping wt. 25 lbs. (11.3kg)

Round Mortar Bar Container— H-3267

Plastic container includes test bar rack that supports 8 bars vertically. Dimensions: 6" x 17" (152 x 432mm). Complies with ASTM C227. Shipping wt. 12 lbs. (5.44kg)

Mortar Bar Container— H-3264

Stainless steel. Dimensions: 1-1/4" x 3-1/2" x 12" (32 x 89 x 305mm) ID. Tight-fitting cover prevents moisture loss. Capacity not more than 315ml of water, which completely immerses three specimens supported above bottom of container. Complies with ASTM C342, C33 and C856.

Retaining Cage, Mortar Bar Container— H-3251RC

For 2" x 2" x 10" (51 x 51 x 254mm) prism molds. Features 1/4-20 continuous threaded rod and acorn nuts. Complies with ASTM C806.

Retaining Cage— H-3257

For 3" x 3" x 10" (76 x 76 x 254mm) prism molds. Features 10-24 continuous threaded rod. Complies with ASTM C878.

Gauge Studs, see page 134



Vicat Apparatus	Specification	Model
Vicat Consistency Apparatus — Reversible stainless steel plunger with 10mm dia. on one end and threaded, H-3070 1mm dia. stainless steel needle on the other. Weight of plunger assembly with adjustable indicator is 300g. Graduated 0-50mm scale. Includes frame, graduated 0-50mm scale, plunger assembly, H-3080 conical mold and H-3049 glass plate. Shipping wt. 8 lbs (3.6kg)	ASTM C91, C141, C187, C191, C308, C451, C472; AASHTO T129, T131, T186	H-3050
Modified Vicat Apparatus — Same as H-3050, but weight of plunger assembly with adjustable indicator is 400g. Shipping wt. 8 lbs (3.6kg)	ASTM C1191, AASHTO T131, EN196/3	H-3060
Time of Set & Consistency Vicat Apparatus — Designed to switch between 17.5mm dia. needle for consistency determinations and a 2mm dia. needle for time of set determinations. Plunger assembly with adjustable indicator weighs 400g with 17.5mm needle attached and 300g with 2mm needle. Includes H-3086, 76mm ID x 40mm brass ring mold. Shipping wt. 6 lbs (2.7kg).	ASTM C807	H-3085
Modified Vicat Consistency Apparatus — Features 19mm dia. plunger with a weight of 50g. Includes plunger rod and indicator, frame, H-3080 conical mold and H-3049 glass plate. Shipping wt. 6 lbs (2.7kg).	ASTM C110	H-3090
Modified Vicat Cone Penetrometer — Features 10cm scale, attached aluminum cone and plunger. Total weight of plunger assembly, 200g. Includes frame, moveable rod with variable weights and plunger assemblies. Includes H-3840 400ml measure for sample as specified by ASTM C185. Shipping wt. 6 lbs (2.7kg).	ASTM C780	H-3133
Modified Vicat Cone Penetrometer — 35g magnesium cone and added 65g weight for 100g plunger weight. Includes frame, moveable rod with variable weights and plunger assemblies. Includes H-3080 mold. Shipping wt. 6lbs (2.7kg)	American Dental Association	H-3134
Modified Vicat Cone Penetrometer — Includes magnesium cone on plunger with total weight of 35g. Use on unsanded plaster. Includes H-3080 conical mold. Shipping wt. 6 lbs (2.7kg).	ASTM C472	H-3135
Modified Vicat Cone Penetrometer — Same as H-3135 with additional 15g weight for 50g total weight for use on sanded plaster. Includes H-3080 mold. Shipping wt. 6 lbs (2.7kg).		H-3137

Replacement Parts Listed on Page 137



Replacement and Alternative Parts for Vicat Apparatuses

Plungers	Use with	Model
Replacement plunger, includes plunger, needle & indicator	H-3050	H-3055
Replacement plunger, includes plunger & bushings	H-3050 H-3090	H-3110
Replacement plunger, includes plunger & bushings	H-3050 H-3120	H-3130
Replacement plunger, includes plunger, cone, indicator & spacers	H-3135	H-3135.1
Replacement plunger, includes plunger, needle, weight, & indicator	H-3085	H-3085.1
Replacement plunger, includes plunger, cone, weight, & indicator	H-3137	H-3137.1
Needles	Use with	Model
1mm dia. stainless steel with knurled threaded holder	H-3050	H-3070
Needle for initial set. Conforms to BS EN 196-3.	H-3050	H-3072M
Needle for final set. Conforms to BS EN 196-3.	H-3050	H-3073
Determination of initial and final setting of cement. Needle has an air vent and an annular attachment	H-3050	H-3075
2mm stainless steel vicat needle	H-3085	H-3147
17.5mm stainless steel vicat needle	H-3085	H-3085-1
Weights	Use with	Model
Replaces 1mm needle. Threaded one end. Provides 400g uncalibrated total weight.	H-3060	H-3061
One end bored to fit over 1/4" (6.4mm) dial. plunger shaft; 100g to increase weight of plunger furnished with H-3090 to 150g	H-3090	H-3100
One end bored to fit over plunger. Total weight: 15g	H-3137	H-3136
One end bored to fit over plunger. Total weight: 65g	H-3135 H-3134	H-3138

Plastic Conical Mold— H-3080

For use with all Vicat apparatuses. Plastic mold, 70mm bottom dia. x 60mm top x 40mm high.

Brass Conical Mold— H-3086

For use with H-3085 Vicat apparatuses. Brass mold, 76mm dia. x 40mm high.

Mold Container— H-3065

Mold for use in false set test. 2" x 2" x 6" (51mm x 51mm x 152mm) Overall length including base is 9-1/4" (235mm). Complies with ASTM C359.

Glass Plate— H-3049

For use with Vicat apparatuses, 4" x 4" x 3/16" (101.6mm x 101.6mm x 4.8mm).



H-3052.4F



H-3150



H-3152

H-3151

Automatic Vicat Machine, 120V 60Hz— H-3052**Automatic Vicat Machine, 230V 50/60Hz— H-3052.4F**

The Vicatronic apparatus provides a completely automatic method for determining the initial and final setting time of cements or mortar pastes. The automated test operation provides for precise and repeatable results, which are automatically printed out from the integral printer built into the apparatus. The Vicatronic can also be connected to a PC via a RS232 cable allowing data to be downloaded via programs like Microsoft Hyper Terminal. The Vicat-Win software (H-3052.4) allows the receiving, managing, processing and completing test data; the software can automatically create graphs, personalise them and print test reports.

The Vicatronic has a large high-contrast, high-resolution LCD display, which shows the test data together with the general functions of the unit. The easy-to-see menu provides a simplified guide to running a test. During the test, the display also provides a real-time graph of the results, which can be monitored.

The Vicatronic is supplied with firmware that allows the automatic performance of tests in accordance with the following standards: ASTM C191, AASHTO T131, EN 196/3, DIN 1164, DIN 1168 gypsum, NF P15/431 and BS4550. Additional programs can be developed by the operator. This is particularly useful when testing new mortars, additives or research tests requiring sophisticated and flexible applications.

The Vicatronic is supplied complete with the integral printer, two hardened needles (one with 1mm diameter and one with 1.13mm diameter), two conical molds EN and ASTM, and a glass plate to hold the conical mold. Dimensions: 15.75" x 7.87" x 18.5" (400 x 200 x 470mm). Weight: 28.6 lb (13kg).

Vicat-Win Software— H-3052.1

Allows the receiving, managing, processing and completion of test data on a PC. This software can automatically create graphs, personalise them and print test reports.

Replacement Needle— H-3052.1

1.13mm diameter replacement needle.

Replacement Needle— H-3052.5

1mm diameter replacement needle.

Weight, 700g— H-3052.45**Mold Tank for Tests in Water— H-3052.3****Replacement Paper for Printer— H-3052.6**

Box of 5 rolls of printer paper for use with H-3052 Vicat Machine.

Gillmore Apparatus— H-3150

Used to determine initial and final set times of Portland cement, masonry cement, hydraulic hydrated lime and certain mortars. Complies with ASTM standards C91, C141, C150, C266, C414; AASHTO T154. Comprised of two stainless steel needles with 3/16" (4.8mm) cylindrical flat-end needles. One is 1/12" (2.12mm) dia., 1/4lb. (113.4g) weight for initial set. The second is 1/24" (1.06mm) dia., 1lb (453.6g) weight for final set. Shipping wt. 10lb (4.5kg)

Gillmore Apparatus Replacement Parts

Description	Model
Flat plate with 1/2" sides for striking off sample to exact 1/2" thickness for Gillmore test	H-3154
1/24" (1.06mm) dia. needle with weight	H-3151
1/12" (2.12mm) dia. needle with weight	H-3152
.050" dia. Gillmore Needle	H-3152.4



H-3240



H-3240.22



H-3240.21M
H-3240.21N



H-3243B



H-3245



H-3244

Cement Autoclave, 120V 60Hz— H-3240

Cement Autoclave, 220V 50/60Hz w/ transformer— H-3240.4F

Uses accelerated means of estimating delayed expansion of Portland cement caused by hydration of CaO and MgO. Test bars are exposed to controlled steam pressure and corresponding constant temperature. Unit produces 60-350 psi (0.4-2.4MPa) range of pressures and consists of steam vessel, pressure regulator, pressure gauge (0-600 psi x 5 psi), air vent valve, power switches and safety pop valve set at 350psi. Includes thermometer, wrench and 5 gaskets. Additional gaskets, heating units and safety pop valves are available as replacement parts. Chamber dimensions: 6-1/8" ID x 16". Overall dimensions: 17 x 48 x 28" (431 x 1219 x 711mm) 1700W maximum power demand. Complies with ASTM C151; AASHTO T107. Shipping wt. 171 lbs. (77.7kg)

Rupture Disk, Monel— H-3240.21M

Rupture Disk, Nickel— H-3240.21N

Rupture disks are used as safety devices in systems that involve pressure vessels, eliminating the need for a safety valve. The rupture disk is designed to be the weakest part of a pressure system so if there is a situation when excessive pressures occur, then the rupture disk fractures or opens thus releasing the built-up energy rendering the system safe. Rupture disks are a simple, yet reliable method for providing a safe system, which does not require calibration.

Rupture Disk Holder— H-3240.22

Rupture disk holder, complete with piping to attach to cement autoclave. Order rupture disks separately above.

Test Bar Holder— H-3243B

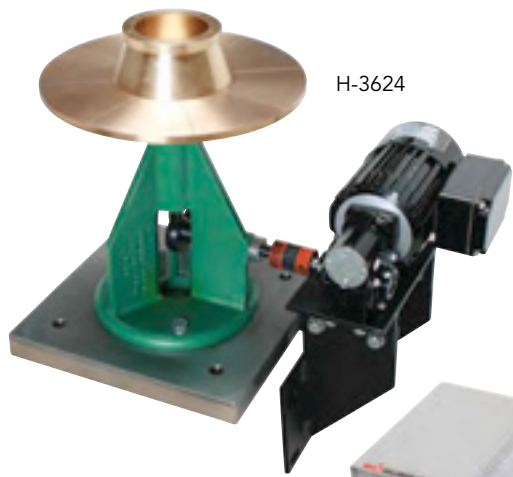
Test bar holder for 10"-long (254mm) gauge bars; 8-bar capacity. Holds specimens vertically, above water level, so each test bar is exposed to steam. Complies with ASTM C141, C151; AASHTO T107.

Test Bar Holder— H-3243A

Test bar holder for 5"-long (127mm) samples.

Autoclave Replacement Parts

Description	Model
Air vent valve	H-3240.2
Safety pop-off valve	H-3240.3
Pressure gauge	H-3240.4
Pressure-control switch	H-3240.5
Set of cap screws, 16 per set	H-3240.6
Relay 60Hz	H-3240.7
Gaskets, graphite, 100 per package	H-3242
Lower heating unit; two heaters in one housing. 115V. 50/60Hz	H-3244
Upper heating element; two-piece wrap-around type. 115V. 50/60Hz	H-3245
Thermometer, 20 to 580°F	H-2600.2F
Thermometer, -5 to 300°C	H-2610.2C



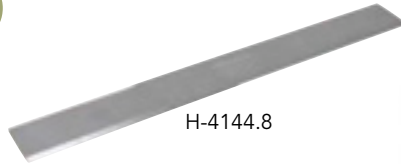
H-3624



H-3620



H-3624F



H-4144.8



H-3621



H-3622



H-3840

Flow Tables

Used to determine the flow of hydraulic cement, mortars and cement pastes. A test specimen is molded on the table to a specified volume and shape. Then, with the mold removed, leaving the test specimen on the table. The table is dropped and raised (via a hand crank or optional motor) a specified number of cycles, after which the flow (or increase in average diameter of the specimen) is measured.

Motorized Flow Table with Counter, 120V 60Hz— H-3624

Motorized Flow Table with Counter, 220V, 50Hz— H-3624.5F

Motorized flow table with 10" (254mm) dia. cast-bronze table/platen and automatic digital counter. Motor stops automatically once pre-set number of drops is achieved. Includes heavy-duty table/platen assembly, standard H-3622 cast bronze, 2-3/4" top dia. x 2" high x 4" bottom dia. cone mold, motor and H-3614B counter. Designed to be mounted to concrete mounting block. Order H-3624F, Pedestal Form and easily create your own mounting block.

Applications include: compression strength and air content tests of cement mortar; flow tests of hydraulic cement mortars; consistency tests of magnesium oxychloride cements; flexural strength test for bond strength or mortar to masonry units. ASTM C87, C109, C110, C185, C230, C243, C348, C593; AASHTO T71, T106, T137 and T152. Shipping wt. 82 lbs (37kg)

Motorized Flow Table with Mold, 120V 60Hz— H-3625

Motorized Flow Table with Mold, 220V, 50Hz— H-3625.5F

Motorized flow table with 10" (254mm) dia. cast-bronze table/platen. Same as H-3624, but without counter. Includes standard H-3622 cast bronze, 2-3/4" top dia. x 2" high x 4" bottom dia. cone mold. Shipping wt. 30 lb (13.6kg). Used in determining consistency of cement mortars. ASTM C230. Shipping wt. 82 lbs (37kg)

Hand-Driven Flow Table with Mold— H-3620

Hand-driven flow table with 10" (254mm) dia. cast-bronze table/platen. Includes standard H-3622 cast bronze, 2-3/4" top dia. x 2" high x 4" bottom dia. cone mold. Shipping wt. 30 lb (13.6kg). Used in determining consistency of cement mortars. ASTM C230. Shipping wt. 27 lbs (12kg)

Automatic Counter, 120V 60Hz— H-3614B

Automatic Counter, 220V 50/60Hz— H-3614B.4F

Can be used to upgrade H-3625 Motorized Flow Table so a pre-determined number of drops can be set to run automatically. Use H-3614B.4F with H-3625.5F.

Caliper, Mortar Diameter— H-3621

Used to measure mortar diameter and indicate percentage of flow. ASTM C87, C185, C230; AASHTO M152, T71, T137.

Flow Mold— H-3622

Cast bronze 2-3/4" top dia. x 2" high x 4" bottom dia. cone mold.

Flow Mold— H-3622M

Cast bronze 70mm top dia. x 50mm high x 100mm bottom dia. cone mold.

400ml Measure— H-3840

Calibrated to 400ml, this measure is used to determine air content of hydraulic cement mortar. Cylindrical with 3" (76mm) ID, approximately 3-15/32" (88mm) depth. ASTM C185, C780; AASHTO T137.

Shield— H-3623

Circular shield for use with H-3622 flow mold to prevent mortar from spilling on table top. ASTM C230; AASHTO M152.

Straight Edge— H-4144.8

Straight edge of ground steel with bevelled edge. 1/8" x 1-1/4" x 8" (3 x 32 x 200mm) ASTM C185, D558, D559, D560, D698; AASHTO T137.

Pedestal Form— H-3624F

Wooden form to create concrete base for flow tables. Shipping wt. 60 lbs (27kg)



Water Retention Apparatus— H-3630A

The apparatus is used in specification tests of masonry cement and physical testing of quicklime and hydrated lime. Unlike older models, the newly designed unit incorporates a vacuum regulator and gauge system in place of the old mercury manometer and relief column. The complete unit consists of an aspirator pump, vacuum regulator, vacuum gauge, three-way stopcock, flask, rubber gasket, brass funnel, perforated brass dish, filter paper and hardwood stand. Complies with ASTM C1506, C110, C207 and E149. Shipping wt. 25 lbs (37kg)

Water Retention Apparatus Replacement Parts

Description	Model
Funnel	H-3630.3
Stopcock	H-3630.4
Rubber Gasket	H-3630.18
Filter Paper, 15cm, Package of 100	H-3630.21
Perforated Brass Dish	H-3631
Flask, 1000ml	H-4913.1M

Cement Bleeding Apparatus— H-3600

Used to determine bleeding rate and bleeding capacity of cement paste and mortar by direct and continuous procedure. Includes noncorrosive metal container for paste or mortar, collecting ring, support stand and necessary glassware. Rubber-covered double V-jaw burette clamp holds stopcock in position; single rubber-covered jaw clamp supports the burette and funnel assembly. Shipping wt. 20 lbs. (9.0kg)

Blaine Air Permeability Apparatus— H-3810

Determines fineness of Portland cement in terms of specific surface expressed as total surface area in square centimeters per gram of cement. Consists of: calibrated U-tube manometer, ground glass joint, stainless steel test cell and plunger, rubber aspirator bulb and perforated disc. Includes 8 oz (226.8g) bottle of red manometer fluid, filter paper, wood block for holding test cell during filling and funnel. Mounted on finished wood panel with rubber-footed base. Complies with ASTM C204; AASHTO T153. Shipping wt. 15 lbs. (11kg)

Blaine Air Permeability Replacement Parts

Description	Model
Rubber Bulb	H-3811
Stopcock, Cell and Plunger	H-3812
Perforated Brass Disc	H-3813B
Perforated Stainless Steel Disc	H-3813S
Manometer Fluid, 8oz (240ml)	H-3814
Monometer U-tube, calibrated	H-3815
Filter Paper Discs, Medium retentive, pkg 500	H-3816

SRM 114q - Portland Cement Fineness Standard— H-3817

This Standard Reference Material (SRM) is used in calibrating fineness testing equipment according to ASTM Standard Methods. The SRM unit consists of a glass vial with plastic caps containing powdered cement (each vial is contained in a sealed foil bag). Each vial contains approximately 5g of cement.

SRM 114q, Portland Cement Fineness Standard— H-3817.20

Package of 20, H-3817 individual vials.

**Cement Calorimeter— H-3160****Cement Calorimeter, 230V 60Hz— H-3160.2F****Cement Calorimeter, 230V 50Hz— H-3160.5F**

For determining heat of hydration of cements by measuring difference between heat of solution of dry cement and heat of solution of a separate sample partially hydrated for 7 to 28 days. Constant-speed stirrer maintains uniform temperature throughout liquid and supplies sufficient agitation to keep solid reactant suspended in the acid mixture. Includes insulated wood case, insulated 1G (3.8L) can; 1 pt. (0.47L) vacuum jar with stopper; differential thermometer plus holder, rod and reading magnifier; plastic funnel; stirring paddle and chuck; geared synchronous motor. Complies with ASTM C186.

Shipping wt. 82 lbs (37kg)

Digital Cement Calorimeter— H-3161**Digital Cement Calorimeter, 230V 60Hz— H-3161.2F****Digital Cement Calorimeter, 230V 50Hz— H-3161.5F**

For determining heat of hydration of cements by measuring difference between heat of solution of dry cement and heat of solution of a separate sample partially hydrated for 7 to 28 days. Constant-speed stirrer maintains uniform temperature throughout liquid and supplies sufficient agitation to keep solid reactant suspended in the acid mixture. Includes insulated wood case, insulated 1G (3.8L) can; 1 pt. (0.47L) vacuum jar with stopper; 2-channel, Precision Digital Thermometer; plastic funnel; stirring paddle and chuck; geared synchronous motor. Complies with ASTM C186.

Shipping wt. 82 lbs (37kg)

Wagner Turbidimeter— H-3805**Wagner Turbidimeter, 230V 60Hz— H-3805.2F****Wagner Turbidimeter, 230V 50Hz— H-3805.5F**

Determines fineness of Portland cement, using photoelectric cell to measure light passing through suspended pulverized material. Microamp meter measures current generated in the cell; indicated reading is measure of turbidity of the suspension. Includes photoelectric cell (and light source in metal cabinet, timing burette and stand, wet sieving assembly including gauge and spray nozzle, microamp meter, 3 flasks, 4 test tubes, stirring apparatus and instruction book. Battery not included. Complies with ASTM C115; AASHTO T98. Shipping wt. 140 lbs. (63.5kg)

Reaction Container— H-3320

For determining potential alkali reactivity of aggregates (chemical method) when used with high alkali cements. Stainless steel unit is 2" dia. x 2-1/4" high (51mm dia. x 57mm) fitted with air-tight cover. 50-75ML capacity. Complies with ASTM C289.

Organic Color Wheel for ASTM C40— H-3492

Color comparison wheel for use with Organic Impurities Test (ASTM C40). Color wheel has five different color filters to compare to test solution.

Organic Impurities Test Set— H-3493

Determines presence of injurious organic compounds in sands used in cement mortar or concrete. Test serves as warning that further tests of sands are necessary before they can be approved for use. Complies with ASTM C40; AASHTO T21. Air shipments must meet Dangerous Goods requirements because of Sodium Hydroxide Beads. Order H-3493X without Sodium Hydroxide Beads to avoid Dangerous Goods requirements. Shipping wt. 10 lbs (5kg)

Organic Impurities Test Set— H-3493X

Organic Impurities Test Set without Sodium Hydroxide Beads

Sodium Hydroxide Beads— H-3491

1lb (454g) Container of Sodium Hydroxide Beads. Air shipments must meet Dangerous Goods requirements.

Graduated Bottle— H-3490A

Graduated, 12 oz. (.35L)

H-3341

H-3342



HC-2834S

H-2834

H-2833

H-3340

H-2838

H-2834SSB

Tube Sampler with Compartments, Bulk Cement— H-3341

For sampling hydraulic cement in bulk shipments or bulk storage. Has two polished brass telescopic tubes with registering slots (with partitions) that open or close by rotation of the inner tube. Outer tube has sharp point to facilitate penetration. Sampler is 1-3/8" (35mm) dia. x approximately 63" (160cm) long. Complies with ASTM C183; AASHTO T127. Shipping wt. 11 lbs. (5kg)

Tube Sampler without Compartments, Bulk Cement— H-3342

For sampling hydraulic cement in bulk shipments or bulk storage. Has two polished brass telescopic tubes with registering slots (without partitions) that open or close by rotation of the inner tube. Outer tube has sharp point to facilitate penetration. Sampler is 1-3/8" (35mm) dia. x approximately 63" (160cm) long. Complies with ASTM C183; AASHTO T127. Shipping wt. 11 lbs. (5kg)

Tube Sampler, Packaged Cement— H-3340

For sampling hydraulic packaged cement, brass unit has hardwood handle. Unit is 1-1/4" (32mm) dia. x 28-3/4 (730mm) long. Complies with ASTM C183; AASHTO T127.

Grout Flow Cone Set, 1/2" (13mm)— HC-2834S

Test set for measuring the flow of grout for preplaced, aggregate concrete. Intended for neat grout and grouts containing fine aggregate capable of passing a No. 8 sieve and grouts which have an efflux time of less than 35 seconds. Kit includes: (1) H-2834 Interchangeable Orifice Flow Cone and Adjustable Point Gauge Assembly, (1) H-2833 Stand, and (1) H-2834SSB Stainless Steel, 6 liter Beaker. ASTM C939. Shipping wt. 30 lbs. (13.6kg)

Grout Flow Cone Set, 3/4" (19mm)— HC-2835S

Test set same as above but with 3/4" (19mm) orifice.

Grout Flow Cone, 1/2" (13mm)— H-2834

Cast-aluminum flow cone from above set, has 1/2" (13mm) replaceable orifice. Can also accommodate 3/4" (19mm) orifice, which can be purchased below. Includes adjustable point gauge assembly. Overall dimensions: 8" dia. x 12"H (203 x 305mm). ASTM C939.

Grout Flow Cone, 3/4" (19mm)— H-2835

Cast-aluminum flow cone from above set, has 3/4" (19mm) replaceable orifice. Can also accommodate 1/2" (13mm) orifice, which can be purchased below. Includes adjustable point gauge assembly. Overall dimensions: 8" dia. x 12"H (203 x 305mm). ASTM D6449.

Replacement Orifice, 1/2" (13mm)— H-2834.500**Replacement Orifice, 3/4" (19mm)— H-2834.750****Flow Cone Stand— H-2833**

Sturdy well-constructed steel stand to support flow cones so the top is level and the cone free from vibration. Overall dimensions: 21"W x 9-1/2"D x 23"H. Shipping wt. 17 lbs. (7.7kg)

6-Liter, Stainless Steel Beaker— H-2834SSB**Grout Box— H-2838**

Cardboard box designed to be used to mold grout test samples. Each box forms 4 molds and can be used as a transport/shipping container as well. Boxes yield consistent, identical prism samples, while the engineered, slotted corrugation retains moisture while closely simulating CMU absorption rates. 25 boxes to a package. Overall dimensions: 7½" x 7½" x 7" (190 x 190 x 178mm). Section: 3¼" x 3¼" x 6¾" (83 x 83 x 171mm)



H-2901



H-2904



H-2902



H-2905.1



H-2905.2



H-2818



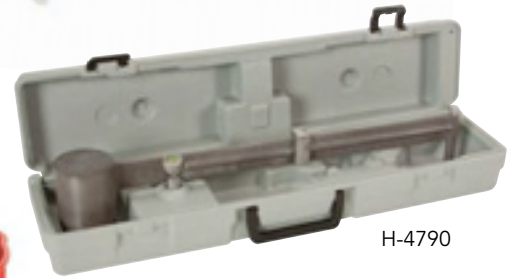
H-2905.3



HC-2842



HC-2843



H-4790

Micrometer Bridge Set— H-2903

Designed to hold one cylinder to permit repeated volume change measurements without moving or disturbing the specimen. Includes the following items: H-2901 Micrometer Bridge, H-2902 Micrometer Depth Gauge, H-2904 Tapered Cylinder Mold, H-2905.1 Tamping Rod, H-2905.2 glass plate and H-2905.3 Weight. Shipping wt. 12 lbs (5kg)

Tapered Cylinder Mold— H-2904

Used to determine volume change of grout, mold is constructed of steel tubing 1/4" wall x 3" dia. x 6"H (6 x 76 x 152mm). Mold is split longitudinally with two quick-acting clamps welded to the mold. Top edge of mold is machine tapered to a narrow rim. Includes detachable base plate. Complies with ASTM C1090. Shipping wt. 6 lbs. (2.7kg)

Micrometer Depth Gauge— H-2902

Graduations in the thousandths of an inch (.001"), range 0 to 3", 1/8" rod dia. Sleeve is designed with staggered lines, hardened and precision ground screw; lock nut holds the setting at the precise measurement. Includes protective case. Base length is 2-1/2".

Micrometer Bridge— H-2901

Bridge is used to hold the H-2904 mold in place while repeated volume change measurements are made. Shipping wt. 3 lbs (1kg)

Tamping Rod— H-2905.1

Round, straight steel rod is 3/8" (10mm) dia. x 12" (305mm) long. Both ends are rounded to a hemispherical tip of the same diameter as the rod. Complies with ASTM C157, C192.

Glass Plate— H-2905.2

Glass plate used with Micrometer Bridge Setup

Weight— H-2905.3

3 lb weight for use with Micrometer Bridge Setup

Fireproofing Mat Depth Gauge— H-2818

Gauge for measuring the depth of fireproofing. Plastic body with steel probe.

Marsh Funnel Viscometer— H-2842

The Marsh Funnel Viscometer is a rugged, easy to operate instrument that is used for making rapid, on the spot measurements of drilling mud viscosity. Marsh Funnel readings are only general measurements, but the frequent reporting of the Marsh Funnel Viscosity will alert the mud engineer to sudden changes in the mud viscosity that could require corrective action. The Marsh Funnel Viscosity is the ratio of the speed of the mud as it passes through the outlet tube (the Shear Rate) to the amount of force—the weight of the mud itself, which is causing the mud to flow (the Shear Stress). Marsh Funnel Viscosity is reported as the number of seconds required for one quart of mud to flow out of a full Marsh Funnel. Shipping wt. 5 lbs (2kg)

1L Measuring Cup for Marsh Funnel— HC-2843

1 liter, plastic measuring cup used for collecting sample from Marsh Funnel.

Mud Balance— H-4790

The Mud Balance provides a simple, practical method for the accurate determination of fluid density. The item's durable construction makes it ideal for field use. It's high-impact plastic case protects the balance during transport while providing a secure base for the balance during use. Scale reads in pounds per gallon (6-24 lb/gal); specific gravity (0.72-2.88 gms/cm³); pounds per cubic foot (45-180 lb/cu ft), and pounds per square inch per 1,000 feet of depth (310-1250 lb/sq in/100ft of depth). The H-4790 Mud Balance meets all the requirements of the API standard procedures for testing water base drilling fluids, oil base drilling fluids and oil well cements. Shipping wt. 5 lbs (2kg)

Asphalt

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Testing Equipment for



Construction Materials

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Heavy-Duty, Automatic, Single Compactor for Marshall Test Molds

Humboldt Automatic, Marshall Compaction Machines are designed to provide a stable and rigid mechanism for producing 4" or 6" diameter asphalt pills used in Marshall tests. These Marshall compaction machines are available in two types of configurations: one with a rotating mold with a tapered-foot hammer assembly, and the other a stationary mold with a flat-foot hammer. Both models feature a heavy-duty design, which stands up well to the constant jarring caused by the compaction process.

These machines feature an automatic counter allows the operator to preset the number of blows wanted and will turn off the machine when completed. After the number of blows has been set, the operator can start the machine with a push button and keep track of the number of blows on an LED readout.

A cam-action lever operates the integral mold holder to facilitate insertion and removal of the compaction mold.

Machines can be ordered for use with 4" or 6" molds, but can be easily altered to accommodate the other size by purchasing a hammer and test molds of the desired size. Each machine includes: the mechanical compactor, an automatic counter, hammer assembly, (1) compaction mold, and (1) package of paper discs. Rotating-Mold Configuration machines come with a tapered-foot hammer assembly and Stationary-Mold Configuration machines come with a flat-foot hammer assembly. Hammer assembly for the stationary base models, Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 400 lbs. (181.4kg).

Heavy-Duty, Automatic Single Compactor with Rotating Mold Configuration

Description	Model
For 4" diameter specimens. 115V 60Hz	H-1364R
For 6" diameter specimens. 115V 60Hz	H-1366R
For 4" diameter specimens. 230V 50/60Hz	H-1364R.4F
For 6" diameter specimens. 230V 50/60Hz	H-1366R.4F

Heavy-Duty, Automatic Single Compactor with Stationary Mold Configuration

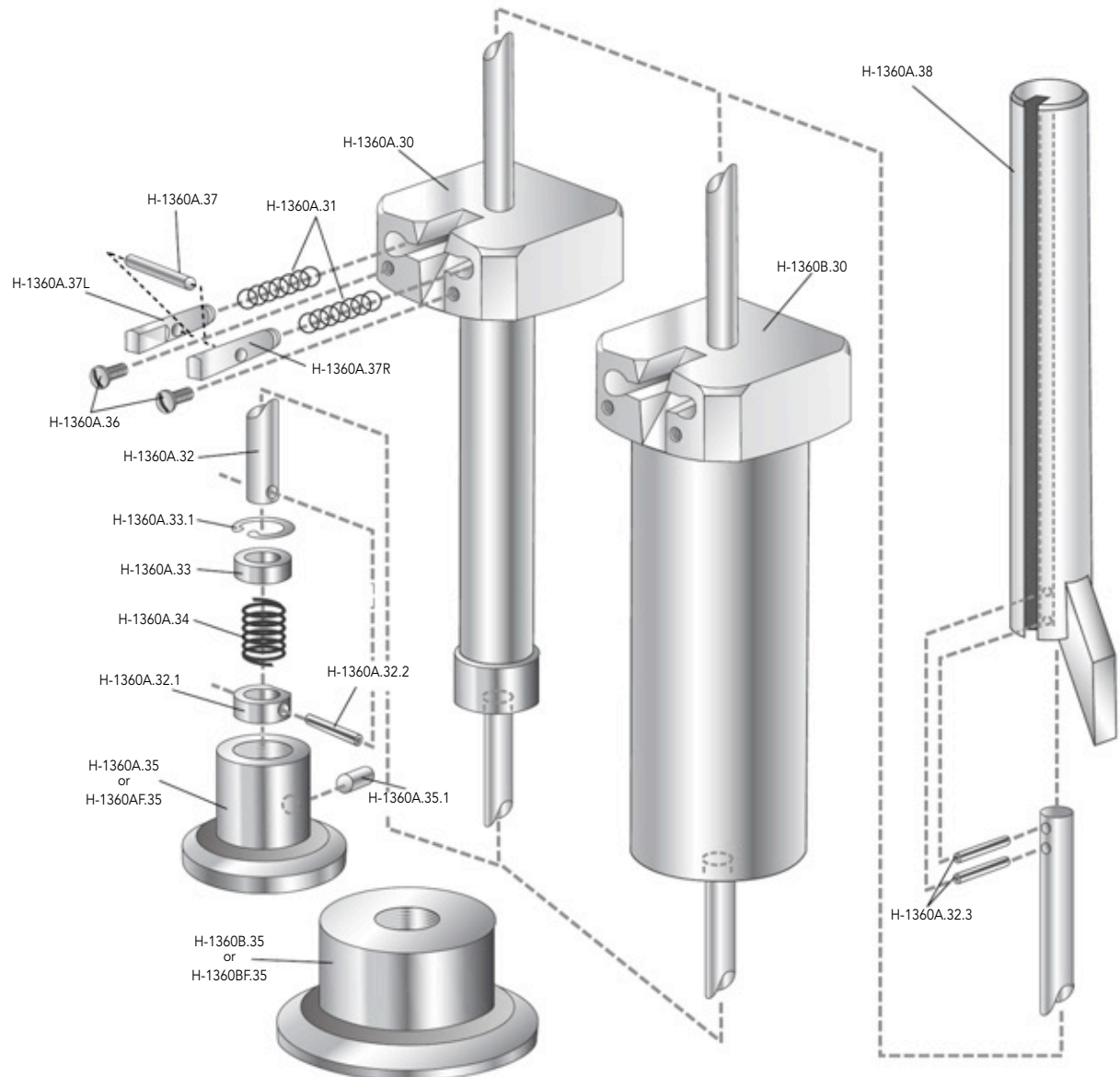
Description	Model
For 4" diameter specimens. 115V 60Hz	H-1364
For 6" diameter specimens. 115V 60Hz	H-1366
For 4" diameter specimens. 230V 50/60Hz	H-1364.4F
For 6" diameter specimens. 230V 50/60Hz	H-1366.4F



Replacement Parts for Heavy-Duty, Automatic Single Compactors

Description	Model
4" Hammer with tapered foot (rotating mold). Shipping wt. 20 lbs (9kg)	H-1360A
6" Hammer with tapered foot (rotating mold). Shipping wt. 25 lbs (11kg)	H-1360B
4" Hammer with flat foot (stationary mold). Shipping wt. 20 lbs (9kg)	H-1360AF
6" Hammer with flat foot (stationary mold). Shipping wt. 25 lbs (11kg)	H-1360BF
Lift Chain for H-1364, H-1366 Series Compactors	H-1360.21
Replacement ASTM-compliant pedestal for Compactors	H-1347M
Replacement Counter and Proximity Switch for Compactors, 120V 60Hz	H-1334BA
Replacement Counter and Proximity Switch for Compactors, 220V 50/60Hz	H-1334BA.4F

See the following pages for Ovens (pgs. 246 and Hotplates (pgs 244) to facilitate the heating of molds and hammers for operation.



Hammer Assemblies and Replacement Parts

Description	Model	Description	Model
Compaction hammer, 10 lb (for 4" mold)	H-1360A.30	Anvil release arm weldment	H-1360A.38
Compaction hammer, 22.5 lb (for 6" mold)	H-1360B.30	Hammer release arm	H-1360A.38.1
Hammer slide shaft	H-1360A.32	Anvil, top	H-1360A.38.2
Spring retainer, anvil	H-1360A.32.1	Spring	H-1338.34
Spring washer, anvil	H-1360A.33	Spring	H-1360A.31
Hammer foot, 4" tapered	H-1360A.35	1/4" dia. x 1" large roll pin	H-1360A.32.2
Hammer foot, 4" flat	H-1360AF.35	3/16" dia. x 1-1/2" roll pin	H-1360A.32.3
Hammer foot, 6" tapered	H-1360B.35	Internal retaining ring	H-1360A.33.1
Hammer foot, 6" flat	H-1360BF.35	5/16" dia x 1/2" large dowel pin	H-1360A.35.1
Hammer release pin, left hand	H-1360A.37L	1/4-20 x 1/2" large truss head screw	H-1360A.36
Hammer release pin, right hand	H-1360A.37R	1/4" dia. x 1-3/8" Large dowel pin	H-1360A.37



H-1336D

Standard-Duty 4" Automatic, Single Compactor with Stationary Base

Easy sample preparation with an automatic, mechanical compactor. Apparatus compacts samples at a preset number of hammer blows and shuts off on completion. Unit includes mechanical compactor, automatic counter, ASTM-compliant oak compaction pedestal, (1) hammer and (1) H-1341 mold assembly. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 198 lbs (89.8kg)



H-1346D

Standard-Duty 4" Automatic, Double Compactor with Rotating Base

Automatically compacts dual samples at a preset number of hammer blows and shuts off automatically on completion. Unit includes mechanical compactor, automatic counter, ASTM-compliant oak compaction pedestal, (2) hammers and (2) H-1337 mold assemblies. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Overall dimensions: 10 x 21 x 66"H. Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 265 lbs (120.2kg)



H-1356D

Standard-Duty 4" Automatic, Triple Compactor with Rotating Base

Triple simultaneous specimen compactions are produced automatically at a preset number of hammer blows. Machine shuts off on completion. Unit includes mechanical compactor, automatic counter, ASTM-compliant oak compaction pedestal, (3) hammers and (3) H-1337 mold assemblies. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Overall dimensions: 16 x 22 x 66"H. Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 351 lbs (181.4kg)

Description	Model
Compactor, 115V 60Hz	H-1336D
Compactor, 230V 60Hz	H-1336D.2F
Compactor, 230V 50Hz	H-1336D.5F

Description	Model
Compactor, 115V 60Hz	H-1346D
Compactor, 230V 60Hz	H-1346D.2F
Compactor, 230V 50Hz	H-1346D.5F

Description	Model
Compactor, 115V 60Hz	H-1356D
Compactor, 230V 60Hz	H-1356D.2F
Compactor, 230V 50Hz	H-1356D.5F



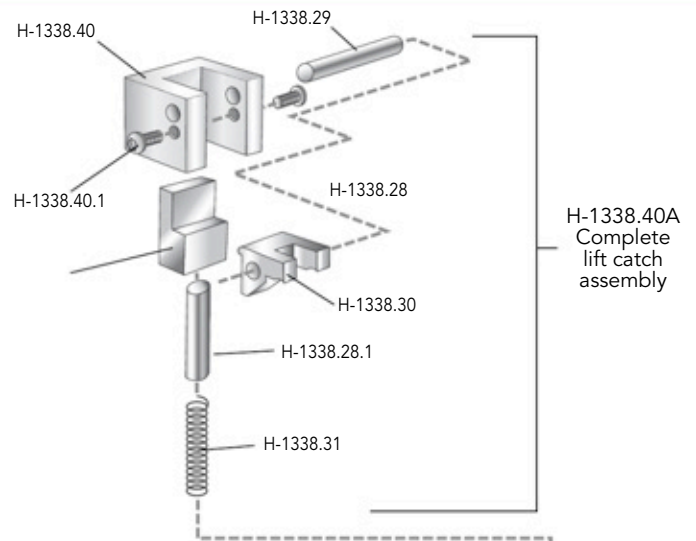
Replacement Parts for Standard-Duty, Automatic Compactors

Description	Model
4" hammer with flat foot (stationary base) for H-1336D	H-1338A
4" hammer with tapered foot (rotating base) for H-1346D, H-1356D	H-1338B
4" hammer with "Canadian" tapered foot (rotating base) for H-1346D, H-1356D	H-1338C
Lift Chain for H-1336D, H-1346D and H-1356D	H-1336.21
Replacement Counter and proximity switch for Compactors	H-1334B
Replacement Counter and proximity switch for Compactors, 230V	H-1334B.4F
Replacement Pedestal for H-1336 Marshall Compactor	H-1347M
Replacement Pedestal for H-1346 Marshall Compactor	H-1347.2M
Replacement Pedestal for H-1356 Marshall Compactor	H-1347.3M

See the following pages for Ovens (pgs. 246 and Hotplates (pgs 244) to facilitate the heating of molds and hammers for operation.

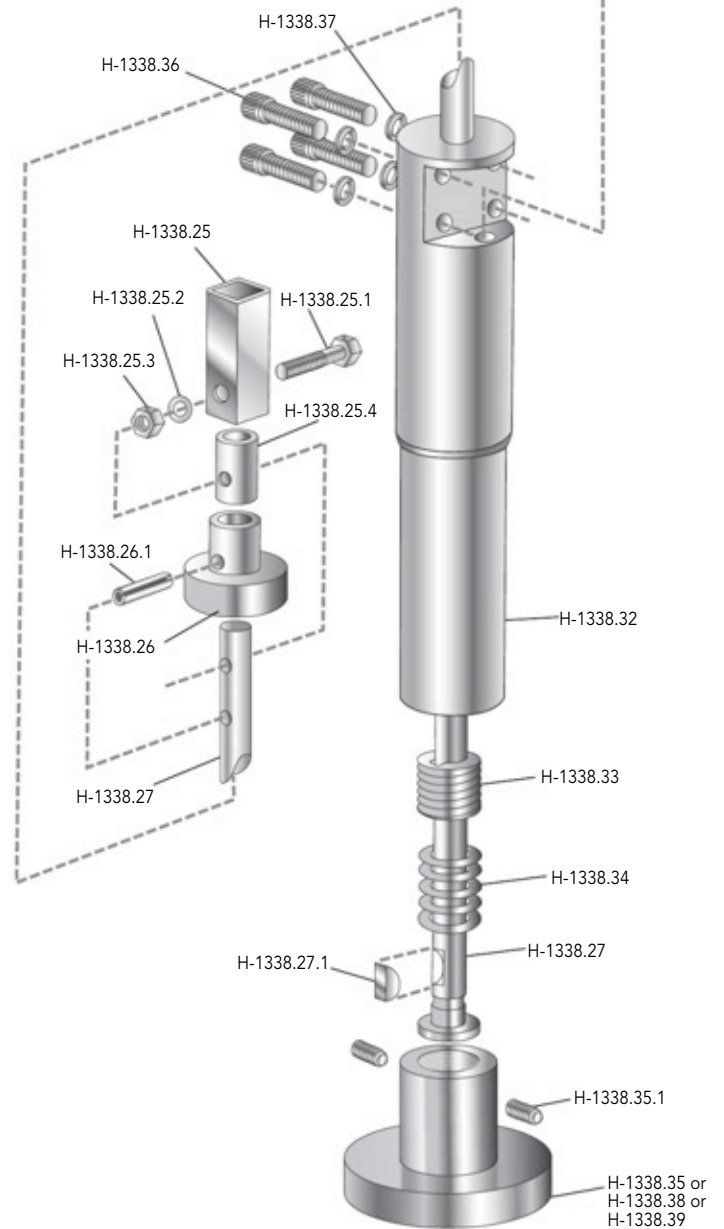
Lift Catch Assembly and Replacement Parts

Description	Model
Complete lift catch assembly	H-1338.40A
Release block	H-1338.28
Pin	H-1338.28.1
Clevis pin	H-1338.29
Lift catch	H-1338.30
Spring	H-1338.31
Screw	H-1338.36
Washer	H-1338.37
Release housing	H-1338.40
Screw for release housing	H-1338.40.1



Hammer Assemblies and Replacement Parts

Description	Model
Clevis pin with screw	H-1338.29
Locator guide	H-1338.25
Hex head bolt	H-1338.25.1
Washer	H-1338.25.2
Nut	H-1338.25.3
Spacer	H-1338.25.4
Hammer handle	H-1338.26
Spring pin	H-1338.26.1
Hammer rod	H-1338.27
Key	H-1338.27.1
Hammer weight (complete)	H-1338.32
Plug	H-1338.33
Spring	H-1338.34
Hammer foot, flat	H-1338.35
Hammer foot, tapered	H-1338.38
Hammer foot, Canadian spec	H-1338.39
Screw for foot	H-1338.35.1
Socket Head Screw, 5/16 x 18 x 1.25"	H-1338.36
Washer	H-1338.37





Hand Compactor Set for 4" Molds— H-1345

Compactor set that facilitates hand compaction of 4" Marshall specimens. Set features ASTM-compliant oak pedestal with hammer support rod, which holds hammer in perpendicular alignment to base during compaction. Also features a mold holder, which keeps the mold securely positioned during compaction. Set includes: H-1340G Compaction Hammer; H-1347 Pedestal with ASTM-compliant steel plate; H-1341 Compaction Mold; H-1343 Compaction Mold Holder; H-1345.6 Hammer Support Rod, and H-1345.5 Adjustable Guide. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Complies with ASTM D6926. Shipping wt. 165 lbs. (74.8 kg)

4" Hand Compaction Hammer— H-1340

Compacts asphalt mixture in the compaction mold. Flat circular face is 3-7/8" (98mm) dia.; hammer is 10 lb. (4.54kg.) sliding weight and has a free fall of 18" (457mm). Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Shipping wt. 20 lbs. (9.0kg)

4" Hand Compaction Hammer w/Finger Guard— H-1340G

Compacts asphalt mixture in the compaction mold. Hammer has finger guard at base of sliding weight. Flat circular face is 3-7/8" (98mm) dia.; hammer is 10 lb. (4.54kg.) sliding weight and has a free fall of 18" (457mm). Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Shipping wt. 20 lbs. (9.0kg)

Mold Holder for Hand Compaction— H-1343

Holder mounts on compaction pedestal and centers the compaction mold over the center of the post. Mold holder keeps mold, collar and base plate securely positioned during compaction. Shipping wt. 10 lbs. (4.5 kg)

Pedestal for 4" Hand Compaction— H-1347

Necessary to stabilize mold during compaction. Consists of 8" x 8" x 18" (203 x 203 x 457mm) ASTM-compliant oak compaction pedestal capped with 12" x 12" x 1" (305 x 305 x 25mm) steel plate. Pedestal mounts to a concrete slab with four angle brackets at bottom of pedestal. Shipping wt. 90 lbs. (40.8kg)

Adjustable Hammer Guide— H-1345.5

Guide for hand compaction hammer. Shipping wt. 3 lbs. (1.4kg)

Hammer Support Rod— H-1345.6

Support rod for hand compaction hammer. Shipping wt. 9 lbs. (4.1kg)

Marshall Mix Design and Testing Booklet— H-1328A

While the new Superpave mix design system continues to evolve, many users worldwide continue to rely on the Marshall Method for hot asphalt mix design. This booklet covers the Marshall mix design criteria; equipment necessary to perform the tests; sample preparation and testing procedures; data analysis, as well as moisture susceptibility testing methods.

See the following pages for Ovens (pgs. 246 and Hotplates (pgs 244) to facilitate the heating of molds and hammers for operation.



H-1353A



H-1341



H-1337



H-1367

H-1348
H-1363

H-1331

H-1341P
H-1361P

H-1355

Marshall Compaction Mold, 6" — H-1367

6" stability compaction mold for preparing test specimens with the H-1366 and H-1366R Compactors. Can be used with rotating or stationary base models. Comply with ASTM D5581. Shipping wt. 15 lbs. (6.8 kg)

Marshall Compaction Mold, 4" (Rotating Base) — H-1337

4" stability compaction mold for preparing test specimens with all rotating base compactors (H-1364R, H-1346 and H-1356), as well as the H-1364 stationary base compactor. Base plate of mold is designed to link with rotating base feature of compactors causing the mold to rotate during compaction. Forming mold is 4" (102mm) ID by 3" (76mm) high. Complies with ASTM D6926. Shipping wt. 10 lbs. (4.5kg)

Marshall Compaction Mold, 4" (Stationary Base) — H-1341

4" Stability compaction mold for preparing test specimens with H-1336 mechanical compactors and H-1340, H-1345 Hand Compactors. Consists of base plate, forming mold and collar. Molds are machined from seamless tubing and plated. Base plate and collar are interchangeable with either end of the forming mold. Forming mold is 4" (102mm) ID by 3" (76mm) high. Complies with ASTM D6926. Shipping wt. 10 lbs. (4.5 kg)

Paper Disks, 4" (1000 pkg) — H-1341P**Paper Disks, 6" (500 pkg) — H-1361P**

Circular, smooth-edged 4" or 6" diameter disks fit in bottom of H-1337 (4"), H-1341 (4") or H-1367 (6") compaction molds before introducing mixture prior to compaction test. Facilitates removal of sample specimen from mold. Shipping wt. 4 lbs. (1.8 kg)

Marshall Sample Storage Can — H-1331

2 lb. can with lid for storing Marshall samples.

Mold Extractors, 4", Shipping wt. 2 lbs. (1.0kg) — H-1348**Mold Extractors, 6", Shipping wt. 3 lbs. (1.4kg) — H-1363**

Used with compression tester for removing 4" or 6" compaction mold specimens.

Hand-Operated Sample Ejector — H-1353A

Designed for lab and field use to extract asphalt samples from either 4" or 6" compaction molds. The ejection force is generated by means of a 3-ton (27.7kN) capacity hand-operated hydraulic jack. The cast-aluminum ejector head assembly can be positioned at different heights through the use of quick release pins. This enables the operator to easily match the ejection travel to the height of the mold being used. Maximum stroke distance for this ejector is 7.5". Overall dimensions: 13"W x 6"D x 27"H (330 x 152 x 686mm). Shipping wt. 60 lbs. (27.2 kg)

Motorized Sample Ejector, 120V 60Hz — H-1355**Motorized Sample Ejector, 220V 50/60Hz — H-1355.4F**

Similar in design and construction to the H-1353A series sample ejector, this model features the use of a 5-ton capacity motorized hydraulic pump and ram assembly. The unit incorporates extended upright rods in order to accommodate both standard 4" or 6" asphalt compaction molds, as well as the taller gyratory compaction molds. Maximum stroke distance for this ejector is 9.25". Overall dimensions excluding pump: 13"W x 6"D x 29"H (330 x 152 x 737mm). Shipping wt. 80 lbs. (36.3 kg)

Complies with ASTM D5581, D6927 and D6931 and AASHTO T245, T283, BS 598, EN12697-34 and other applicable International standards

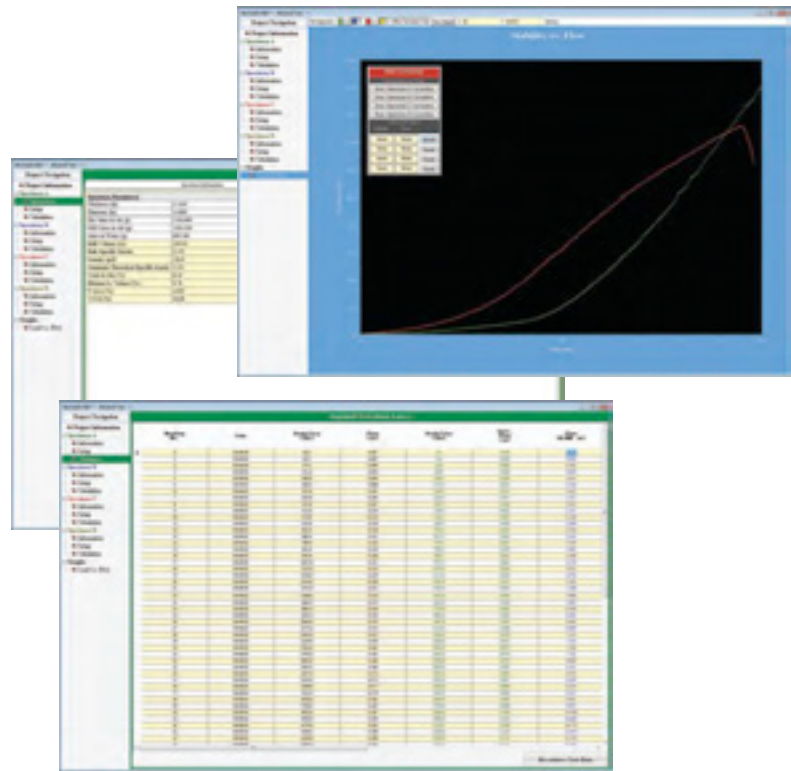


Marshall Setup using the HM-3000.3F Load Frame
 Pictured is the HM-3000.3F Load frame with a typical Marshall setup. See the chart to the right for items to order for the setup shown. See page 70 for more information on the HM-3000.3F Load Frame.
 Shipping wt. 300 lbs. (136.1kg)

HM-3000.3F Marshall Testing Solution

The HM-3000 provides the ultimate lab solution of a multi-purpose load frame that can handle Marshall and Hveem tests with built-in test parameters, as well as soil tests such as CBR, UU, CU, CD and UC. The HM-3000 can work as a stand-alone unit, which can perform Marshall tests at the push of a button; or with the aid of Humboldt's HMTS software and a computer, be automated to run tests and gather data in real-time data acquisition in the form of charts and graphs. The HM-3000 is ideal for road construction projects in either mobile or fixed labs, educational institutions and consulting firms.

Description	Qty	Part #
Digital MasterLoader 110/220V 50/60Hz	1	HM-3000.3F
S-Type Load Cell, 10,000 (50kN)	1	HM-2300.100
Strain Transducer 1" (25mm)	1	HM-2310.10
Displacement Transducer Bracket	1	HM-4178BRT
Marshall Reporting Software	1	HM-3005SW



HMTS Reporting Software, Marshall Module— HM-3005SW

Humboldt Material Testing Software (HMTS) is a stand-alone application used in conjunction with Humboldt's load frames, MiniLoggers, etc. to provide real-time data acquisition. The Marshall Module provides a simple, test-specific interface to control Marshall test operations and automatically record data while also displaying it in real-time tables and graphs. Technicians can be freed-up for other duties with the assurance that all test data is being collected and saved.

- Test Information is stored, and all calculations are performed automatically
- Live tests and live graphing capabilities (real-time)
- Complete test report including all calculations and graphs required for testing
- Review and export tests using Microsoft Excel
- Smart Test Function: automatically picks up where it left off if the test was not finished due to unexpected events within your computer.

Complies with ASTM D5581, D6927 and D6931 and AASHTO T245, T283, BS 598, EN12697-34 and other applicable International standards



HM-1327MAR machine shown with the optional, HM-1327.400.3F chart recorder and H-1342 Breaking Head.

The HM-1327 is a fully automatic, single-speed Load Frame, 2.0 inches/minute, (50mm/minute), designed for those who want a high-quality, application-specific Load Frame that provides simple operation with built-in data acquisition capabilities. The HM-1327 provides two channels with integral data acquisition to accommodate a load cell and transducer for Marshall testing. The machine's digital display provides the ability to monitor test data in real-time, as well as the ability to see a test's peak value at a glance.

Features include:

- 8" platen provides roomy, stable base for test equipment
- Two channels with real-time data acquisition
- Backlit LCD displays test data and peak value at a glance
- Battery-backed, real-time clock
- RS232 interface provides computer control and downloading of test data.
- Chart recorder output.
- Nonvolatile test data storage and instrument calibration
- Auto conversion of instrument calibration between English or Imperial units and SI or metric units
- User-selectable Marshall or TSR test functions
- Machine auto reverses to home position at the end of test
- Automatic triggering of test data logging

The HM-1327 can be ordered in the following configurations:

HM-1327MAR— includes a 10,000 lb (50kN) S-type Load Cell and a 1" (25mm) Strain Transducer, as well as Humboldt's HM-3005SW Marshall HMTS Reporting Software Marshall Module.

HM-1327TSR— includes a 10,000 lb (50kN) S-type Load Cell, as well as Humboldt's HMTS Reporting Software.

HM-1327WCR— includes a 10,000 lb (50kN) S-type Load Cell, the HM-1327.400.3F chart recorder, as well as Humboldt's HMTS Reporting Software.

Description	Model
Marshall/TSR Loader with Load Cell, Strain Transducer and HMTS Marshall Module Software, 115V 60Hz	HM-1327MAR
Marshall/TSR Loader with Load Cell, Strain Transducer and HMTS Marshall Module Software, 220V 60Hz	HM-1327MAR.2F
Marshall/TSR Loader with Load Cell, Strain Transducer and HMTS Marshall Module Software, 220V 50Hz	HM-1327MAR.5F
Marshall/TSR Loader with Load Cell and HMTS Reporting Software, 115V 60Hz	HM-1327TSR
Marshall/TSR Loader with Load Cell and HMTS Reporting Software, 220V 60Hz	HM-1327TSR.2F
Marshall/TSR Loader with Load Cell and HMTS Reporting Software, 220V 50Hz	HM-1327TSR.5F
Marshall/TSR Loader with Load Cell, Chart Recorder and HMTS Reporting Software, 115V 60Hz	HM-1327WCR
Marshall/TSR Loader with Load Cell, Chart Recorder and HMTS Reporting Software, 220V 60Hz	HM-1327WCR.2F
Marshall/TSR Loader with Load Cell, Chart Recorder and HMTS Reporting Software, 220V 50Hz	HM-1327WCR.5F

Shipping wt. 248 lbs (112kg)

Description	Model
Chart Recorder for use with HM-1327 Models	HM-1327.400.3F



H-1335
Basic Marshall Test Set

H-1339B

HM-2800

Marshall Compression Machine, 120V 60Hz— H-1339B

Marshall Compression Machine, 220V 60Hz— H-1339B.2F

Marshall Compression Machine, 220V 50Hz— H-1339B.5F

Compression machine designed specifically for testing the resistance to plastic flow of bituminous paving mixtures— the Marshall Test. Machine has a one-speed motor with reversing switch that produces a uniform vertical movement of 2" (51mm) per minute. Unit includes a H-4454.100 calibrated load ring and dial indicator for determining test load. Load capacity is 11,000 lbf. (50kN). Maximum piston travel is 3-1/2" (88mm). Overall dimensions are: 18" x 18" x 38-1/2"H (457 x 457 x 978mm). Shipping wt. 185 lbs. (78.9 kg)

Basic Marshall Test Set, 120V 60Hz— H-1335

Basic Marshall Test Set, 230V, 60Hz— H-1335.2F

Basic Marshall Test Set, 230V, 50Hz— H-1335.5F

Basic Test Set for evaluating stability and plastic flow (Marshall Tests) of bituminous paving mixtures. Includes all the basic testing equipment for performing these tests. Ideal setup for field lab applications, as well as dedicated Marshall test labs. Included in the set are: (1) H-1339B— Marshall Compression Machine; (1) H-1340—4" Hand Compaction Hammer; (2) H-1341—4" Marshall Compaction Molds; (1) H-1342—4" Marshall Breaking Head; (1) H-1343— Mold Holder for Hand Compactor; (1) H-1344—Dial Flowmeter with Guide Sleeve; (1) H-1347— Pedestal for 4" Hand Compactor; (1) H-1348—4" Mold Extractor, and (1) H-1390— Water Bath. Basic Test Sets for 230V applications, include a H-1390.4F Water Bath. Shipping wt. 325 lbs. (147.4 kg)

Basic Marshall Test Set— Metric, 230V, 60Hz— H-1335M.2F

Basic Marshall Test Set— Metric, 230V, 50Hz— H-1335M.5F

Same Basic Set as the H-1335.2F and H-1335.5F above, except these include a H-1344M Flowmeter, H-1337MM 100mm Mold and H-1342M Breaking Head. Shipping wt. 325 lbs (147kg)

Digital Accessory Kit, 110-250V 50-60Hz— H-1324A.3F

Twin-channel digital display for use with the H-1339. Includes S-type 11,000 lbf (50kN) load cell, 0.4" (10mm) linear strain transducer, and transducer bracket. Display: 12" x 10" x 4" (304 x 254 x 102mm).

Chart Recorder Accessory Kit, 120V 60Hz— H-1329CK

Chart Recorder Accessory Kit, 220V 50Hz— H-1329CK.5F

This kit is comprised of a H-1329LR chart recorder, an LVDT and a H-2300.100 load cell for converting a H-1339B Marshall compression machine into an automatic Marshall compression tester and recorder. Includes LVDT sensor, electronic load cell and plotter assembly. Shipping wt. 18 lbs (8.2kg)

Multi-Speed Load Frame, 120V 60Hz— HM-2800

Multi-Speed Load Frame, 220 50/60Hz— HM-2800.4F

The HM-2800 is a multi-use, multi-speed machine that provides a dedicated setting for Marshall testing in addition to its ability to provide variable speeds of operation between 0.008 and 2.000 inches/minute for doing the multitude of tests required by today's labs. The HM-2800 features a quiet, direct-drive DC motor that provides a loading speed range from .008 to 1.999 in/min., controlled through the use of edit keys and a digital display. It also incorporates a separate, dedicated control to accommodate 2.00 in/min. for use in Marshall and TSR Testing for asphalt. The controls also accommodate a rapid travel speed of 2.25 in/min for moving the platen into position quickly. HM-2800.4F uses a step-down transformer for electric conversion. Shipping wt. 300 lbs (136kg)

See page 72 for more information on the HM-2800. See the chart below for items to order for the setup shown.

HM-2800 Load Frame Typical Marshall Setup for 4" Samples

Description	Qty	Part #
Multi-Speed Load Frame	1	HM-2800
Load Ring, 11,000 lbf (50kN)	1	H-4454.100
Dial Flow Meter Kit w/ Dial Gauge 1.00" x 0.01"	1	H-1344
Marshall Breaking Head, 4"	1	H-1342



Marshall Test Load Ring, 11,000 lbf (4,550kgf, 50kN)— H-4454.100
Marshall Test Load Ring, 5,500 lbf (2,500kgf, 25kN)— H-4454.050

Calibrated load rings with dial gauges for use in Marshall testing are individually serial numbered for positive identification and comes with a calibration chart showing the relationship between deflection and pounds force for the individual ring. Units are calibrated in lbs. force every 20 lbs. from 0 to 1,000 lbs. and every 50 lbs. from 1,000 to 11,000 lbs. with adequate deflection to interpolate to 10 lbs., in kg force and kN. Comes with 3/4" -16 female, threaded mount. Complies with ASTM E74. Shipping wt. 8 lbs. (3.7kg).

Digital Load Ring, 11,000 lbf (4,550kgf, 50kN)— H-4454.100D
Digital Load Ring, 5,500 lbf (2,500kgf, 25kN)— H-4454.050D

Identical to Load Rings above except they use digital indicators in place of the dial indicators.

Load Rings

Load Rings for use in various other applications. Comply with ASTM E74. Rings are individually serial numbered for positive identification and come with a calibration chart showing the relationship between deflection and pounds force for the individual ring.

Range and Measurement Units			Model	
lbf	kN	kgf	Analog	Digital
110	0.5	50	H-4454.001	H-4454.001D
220	1.0	100	H-4454.002	H-4454.002D
550	2.5	250	H-4454.005	H-4454.005D
1,100	5.0	500	H-4454.010	H-4454.010D
2,200	10.0	1,000	H-4454.020	H-4454.020D
5,500	25.0	2,500	H-4454.050	H-4454.050D
11,000	50.0	5,000	H-4454.100	H-4454.100D
22,000	100.0	10,000	H-4454.200	H-4454.200D

NOTE: ASTM recommends that load rings be recalibrated each year after they have been put into service.

Marshall Breaking Head, 4"— H-1342
Marshall Breaking Head, 6"— H-1362

Marshall Breaking Heads consist of an upper and lower cylindrical segment having an inside radius of curvature of 3" for a 6" samples and 2" for a 4" sample. The lower segment is mounted on a base with two perpendicular guide rods extending vertically from the base. One guide rod is larger than the other, with a correspondingly larger guide sleeve in the upper segment to ensure correct assembly. Guide sleeves in the upper segment bring the two sections together without appreciable binding or loose motion on the guide rods. Complies with ASTM D6927. H-1342 shipping wt. 20 lbs. (9.1kg), H-1362 shipping wt. 30 lbs. (13.65kg)

Lottman Breaking Head, 4"— H-1349
Lottman Breaking Head, 6"— H-1369

Breaking heads for testing tensile strength. H-1349 has 1/2" wide upper and lower segments for use on 4" samples. H-1369 has 3/4" wide upper and lower segments for use on 6" samples. Complies with ASTM D6931, AASHTO T283. Shipping wt. 10 lbs.

Dial Flowmeter Kit— H-1344
Dial Flowmeter Kit, metric— H-1344M

Consists of a special dial indicator with a maximum position brake assembly and a guide sleeve that fits over either guide rod of a H-1342 or H-1362 stability test mold. H-1344 has a range of 1.00" with 0.01" divisions and the H-1344M has a range of 25mm with 0.25mm divisions.

Dial Gauge For Flowmeter— H-1344.2
Dial Gauge (Metric) For Flowmeter— H-1344.2M

Replacement Dial Gauges for H-1344 and H-1344M Dial Flowmeters.

Guide Sleeve For Flowmeter Kit— H-1344.1



Water Baths with Microprocessor-based Temperature Control

- Auto-tuning is fast & effortless
- Dual, digital display simultaneously shows set point and process temperature
- Ramp-to-set point handles critical temperature processes smoothly
- Set point range limiting protects process and equipment
- Percent power limit protects components from stress
- Rapid cycling provides fast system response
- Operator lockout guards against unwanted changes
- All exposed parts are stainless steel. Front panel is water and corrosion resistant.

Humboldt waterbaths are a perfect match for Marshall and Superpave test applications and meet ASTM D6927, D5581 and D4867.

Humboldt water baths feature a microprocessor-based digital controller for precise temperature control throughout their temperature range of ambient to 180°F (82°C) at an accuracy of +/-0.1% of input span.

The dual digital display simultaneously shows the set point and the process temperature at a glance.

Humboldt Water Baths are fully insulated to help maintain constant temperatures easily. Models H-1390 and H-1392 can accommodate (12) 4" diameter or (3) 6" diameter Marshall specimens at a time. And the model H-1394 can accommodate (16) 4" and (9) 6" diameter Marshall specimens at a time. All models include a stainless steel shelf, which supports specimens while allowing 2" of free circulating water above and below specimens. Models H-1390 and H-1394 also utilize a magnetic stirring bar to induce water flow within the bath and ensure a uniform temperature is maintained. Model H-1392 does not have a magnetic stirring bar.

All exposed areas are stainless steel and the front control panel is both water and corrosion resistant.

Deluxe Water Bath, 110V 60Hz— H-1390

Deluxe Water Bath, 220V 50/60Hz— H-1390.4F

Microprocessor-based control for precise temperatures throughout the range. Includes magnetic circulator, ensuring constant water temperature, and, a stainless steel shelf, which stands 2" (51mm) above the bottom of the unit for free circulation of water above and below test samples. Volume is 7.76 gallons (29.40L) and dimensions are: ID: 19.5" W x 11.5" D x 8" H (495.3 x 292.1 x 203.2mm). Shipping wt. 47 lbs. (21.4kg)

Large Deluxe Water Bath, 110V 60Hz— H-1394

Large Deluxe Water Bath, 220V 50/60Hz— H-1394.4F

Microprocessor-based control for precise temperatures throughout the range. Includes magnetic circulator, ensuring constant water temperature, and, a stainless steel shelf, which stands 2" (51mm) above the bottom of the unit for free circulation of water above and below test samples. Volume is: 17 gallons (63.4L) and dimensions are 20" x 20" x 10" deep (508 x 508 x 254mm). Shipping wt. 74 lbs. (33.5kg)

Water Bath, 110V 60Hz— H-1392

Water Bath, 220V 50/60Hz— H-1392.4F

Same as H-1390, except it does not have a magnetic circulator. Shipping wt. 47 lbs. (21.4kg)

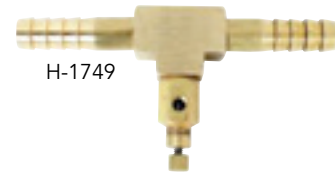
Economy Water Bath, 110V 60Hz— H-1380

Economy Water Bath, 220V 50/60Hz— H-1380.4F

Low-cost alternative water bath for heating specimens holds eight standard 4" stability molds. Supporting shelf above the bottom allows water circulation around specimens. Automatic thermostatic control with a range of 150° to 500°F (65° to 160°C). ID 11-1/2 x 19-1/2 x 5-1/2" (293 x 497 x 140mm) deep. H-1380.4F uses a step-down transformer, which is included, for electric conversion. Shipping wt. 28 lbs. (12.7kg)



Typical Rice Test Setup



H-1749



H-1754D



H-1750



H-1755A

H-1750

H-1751

Available Pycnometer Size Comparison.



H-1820

Vacuum Pycnometer Set (4.34L) for Rice Test— H-1750

Used in Rice testing to determine the maximum specific gravity of bituminous paving mixtures with maximum aggregate size up to 19.1mm (3/4in.). The H-1750 provides a 4.34L volume with a 2.9L max. sample volume and a 2500g typical required sample size and a 7-1/2" ID x 6" depth. Set includes aluminum volumetric canister; volumetric lid; flat, Plexiglas vacuum lid with O-ring and a metal water vacuum aspirator with 3/8" IPT and 6' hose with release valve and fittings. Unit achieves vacuum using an aspirator or optional vacuum pump. Use with H-1756A Vibrating Apparatus or H-1782 De-Airing Device, and H-1754D manometer, sold separately. See page 158-159 for vacuum pumps. Replacement parts are available, please inquire. Complies with ASTM D2041; AASHTO T209, T283. Shipping wt. 12 lbs (5kg)

Stainless Steel, Vacuum Pycnometer Set— H-1750SS

Same as H-1750 except stainless steel vessel.

Small Vacuum Pycnometer Set (2.9L)— H-1751

The H-1750 provides a 2.9L volume with a 1.9L max. sample volume and a 1500g typical required sample size and a 7-1/2" ID x 4" depth. Non-ASTM tests.

Vacuum Pycnometer Set (5.8L)— H-1755A

The H-1755A provides a 5.8L volume with a 3.9L max. sample volume and a 4000g typical required sample size and a 7-1/2" ID x 8" depth. Shipping wt. 12 lbs (5kg)

Aluminum Lid— H-1750.2

Replacement lid for models H-1750 and H-1751.

O-Ring— H-1750.3

Replacement o-ring for models H-1750 and H-1751.

Large-Capacity Vacuum Pycnometer Set— H-1820

Large-capacity unit, 10L (2.64 gal.), 6000g (13.2 lbs.) sample weight, with maximum aggregate size of 50mm (2in.). Set features domed transparent cover for easy observation of sample testing, perforated plastic shelf, which some States require; water inlet valve and 1/4" ID hose, quick-disconnect, vacuum gauge, vacuum hose and aspirator with 3/8" NPT fitting. Flange OD is 10-3/4" (273mm); maximum clearance above plate is 7-3/4" (197mm). Use with H-1826A vibrating table, and H-1754D manometer, sold separately. See page 158-159 for vacuum pumps. Replacement parts are available, please inquire. Dimensions: 9-7/16" ID x 12-1/8" (240 ID x 311mm). Complies with AASHTO T209, T283. Shipping wt. 10 lbs (5kg)

Digital Manometer, 120V 60Hz— H-1754D

Digital Manometer, 120V 50/60Hz, Certified— H-1754D-CA

Digital Manometer, 220V 60Hz— H-1754D.4F

Digital Manometer, 220V 50/60Hz, Certified— H-1754D.4F-CA

A precise measurement device designed to replace mercury-filled manometers used in Rice test applications. This portable, hand-held device can be easily moved around the laboratory. Holes are provided for bench or wall mounting and a 3/8" barb fitting is used for quick connections. The instrument features a digital display range of 0 to 1000mm Hg (absolute) at a resolution of 0.1mm Hg. The device has a rated accuracy of +/-0.5% full scale and is powered by one 9V battery or AC adapter, both are included. Shipping wt. 5 lbs (2kg)

Slow Release Valve for Vacuum Pycnometers— H-1749

For use with H-1750, H-1751 and H-1820 for greater accuracy and shorter dry back time. Brass valve maintains 30mm vacuum pressure on sample. Complies with ASTM D2041, AASHTO T283.



H-1782



H-1756A



H-1826A



H-1753 shown in use with H-1782



H-4296A



H-4296



H-1759



H-1758

H-1757



H-1763A

Vibrating Apparatus for Pycnometer, 120V 60Hz— H-1756A**Vibrating Apparatus for Pycnometer, 220V 50Hz— H-1756.4F**

Heavy-duty Vibrating Apparatus for use with H-1750, H-1755A and H-1751 pycnometers keeps sample material loose for more reliable test results. Strong, rugged-duty vibrators and sturdy bases having integral, heavy-duty on/off switches. Exclusive quick-release cam/lock fasteners allow quick placement and removal of canister. Shipping wt. 15 lbs (7kg)

Vibrating Apparatus for H-1820, 120V 60Hz— H-1826A**Vibrating Apparatus for H-1820, 220V 50Hz— H-1826.4F**

Heavy-duty vibrating Apparatus keep sample material loose for more reliable test results. Strong, rugged-duty vibrators and sturdy bases having integral, heavy-duty on/off switches. Exclusive quick-release cam/lock fasteners allow quick placement and removal of canister. The open-end model has a sliding scale and is graduated above and below zero to 130 x 1mm. Shipping wt. 48lbs (22kg)

Flask Attachment— H-1753

For use with H-1756A and H-1782, flask not included.

Orbital De-Airing Device for Pycnometer, 120V 60Hz— H-1782

The Humboldt Orbital De-Airing Device is designed for use in maximum specific gravity and density determinations of bituminous paving mixtures. Through the use of an orbital shaking action, material densification that entraps air is virtually eliminated, resulting in more accurate and uniform test results. The front panel incorporates a variable speed controller with a range of 10 to 250 rpm and an LED programmable timer with an accuracy of better than $\pm 0.1\%$. The orbital diameter of the 11" x 12" (279 x 305mm) platform is set at 1-1/2" (38.1mm). Taking up little counter space, the base is 10" x 10" (154 x 154mm) and has an overall height of 16" (406mm). Quick release clamps are used to permit quick mounting and removal of the pycnometer. The optional H-1753 Flask Attachment allows the user to conduct tests using a laboratory flask. Shipping wt. 38lbs (17kg)

Note: For 220V operation, order Model H-1042 Transformer.

Universal Digital Timer, 120V 60Hz— H-4296A**Universal Digital Timer, 220V 50/60Hz— H-4296A.4F**

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features easy-to-use digital interface and two-plug AC receptacle. Shipping wt. 6 lbs (3kg)

Universal Analog Timer, 120V 60Hz— H-4296**Universal Analog Timer, 220V 50/60Hz— H-4296.4F**

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features two-plug AC receptacle.

Indicating Drierite Air Drying Unit— H-1759

Easily installs in-line between vacuum pump and rice test equipment. This refillable unit measures 2-5/8" by 11-3/8" (667 x 289mm) with hose barbs at both ends, which can accept 1/4" to 3/8" flexible tubing. Supplied complete with 650g of 8 mesh, indicating desiccant. Shipping wt. 3 lbs (1kg)

Drierite Desiccant, 1 lb/ 8 mesh— H-1757**Drierite Desiccant, 5 lb/ 8 mesh— H-1767**

Replacement desiccant for air drying unit. Protects vacuum pump by removing final traces of moisture. Complies with ASTM D2041.

Indicating Drierite Desiccant, 1 lb/ 8 mesh— H-1758**Indicating Drierite Desiccant, 5 lb/ 8 mesh— H-1761**

Indicating Drierite is impregnated with cobalt chloride. This desiccant is blue when dry and changes to pink upon absorption of moisture. The color change is pronounced and clearly visible. This makes Indicating Drierite valuable when it is necessary to know with certainty that dryness is being maintained and to signal when the drying agent should be replaced. It has the same efficiency as Regular Drierite and can be regenerated for reuse. Complies with ASTM D2041.

High Vacuum Pump, 120V 60Hz— H-1763A**High Vacuum Pump, 230V 50/60Hz— H-1763A.4F**

Direct-drive two-stage rotary sliding vane high vacuum pump features gas ballast and trap to reduce risk of oil being sucked into the system. Produces free air displacement 85L per minute (3 cu. ft. per minute) and maximum vacuum 29-30". Operating temperature is 30 to 170°F (-1.11 to 76.6°C). Has 1/4" OD intake ports for 1/4" ID tubing. Dimensions: 11-1/4" x 15-1/2" x 6-1/2" (28.6 x 39.4 x 16.5cm). Shipping wt. 26 lbs (13kg)



H-1762

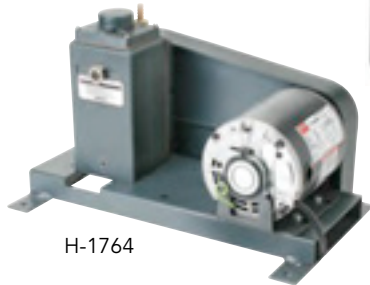


H-1770



H-1766.2

H-1768.3



H-1764



H-1766.3



HM-9110
HM-9111



HM-9113

Two-Stage Oil-less Vacuum Pump, 120V 60Hz— H-1762

Two-Stage Oil-less Vacuum Pump, 230 50/60Hz— H-1762.4F

Split-capacitor four-pole, two-stage oil-less diaphragm vacuum pump pulls 29" Hg maximum-obtainable vacuum. Shipping wt. 25 lbs (11.36kg)

Two-Stage Vacuum Pump, 120V 60Hz— H-1764

Two-Stage Vacuum Pump, 230 60Hz— H-1764.2F

Two-Stage Vacuum Pump, 230 50Hz— H-1764.5F

Designed for continuous use, this two-stage, belt-driven pump operates on the oil-sealed rotary vane principle and is ideal for distillation, filtration, degassing and as a roughing pump for high-vacuum systems. Pumps are mounted on rectangular steel base plate and include V-belt and belt guard that totally encloses belt and pulleys. Pump pulls 29-30" maximum vacuum. Includes initial supply of oil plus an extra quart of HyVac® oil. Shipping wt. 80 lbs (36kg)

Vacuum Pump, 120V 60Hz— H-1770

High-vacuum, small capacity, general-purpose vacuum pump with belt guard has two-stage construction for efficiency with low maintenance. Features metal vanes and vented exhaust for introduction of air to remove condensable vapors. Pump is filled with oil; an extra quart is included. Exhaust filter is available separately. Guaranteed ultimate vacuum is 25-29" (635-736mm) mercury, and free-air displacement is 25L/min. (0.9cfm). Shipping wt. 80 lbs (36kg)

Vacuum Pump Oil

High purity oil with low vapor pressure that does not materially increase at temperatures up to 50°C (122°F) and viscosity sufficiently low for use at 125°C (59°F). Oil remains fairly constant up to 50°C (122°F).

Vacuum Pump Oil, 1 Quart— H-1766.2 Shipping wt. 2 lbs (1kg)

Vacuum Pump Oil, 1 Gallon— H-1766.3 Shipping wt. 8 lbs (4kg)

Vacuum Pump Oil, 5 Gallon— H-1766.4 Shipping wt. 40 lbs (18kg)

Vacuum Pump Oil, 12 Quart Case— H-1766.5 Shipping wt. 24 lbs (11kg)

Vacuum Pump Oil, 6 Gallon Case— H-1766.6 Shipping wt. 50 lbs (23kg)

Flushing Oil for Vacuum Pumps— H-1768.3

Purges contaminants and condensables, such as water & solvents from all mechanical vacuum pumps. Use between oil changes minimizes contamination of new oil by residue from old oil; extends pump life. Shipping wt. 9 lbs (4.1kg)

Asphalt Permeameter, 4"— HM-9110

Asphalt Permeameter, 6"— HM-9111

These asphalt permeameters are compact, self-contained, easy-to-use units, which can be used in the lab or in the field. They are used to test the permeability of a compacted asphalt paving mixture by using the falling head method to determine hydraulic conductivity of saturated 4" or 6" samples. To use, place the specimen inside the metal cylinder, where it is held in place by a latex membrane. The unit is then pressurized by the built in hand pump. The expanding membrane pushes against the outer edge of the sample, filling in voids and preventing flow down the side of the core. The sample is then saturated from the bottom, and 500cc of water is allowed to flow through the sample while being timed. Both permeameters include a 500cc manometer with 15 ft of 1/4" OD water line, built-in hand pump and a pressure gauge. Shipping wt. 24 lbs (11kg)

4" Membranes— HM-9110.2

4" O-rings— HM-9110.1

6" Membranes— HM-9111.2

6" O-rings— HM-9111.1

NCAT Field Permeameter— HM-9113

The NCAT Field Permeameter is a falling-head permeameter using Darcy's Law to determine rate of water flow through asphalt pavement. This design was selected by the National Center for Asphalt Technology (NCAT) for its close correlation with laboratory test results. Testing and subsequent calculations can usually be completed in 10-15 minutes by one technician.

The HM-9113 Permeameter is supplied in two sections and constructed of rugged plastic. In use, sealing material is placed on the base plate and the unit seated against the pavement using gentle foot pressure and included base weights. After filling with water, outflow is observed using the clearly marked graduations. The smallest, uppermost tier allows rapid determinations in low-porosity pavements. The larger diameter tiers are used to accurately read flow on more porous pavements. Alternate top section HM-9113 replaces the two top tiers with one larger diameter tier. This allows for extended test times on moderately permeable mats or for rapid filling when testing highly permeable mixes.



H-3841.2

H-3841

ASTM-Compliant Mixer, 5-Qt. (4.73L), 120V 60Hz— H-3841

ASTM-compliant mixer for mixing hydraulic cement pastes and mortars of plastic consistency. Mixer includes H-3844 Bowl Positioning Adapter, a 5-qt. (4.73L) stainless steel bowl and 1 flat, stainless steel beater for mixing heavy materials. Hobart Model No. N-50 operates on principle of planetary action—beater reaches every part of the batch, rotating on its axis in opposite directions as it moves around the bowl. Thoroughly blends, mixes and aerates all ingredients for consistent, predictable finished batches. Selective agitator transmission has 3 speed settings: 139, 285 and 591 RPM. Base dimensions: 10-3/8 x 15" (264 x 381mm). Height: 17" (432mm). Features U/L listed cord and plug. Complies with ASTM C227, C305; AASHTO T162. Shipping wt. 55 lbs (25kg)

Mixer, 5-Qt. (4.73L), 230V 60Hz— H-3841.2F

Mixer, 5-Qt. (4.73L), 230V 50Hz— H-3841.5F

Identical to H-3841 mixer above, except that the electrical configurations cause the mixer to run at a slightly slower speed, which renders them non-ASTM compliant.

H-3841—5-Qt. Mixer Accessories and Replacement Parts

Description	Model
Bowl Positioning Adapter	H-3844
Bowl Lid, acrylic	H-3846L
Beater—Stainless Steel, Flat-type	H-3841.1
Bowl—Stainless Steel, 5 qt. (4.73L)	H-3841.2
Wire Loop Whip—Stainless Steel	H-3841WW

Humboldt Extreme-Duty 12 Qt. Whisk— H-3842HW

Humboldt Extreme-Duty 20 Qt. Whisk— H-3843HW

Custom, hand-made extreme duty whisks are formed from 1/4" dia. stainless steel rod. Designed to stand up to the abuse of mixing heavy aggregate asphalt mixes in the Mixers listed above. Shipping wt. 15 lbs (7kg)



H-3843AHW

H-3842HW



H-3843A

H-3842A

12-Qt. (11.35L) Laboratory Bench Mixer, 120V 60Hz— H-3842A Bench Mixer, 230V 50/60Hz— H-3842A.4F

The Hobart Model HL-120 bowl has a 12-qt. (0.401 cu. ft.) mixing capacity and a 15-minute motor-driven timer. Planetary action of the beater assures thorough blending and mixing. Selective agitator transmission has 3 speed settings: 106, 196 and 358 RPM. Includes stainless-steel bowl, flat-type aluminum grid beater and aluminum dough hook. Base dimension: 14-3/4" x 20" x 29-9/16" (375 x 508 x 750cm). Shipping wt. 185 lbs. (83.9 kg)

20-Qt. (18.92L) Laboratory Bench Mixer, 120V 60Hz— H-3843A Bench Mixer, 230V 50/60Hz— H-3843A.4F

The Hobart HL-200 mixer has a positive gear drive and planetary mixing action to deliver positive results. Selective agitator transmission has 3 speed settings: 107, 198 and 361 RPM. Exclusive stirring switch provides low (53RPM) speed to facilitate adding liquids to semi-solids. Includes stainless-steel bowl and flat-type aluminum grid beater. Base dimension: 21" x 21-1/2" x 41-1/4" (533 x 546 x 1048cm). Shipping wt. 226 lbs. (102kg)

H-3842A—12-Qt. (Hobart HL-120) Mixer Replacement Parts

Description	Model
Aluminum Beater	H-3842A.1
12-Qt. Stainless Steel Bowl	H-3842A.2
Aluminum Dough Hook	H-3842ADH
Stainless Steel Wire Loop Whip	H-3842AWW

H-3843A—20-Qt. (Hobart HL-200) Mixer Replacement Parts

Description	Model
Aluminum Beater	H-3843A.1
20-Qt. Stainless Steel Bowl	H-3843A.2
Aluminum Dough Hook	H-3843ADH
Stainless Steel Wire Loop Whip	H-3843AWW

Replacement parts for previous models, H-3842 (Hobart A-120) and H-3843 (Hobart A-200) are available, please call.

Humboldt Extreme-Duty Whisks

Description	Model
For H-3843A (Hobart HL-200 1/2HP) Current	H-3843AHW
For H-3842A (Hobart HL-120 1/2HP) Current	H-3842AHW
For H-3841 (Hobart N-50A-10) Current	H-3841HW
Hobart 20-Quart Mixer Old Model (prior to 2007)	H-3843HW
Hobart 12-Quart Mixer Old Model (prior to 2007)	H-3842HW

Extreme-duty Whisks for previous models, H-3842 (Hobart A-120) and H-3843 (Hobart A-200) are available, please call.





H-1690



H-1692



H-1690.3



H-1690.2



H-1692.9



H-1692.6



H-1691



H-1690.1



H-1692.5

Asphalt/Concrete Mixer, 5 gal., Stationary, 120V 60Hz— H-1690
Asphalt/Concrete Mixer, 5 gal., Stationary, 220V 50Hz— H-1690.5F

Chain-drive mixer, ideal for sample batch mixing in either laboratory or field. Separate utility bucket cradles securely inside enameled-steel mixer frame. Maximum capacity 70 lbs (50lb recommended). Built for continuous duty performance. Choice of 4 Mixing angles. Mix bucket speed is 60 rpm with 1/2 HP motor. Configuration includes bucket, H-1690.2 paddle and accessory chain guard. Shipping wt. 45 lb (20kg).

Asphalt/Concrete Mixer, 5 gal., Mobile, 120V 60Hz— H-1691
Asphalt/Concrete Mixer, 5 gal., Mobile, 220V 50Hz— H-1691.5F

Direct-drive, 5 gallon, portable mixer with 8-inch semi-pneumatic wheels for mobility. Mix bucket speed is 60 rpm with 1/2 HP motor. Includes mix bucket only. **Order desired paddles separately, see below.** Shipping wt. 81 lb (37kg).

Asphalt/Concrete Mixer, 10 gal., Mobile, 120V 60Hz— H-1692
10 gal. Mixer, Mobile, 220V 50/60Hz— H-1692.4F

10 gallon, portable mixer with 8-inch semi-pneumatic wheels for mobility. Mix bucket speed is 60 rpm with 1/2 HP motor. Includes mix bucket only. **Order desired paddles separately, see below.** Shipping wt. 97 lb (44kg).

H-1690 Asphalt/Concrete Mixer Accessories

Description	Model
Mixing Paddle for 5 gal. H-1690 Mixer	H-1690.2
Deluxe Mixing Paddle for 5 gal. H-1690 Mixer	H-1690.3
Bucket & Cover for 5 gal. H-1690 Mixer	H-1690.1

H-1691, H-1692 Asphalt/Concrete Mixer Accessories

Description	Model
Asphalt Paddle for 5 gal. Portable Mixer	H-1691.6
Asphalt Paddle for 10 gal. Portable Mixer	H-1692.6
Concrete Paddle for 5 gal. Portable Mixer	H-1691.8
Concrete Paddle for 10 gal. Portable Mixer	H-1692.9
Mix Bucket for 5 gal. Portable Mixer	H-1691.4
Mix Bucket for 10 gal. Portable Mixer	H-1692.5



H-4122

H-4122QF



H-1304



AY1087X1



F85930-33
F85938

QuarterMaster™ Hot Asphalt Mix Sample Splitter— H-4122

The QuarterMaster™ is ideal for dividing the larger asphalt mix samples required in Superpave specifications. The hopper accepts samples up to 120 lb (54kg) of any mix with aggregate between 9.5 to 37.5mm and quarters it into four equal parts. In operation, a simple throw of a lever divides the sample. Using the device ensures greater control, consistency and uniformity in the preparation of test samples.

The unit is supplied complete with four sample buckets. Dimensions are 14"W x 17"D x 48"H (356 x 432 x 1219mm). To assist operation, order a H-1702 materials handling scoop. Shipping wt. 84 lb (38kg)

QuarterMaster™ Quick Funnel Insert— H-4122QF

Use Funnel to significantly reduce the hopper size when reduction of smaller samples is desired.

QuarterMaster™ Replacement Bucket— H-3372

Rhoma-Sol™ Specialty Emulsifier— H-1304

Spray-on solution used to remove bituminous deposits and stains from test equipment, contains no hazardous petroleum solvents and is 100% biodegradable.

Asphalt Content/Binder Ignition Furnace— F85930-33

240V 50/60Hz, 20 amp, 4,800 watt operation, includes Accessory Package AY1087X1

Asphalt Content/Binder Ignition Furnace— F85938

208V 60Hz, 23 amp, 4,800 watt operation, includes Accessory Package AY1087X1

The Asphalt Content/Binder Furnace with internal automatic balance is an environmentally-friendly and cost-effective method for the accurate determination of asphalt content. Developed by NCAT, the National Center for Asphalt Technology. Furnace's large capacity handles samples up to 4,000 grams. Ignition method reduces testing time compared to solvent testing methods and automatic operation frees technicians for other tasks. Temperature range is: 392 to 1202°F (200 to 650°C). Accurate internal balance monitors weights automatically throughout ignition to within ±0.1 gram. Easy operation— simply enter sample weight, calibration factor, load the sample, and push start, when unit beeps at test end, push stop, and sign receipt. Door safety features, such as a software-activated door lock, an automatic interlock that cuts power when door is open, full 180 degree door opening and door hinge lock eliminate harmful solvents and make operation easy. Ignition Furnace comes complete with Accessory Package AY1087X1. Complies with ASTM D6307. CE-Approved.

Chamber dimensions: 14"W x 10.5"H x 14"D (355 x 266 x 355mm).

Shipp. dimensions: 32"W x 32"D x 60"H (813 x 813 x 1524mm).

Shipping wt. 376 lb (171kg)

Asphalt Content/Binder Ignition Furnace— F85930-33X

Furnace only. 240V 50/60Hz, 20 amp, 4,800 watt operation.

Asphalt Content/Binder Ignition Furnace— F85938X

Furnace only. 208V 50/60Hz, 20 amp, 4,800 watt operation.

Accessory Package for Ignition Furnaces— AY1087X1

Accessory package includes: 4 baskets, 2 trays, 2 covers, handle, cooling cage, insulated plate, gloves, face shield, 4 rolls of printer tape, balance calibration plate and anderol oil.

Shipping wt. 132 lb (60kg)

F85930-33 & F85938 Accessories

Description	Model
Exhaust Tubing (per foot)	H-1515
Exhaust Tubing, Stainless Steel (per foot)	H-1515SS
Printer Paper	PRX2
Baskets (set of 2)	AY1087X6

Specifications

Operating Pressure	2.10 ±0.05 MPa (304 psi)
Temperature Range	90°C to 110°C (194°F to 230°F)
Temperature Control Resolution	±0.1°C
Test Temperature Uniformity	±0.5°C
Time to Setpoint	3 hours from ambient
Return to Setpoint	120 min. after preheating and loading of specimens
Pressure Vessel	ASME code section VIII, division 1; 1992 A 93
Maximum Pressure	325 psi (2.24 MPa) at 120°C (250°F)
Pressure Safety Release	325 psi (2.24 MPa)

H-1640.4F

**Pressure Aging Vessel, 230V 50/60Hz— H-1640.4F**

The Pressure Aging Vessel (PAV) is used to simulate in service oxidative aging of asphalt binder according to procedures developed by the Strategic Highway Research Program (SHRP). The H-1640 is fully compliant with the most recent ASTM and AASHTO standards for these tests. (Refer to ASTM designation D6521-05 and AASHTO method R28-06). The complete PAV system consists of an ASME-code stainless steel pressure vessel in a stainless steel cabinet with encased band heaters, a precision sample holder for simultaneous testing of ten specimens, a set of ten TFOT specimen trays, a pressure controller, temperature controller, pressure and temperature measurement devices, temperature recorder, and a specimen loading and unloading tool.


The H-1640 PAV takes the hassle out of running and documenting asphalt binder aging operations. Three easy, non-complicated steps produce accurate and reliable results. Just press the "heat" button, inset specimens when prompted and press the "Age" button and let the PAV do the rest.

Custom status screens guide the user step-by-step through the entire process. Each display screen (preheat start-up, preheat ready, aging heat up, aging pressurized, and aging complete) is simple and direct, with detailed process and status information. The final output screen, when the test is complete, shows the current vessel pressure, as well as minimum and maximum temperatures achieved during the test procedure. Process data (temperature and pressure) is continually stored at regular intervals in the programmable logic controller (PLC) that controls and monitors the process.

The H-1640 PAV features a compact, benchtop design with integral pressure vessel. Its rotating vessel lid with rounded support block provides easy opening and closing.

A built-in timer accumulates and records out-of-range time (out-of-range time for the PAV is typically less than 10 minutes during a 20-hour test) Minimum and maximum temperature data is recorded and displayed at the end of each test. Optional remote control operation and data access is also available, please contact Humboldt. This new control setup has many exciting prospects, including improved productivity and tighter

process control, with the ability to control testing and to access data from a single remote location. With the appropriate hardware, a single user is able to initiate or cancel a test, monitor test progress, and view test results on any number of PAVs located anywhere in the world.

Shipping Weight 425 lbs. (193kg) 

UPS Battery Backup System— H-1640.1

Prevents power failures, sags, surges, under and over voltages. Includes extended battery module EDM, and provides 4 hours of backup at full load. Provides three-stage charging, doubling battery life and optimizing recharge times. Provides 60-day advanced notification of end of useful battery life. Power Requirements: 230 VAC, 1 Ph. 60 Hz.

PAV Verification Kit— H-1640.2

Provides NIST-traceable temperature and pressure verification and includes a calibration block. Temperature range is -201 to 1210°C with a ± 0.03°C accuracy. Pressure range is 0 to 500 psi with an accuracy of ± 0.25% full scale (ANSI/ASME B40.1 Grade 4A)

PAV O-Ring— H-1640.3

Single-stage air pressure regulator (for external use on air tank)

- 0-4,000 psi high pressure gauge.
- 0-600 psi low pressure gauge includes relief valve.

CGA Adapter— H-1640.4

For use with bottles using 346 CGA connection

High Pressure Hose— H-1640.5

6 ft. stainless steel braided sheath pressure hose. Includes fittings and quick connect coupling.

Specimen Pans Set— H-1640.6

Set of 10 AASHTO T179 pans reduces down time between aging samples.



H-1641

Vacuum Degassing Oven (VDO), 120V 60Hz— H-1641
Vacuum Degassing Oven, 230V 50Hz— H-1641.5F

The Vacuum Degassing Oven (VDO) is used to precisely and accurately degas pressure-aged binder samples to meet AASHTO R28-06 and ASTM D6521-05 standards. The compact, table-top unit is constructed of stainless steel with a hinged lid to conserve space while allowing easy access to the stainless steel vacuum chamber. The oven holds up to (4) specimen containers and features a self-contained, automatic vacuum system. The high-precision controller features a digital display indicating time, temperature and the current stage of each process, as well as illuminated pre-heat, degas and end/stop buttons. It also features audible and visual alarms, indicating end of process. Over temperature protection is provided by a pressure safety release solenoid valve. The VDO includes (4) specimen containers and a specimen removal tool. Dimensions: 37" x 25" x 27" (94 x 63.5 x 68.5). Shipping wt. 185 lbs (84kg).

Specifications

Operating Pressure	Adjustable from 15 KPA to Atmosphere
Temperature Range	175° C ± 5° C
Temperature Control Resolution	0.1° C
Test Temperature Uniformity	± 5° C

Verification Kit— H-1641.7

Vacuum Degassing Oven (VDO) verification kit.

Specimen Mold Set for BBR— H-1642.1

Set is for 5 complete specimen molds and includes: aluminum casing bars, mylar strips, holding bands 127mm length with end piece location marks, 6.4 mm thick, 12.7 mm wide.

Specimen Mold Set for BBR— H-1642.2

Mylar Strips. 5 sets of 3 each.



H-1642

Bending Beam Rheometer, 120V 60Hz— H-1642
Bending Beam Rheometer, 230V 50Hz— H-1642.5F

The Bending Beam Rheometer (BBR) performs flexural tests on asphalt binder and similar specimens per ASTM D6648-01 and AASHTO T313-02. These tests, initially developed by the Strategic Highway Research Program (SHRP), consist of a constant force being applied to a specimen in a chilled fluid bath in order to derive specific rates of deformation at various temperatures. The complete BBR system consists of a fluid bath base unit, a three-point bend test apparatus, which is easily removed from the base unit for specimen loading and unloading, an external cooling unit with temperature controller and a calibration hardware kit with carrying case. The unit features an integral, stainless steel load frame and In-line, blunt-point loading shaft. The large, easy-to-read digital display shows load, displacement, and bath temperature for ease of setup and operation. Real-time displacement, loading, and temperature graphs are displayed during the test cycle and can be re-plotted and re-scaled as needed for easy viewing. Unit includes ASTM/AASHTO-compliant specimen molds and complete calibration kit with carrying case. Dimensions: 37" x 25" x 27" (94 x 63.5 x 68.5). Shipping Weight 250 lbs. (115kg).

System Features:

- Durable, corrosion-resistant construction
- Computerized control, data acquisition, and analysis
- PID temperature controller with digital display
- Two independent platinum RTDs for precise control
- Mechanically-refrigerated cooling bath with environmentally-safe non-CFC coolant
- Integral LVDT and temperature-compensated load cell for accurate test results
- Patented air bearing ensures reliable loading with accurate, repeatable results

Specifications

Test Load	0 to 200g
Test Cycle Control	±0.5g
Cycle Times	Operator Adjustable
Load Cell (temp. compensated)	500g
Sample Supports	25mm (0.98 in.) dia. spaced 4.00 in. (101.6mm) apart
Operating Temperature	Ambient to -40°F (-40°C)
Compressed Air Requirements	50 psi (0.34 MPa) clean, dry



H-1635

AFGB Superpave Gyrotory Compactor, 110V 60Hz— H-1635
AFGB Superpave Gyrotory Compactor, 230V 50/60HZ— H-1635.4F

The AFGB is a completely self-contained SGC that weighs only 304 pounds. Just roll it into the bed of a pickup or into a minivan and take it anywhere. Ideal for onsite testing and mobile labs, this SGC can handle design and QC/QA work with equal ease.

The AFGB Superpave Gyrotory Compactor measures the mold angle during compaction. This angle, along with the consolidation pressure, gyration number, and specimen height is displayed throughout the compaction process. The tubular frame design and patented method of inducing gyrotory motion ensures an accurate angle every time.

Designed for Ease of Use the AFGB has an integrated industrial computer control the compaction of the specimen from start to finish. Simply enter the compaction parameters, lower the prepared mold into the compaction chamber, secure the gyrotory head, and press Start. The system then applies the consolidation pressure, induces the angle, and gyrates the mold until the specified number of gyrations or specified height is reached. Extrude the specimen after compaction with the same hydraulic ram used to compact the specimen.

The 215mm of internal height available in the AFGB molds is enough for most performance testing specimens. During compaction, the specimen height is sent (once per gyration) to a printer or directly to a computer through the serial port. In addition, the compactor stores the data from last 10 tests, marking each with the date and time. These saved results can be sent to a printer or transferred to a computer as needed.

AFGB Superpave Gyrotory Compactor Specifications

Dimensions	30.0"W x 21.3"D x 55.4"H (760mm x 540mm x 1410mm)
Weight	Approx. 304 lb (138 kg)
Applied Pressure:	300 – 1000 kPa
Angle of Gyration:	0.82° Internal; 1.16° Internal, or 1.25° External Specify at time of order.
Speed of Gyration:	30 gyrations per minute
Number of Gyrations:	0-299
Mold Dimensions:	150.0mm +0.0/-0.1 mm ID x 280 mm tall (215mm internal height) 10.0mm minimum specimen height
Max. Mold Temp.	200°C
Mode of Operation	Compact to Number of Gyrations, Compact to Specified Height
Data Acquisition:	Gyration Number Specimen Height (mm)
Data Output Options:	RS232 Serial Communication, Serial Printer Kit (optional)



H-30068.2F

Oven Interior

Rolling Thin Film Oven, 208-230V 60Hz— H-30068.2F

Rolling Thin Film Oven, 208-230V 50Hz— H-30068.5F

The rolling thin film oven is used to measure the effect of heat and air on a moving film of semi-solid asphaltic material. The results of this treatment are determined from measurements of the asphalt properties before and after the test. Through the use of a programmable temperature controller and 4-digit digital display system, the oven accurately maintains the specified test temperature of 163°C. The oven includes a 200 to 14,000 ml/min flow meter, 0 to 100 psi air pressure gauge, rotating test rack and eight glass specimen jars. Overall dimensions 40"W x 36"H x 26"D (1016 x 3292 x 660mm). Complies with ASTM D2872, AASHTO T240 and California test method 346. A clean, dry compressed air source is required for oven operation. Shipping wt. 440 lbs. (200kg)

Glass Container for Rolling Thin-Film Oven— H-30068.12

Heat-resistant, glass, oven jar. 64mm OD (2.52") x 139.7mm H (5.50"). Complies with ASTM D2872, AASHTO T240.

AFGB Superpave Gyrotory Compactor Accessories

150mm Mold Assembly for AFGB— H-1635.1

Includes top and bottom plates.

Calibration Kit for AFGB— H-1635.2

Force, Height and External Angle.

Printer Kit with Cable— H-1635.3

Force, Height and External Angle.

150mm Paper Disk— H-1635.4

Pack of 500

150mm Specimen Lift Handle— H-1635.5

Ductility Testing Machines

These machines determine ductility of formed asphalt/cement or semi-solid bitumen by measuring the distance of elongation before reaching the breaking point of a briquet sample, which is pulled apart at a specific speed and temperature.

Comply with ASTM D113, D5892, D6084, AASHTO T51

Ductility

166

Asphalt



Humboldt Ductility Machine, 120V 60Hz— H-1068X

Humboldt Ductility Machine, 220V 50Hz— H-1068X.5F

The H-1068X is a three-speed machine designed for Standard and Force Ductility tests. The unit tests three briquets simultaneously and its DC, direct-drive motor maintains constant speed, entirely vibration-free. Speeds of 1/4, 1 or 5cm per minute are selected via lever shift on mechanical gear box.

A single brass lead screw mounted above water level prevents agitation of water and premature rupture of specimens. A traveling pointer adjusts to zero starting position and indicates exact position of carriage on a linear centimeter scale attached to trough's front edge. Maximum carriage travel (elongation) is 150cm with an automatic stop.

The Unit has a stainless steel interior with an overflow connection, and a baked enamel stainless steel-wrapped exterior. Gears are bronze or brass; all other parts are solid brass to prevent rusting. Finned stainless steel tubes beneath a false bottom provide efficient thermal transfer. Includes a 6' (183cm) cord, feed-through switch and 3-prong plug. Includes 3 standard H-1080 briquet molds with H-1090 plates. Trough overall dimension: 11-3/4 x 74 x 6-3/8"H (30 x 188 x 16cm). **H-1068PC Acrylic Cover is recommended to maintain constant tank temperatures.** Shipping wt. 350 lbs. (159kg)

Temperature Controlled Ductility Machine, 120V 60Hz— H-1068B

Temp Control Ductility Machine, 220V 60Hz— H-1068B.2F

Temp Control Ductility Machine, 220V 50Hz— H-1068B.5F

The H-1068 Ductility machine takes our H-1068X machine and adds a circulating temperature control unit. Solid-state thermostatically controlled bath and circulator maintain water temperature within a $\pm 0.18^\circ\text{F}$ ($\pm 0.1^\circ\text{C}$). All features identical to the H-1068X. Includes three H-1080 molds. H-1068PC Plastic Cover is recommended to maintain constant tank temperatures. Shipping wt. 430 lbs. (195kg)

Basic Ductility Machine, 120V 60Hz— H-1050

Basic Ductility Machine, 220V 60Hz— H-1050.2F

Basic Ductility Machine, 220V 50Hz— H-1050.5F

The H-1050 is a three-speed machine designed for Standard and Force Ductility tests. The unit is a lower cost machine, identical to the H-1068X except that it does not include the baked enamel stainless steel-wrapped exterior or the thermal finned stainless steel tubes in the bottom for enhanced thermal transfer.

Shipping wt. 200 lbs. (90.7kg)

Circulating Temperature Controller, 120V 60Hz— H-1068CB

Circulating Temp. Controller, 220V 50Hz— H-1068CB.5F

The H-1068CB Circulating Temperature Controller is designed for use with the H-1068X Ductility Machine. It provides a solid-state, thermostatically controlled bath and circulator to maintain water temperature within a $\pm 0.9^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$). Temperature range is: -10°C to 80°C . 1000W heating capacity with 0.1°C stability. Dimensions: 25" x 9" x 19" (635 x 229 x 483cm) Shipping wt. 75 lbs (34kg)

Clear Acrylic Cover for Ductility Machines— H-1068PC

Temperature control cover made from clear Acrylic Sheet. Can be used with all ductility machines. Shipping wt. 40 lbs (18kg)

Ductility Machine Stand— H-1068.100

Designed for use with Humboldt Ductility Machines, places machine at working height and includes a shelf for Circulating Temperature Controller. Features square steel legs. Needs assembly.

Shipping wt. 200 lbs (91kg)





Refrigerated Machine, 220V 60Hz— H-1060.2F
Refrigerated Machine, 220V 50Hz— H-1060.5F

This Refrigerated Ductility Machine features the H-1050 machine mounted into a polypropylene bath designed for use with sodium chloride solutions. The heavy-gauge, enamel-finish steel cabinet is fully-insulated and the sealed space between the inner and outer walls protects the low-thermal conductivity properties of the foam and fiberglass combination (tested and proven to have the best K factor). High-capacity pump assures positive circulation in bath to give close temperature control. Three-direction flow regulation is handled with flow cut-off valves that engage when equilibrium is reached. Sensitive magnetic setting transistorized electronic relay control panel for heat and refrigeration maintains temperature range of 32°F (0°C) to 86°F (30°C) by 0.1°F (0.1°C). Cabinet is 90 x 41 x 23" (229 x 104 x 58cm). Includes 3 H-1080 molds. Shipping wt. 1066 lbs. (484kg)

Ductility Briquet Mold— H-1080

Mold for making test briquets for use with any ductility testing machine. H-1080 Briquet Mold has angled sides for use in standard test. Four accurately machined interlocking brass segments are interchangeable with same parts from different molds; no parts identification marks are needed for matching. End pieces, designed to hold specimens being elongated, are provided with mounting holes. Complies with ASTM D113

Elastic Recovery Mold— H-1030

Mold for making test briquets for use with any ductility testing machine. H-1030 Briquet Mold has straight sides for use in forced tests. Requires H-1090 or H-1090.3 base plates. Four accurately machined interlocking brass segments are interchangeable with same parts from different molds; no parts identification marks are needed for matching. End pieces, designed to hold specimens being elongated, are provided with mounting holes. Complies with ASTM D5892, D6084, AASHTO T301.

Base Plate— H-1090

Brass base plate for single mold. Flat surface provides uniform contact with bottom surfaces mold. 5-1/2" x 8" x 1/8" (140 x 51 x 3mm)

Base Plate, Triple Mold— H-1090.3

Brass base plate for triple mold. Flat surface provides uniform contact with bottom surfaces mold. 5-1/2" x 8" x 1/8" (140 x 203 x 3mm)

Force Determination Adapter, 120V 60Hz— H-1021

Force Determination Adapter, 220V, 50/60Hz— H-1021.4F

Provides precise tensile strength measurement of any material, preparation, procedure or type of test to an accuracy of 0.01 lbs. Attaches over existing pin in ductilometer without tools or machine modification, eliminating need for dedicated equipment for standard and force ductility testing. Stainless steel unit has spring-loaded movable platform to which sample is attached and stationary L-shaped base that incorporates LVDT sensor. LVDT can accommodate two adapters simultaneously. Electric components are located out of the water bath. Digital display is calibrated in pounds. Includes power supply to serve LVDT, digital display, calibration stand to ensure consistent results, one 4-lb. and five 5-lb. slotted weights and standard 0-2 VDC analog output; 60ma DC power supply provides constant voltage excitation with adjustable voltage. Analog output provides easy interface with chart recorder, computer or other readout devices via RS232 port. H-1030 mold is recommended for use with this equipment. Adapter overall dimension: 6" x 5-3/8" x 1-3/4" (152 x 137 x 44mm). Shipping wt. 20 lbs. (9kg)

Chart Recorder, 120V 60Hz— H-1026

Chart Recorder, 220V, 50/60Hz— H-1026.4F

For accurate, permanent graphic record of the input signal on single-channel, multi-range potentiometric null balance servo recorder. Versatile precision instrument records a wide range of laboratory test results. Writing width is 7-3/4" (200mm). Dim. 15" x 4-1/4" x 10" (380 x 108 x 254mm). Shipping wt. 11 lbs. (4.9kg)



H-1200



H-1240



H-1240D



H-1250

Universal Penetrometer— H-1200

Direct-reading instrument for precision penetration measurements of bituminous materials, cement, petrolatum and waxes, as well as food, cosmetics and pharmaceutical products. Unit has 5" diameter indicator dial, graduated in 400 divisions of 0.1mm, corresponding to 40mm penetration. Zero preset to eliminate errors. Includes 47.5g plunger with 3.2mm hole, and two loading weights (50g and 100g). Overall dim. 10-1/2" x 13" x 22" (266.7 x 330.2 x 558.8mm). Complies with ASTM D5, D217, D1168, D1191, D1321, D1403, D1831, D1855; AASHTO T49, T187 and others. Shipping wt. 25 lbs (11kg)

Electric Penetrometer, 120V 60Hz— H-1240

Electric Penetrometer, 220V 50/60Hz— H-1240.4F

Takes our H-1200 Universal Penetrometer and adds an automatic digital timer to it. The timer's release mechanism is switchable between seconds minutes, or hours. Timer may be set in 1/10th second intervals. Plunger releases with push of a button, and automatically stops after the preset time duration. H-1240.4F adds a voltage adapter and internal switch on the timing mechanism to change cycle to 50Hz. Shipping wt. 32 lbs (15kg)

Digital Penetrometer, 120V 60Hz— H-1240D

Digital Penetrometer, 220V 50/60Hz— H-1240D.4F.

The H-1240D Penetrometer adds a digital gauge to the H-1240 electric penetrometer to provide precise at-a-glance readings, as well as the ability to automatically start a test with a button push and have the test end after a preset duration. Shipping wt. 32 lbs. (14.5kg)

Portable Penetrometer— H-1250

Lighter and smaller than H-1200 for field work, unit's micrometer adjusts for accurate settings, as well as coarse adjustment for approximate settings. Only one additional 50g loading weight is included with a H-1280 needle. Overall dim. 7" x 7" x 16" (178 x 178 x 406mm). Shipping wt. 8 lbs. (3.6kg)

Portable Penetrometer— H-1252

Battery Paste Penetrometer combines the H-1250 and a H-1255 Grease Cone.

Tin Sample Cups

Flat-bottom, seamless tin sample cups have telescoping covers. Hold samples for determining penetrations.



H-1350.70



H-4929

Capacity	Dimensions	Set Quantity	Model
2.5 oz (71g)	1.87" (47.5mm) ID, 1.42" (36mm) deep	48	H-1350.3A
3 oz (85g)	2.25" (57.1mm) ID, 1.42" (36mm) deep	36	H-1350.3
4.7 oz (133g)	2.42" (61.5mm) ID, 1.67" (42.6mm) deep	36	H-1350.4A
5.6 oz (159g)	2.59" (66mm) ID, 1.72" (43.4mm) deep	36	H-1350.6A
8.2 oz (232g)	3.05" (77.5mm) ID, 1.97" (50mm) deep	18	H-1350.8A
16 oz (454g)	4" (102mm) ID, 2.375" (60.3mm) deep	1	H-1350.16
42.3 oz (1200g)	6.12" (155mm) ID, 3" (76.2mm) deep	1	H-1350.42
70.5 oz (2000g)	6.12" (155mm) ID, 5" (127mm) deep	1	H-1350.70

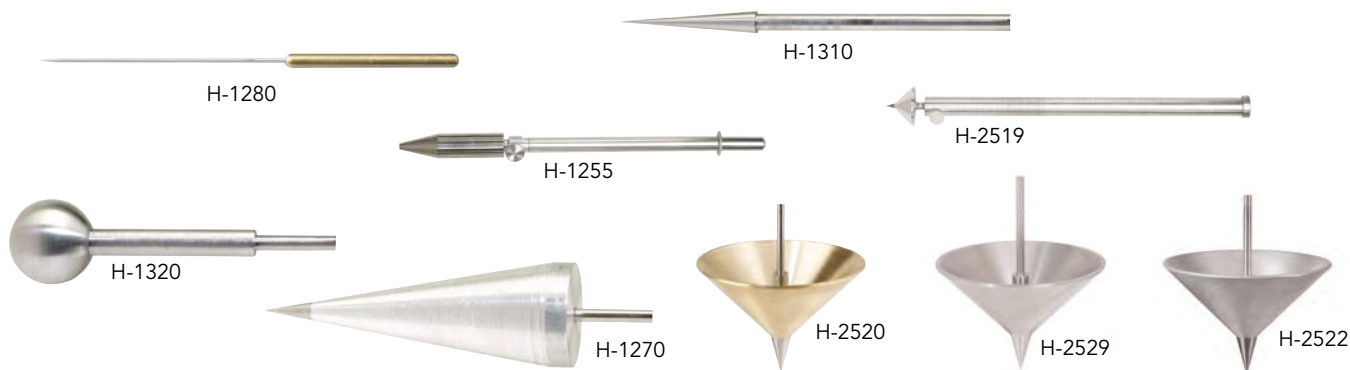
Aluminium Moisture Boxes

Flat-bottom, straight-side seamless aluminium box has tight fitting cover, which fits bottom of box as well. Protects sample from exposure during storage and weighing operations.

OD	ID	Height	Inside Ht.	Volume cu. in.	Volume fl. oz.	Model
2" (51mm)	1.975 (50mm)	.875" (22mm)	0.865" (22mm)	2.650 (44cc)	1.47 (44ml)	H-4926
2.5" (64mm)	2.470 (63mm)	1.75" (44mm)	1.746" (44mm)	8.366 (137cc)	4.64 (137ml)	H-4927
3" (76mm)	3.000 (76mm)	1" (25mm)	0.985" (25mm)	6.963 (114cc)	3.86 (114ml)	H-4928
3.5" (89mm)	3.490 (89mm)	2" (51mm)	1.990" (51mm)	19.037 (312cc)	10.55 (312ml)	H-4929



Penetration Needles and Cones



Bituminous materials ASTM D5; AASHTO T49, IP49; ASA Std. A37.1; Fed Spec. SS.R. 406C, Meth. 214.01	H-1280	Standard hardened stainless steel needle, 40-45mm exposed needle length. Wt. 2.5g.
	H-1300	Standard hardened stainless steel needle, 40-45mm exposed needle length. Certified to ASTM accuracy by independent laboratory. Wt. 2.5g.
	H-1290	Long hardened stainless steel needle, 50-55mm exposed needle length. Wt. 2.5g.
	H-1302	Long hardened stainless steel needle, 50-55mm exposed needle length. Certified to ASTM accuracy by independent laboratory. Wt. 2.5g.
Waxes with 250 or less penetration ASTM D1321	H-1310	Hardened stainless steel wax penetration needles with tapered point, blunt tip of truncated cone. Ferrule is approx. 3.2mm dia. Wt. 2.5g.
	H-1317	Same as H-1310. Certified to ASTM accuracy by independent laboratory.
Battery paste	H-1255	Hardened stainless steel tip with special plunger. Total wt. 60g ± .050g.
Joint sealant for asphalt & concrete pavements ASTM D5329	H-1320	Resilience ball penetration tool. Total wt. 27.5g.

Measuring firmness of solid and plasticized fats: shortenings, butter, margarine. AOCS Cc 16-60	H-1270	20° aluminum cone, 3.2mm ferrule, 0.8mm stainless steel blunt tip. Overall length 106mm. Wt. 45g.
Recovery of used grease, small obtained samples ASTM D1403	H-2519	1/4 scale. (Not considered a substitute for full-size cone specified in ASTM D217.) Wt. 9.38g
Grease testing penetrometers ASTM D217, D937 ASA Std. Z11.3	H-2520	Hollow 90° brass cone, highly polished stainless steel tip. Removable nut and stem. Wt. 102.5g.
	H-2522	Hollow 90° stainless steel cone, highly polished stainless tip. Removable nut and stem. Wt. 102.5g.
ASTM D2884	H-2524	Hollow 90° Magnesium cone and plunger. Total Cone wt. 30.0g.
Applications requiring 90° cones ASTM D217, D937 ASA Std. Z11.3	H-2525	Stainless steel replacement tip, nut and stem.
Food, Paste, Paints U. S, Dept of Agriculture	H-2529	Hollow 90° Aluminum cone and tip. Total wt. 35g

Heater/Circulator, 120V 60Hz— H-2266

Heater/Circulator, 230V 50/60Hz— H-2266.4F

Immersion circulator suitable for use with any tank or jar style bath to create a highly accurate constant temperature circulating system at above ambient temperatures. Minimum immersion depth 3" (8cm), maximum immersion depth 7" (17cm). Clamp-on style fits up to 1-3/16" (3cm) wall thickness, or rod type lab stand. All stainless steel construction. Two-speed pump minimizes turbulence in small tanks, maintains greater uniformity in large tanks. Adjustable flow director accepts 1/2" (13mm) ID tubing for external circulation. Suitable for use with wide variety of fluids. LED set and read. Adjustable PID parameters and very precise temperature control under changing heat loads, plus great temperature stability over a broad range. 6"H x 5"D x 13"D (15.2 x 12.7 x 33cm). Shipping wt. 10 lbs. (4.5kg)

Acrylic Tank— H-2267

See-through acrylic tank is ideal for applications where visibility is desired. Temperature range up to 70°C maximum. Capacity 5-1/2 gal. (21 liters). ID, 7-1/2"H x 13-1/8"W x 18"D (190 x 333 x 457mm).

Transfer Dish— H-1352

Plastic transfer dish has flat bottom, straight sides and metal centering lugs with magnet in the bottom. Size is: 3-3/4" dia. x 3-1/4" deep (95 x 83mm). Complies with ASTM D5.



H-2266



H-1352

H-1720

H-1745
H-1735

H-1730



Constant Temperature Bath, 120V 60Hz— H-1720
Constant Temperature Bath, 240V 50/60-Hz— H-1720.4F
 (Cannon Model CT-500)

Specifically designed for precise viscosity determination with glass capillary viscometers, the H-1720 baths offer superior temperature control to 100°C. The H-1720 offers a 12" Dia x 12" H (305mm x 305mm). bath jar that can accommodate most viscometers.

These baths maintain accurate temperature control of $\pm 0.01^\circ\text{C}$ within the range of 20°C to 100°C ($\pm 0.01^\circ\text{C}$), providing the temperature sensitivity required by ASTM D445 for kinematic viscosity measurements with glass capillary viscometers. Two electric heating elements inside the bath rapidly heat the medium to any desired temperature within the range.

The H-1720 bath chamber is a cylindrical clear 17L Pyrex glass vessel 12" Dia x 12" H (305mm x 305mm). A Teflon®-coated stainless steel baffle located in the center of the bath provides a plain reflective background to aid in viewing instruments. The top cover contains seven round holes 2" (51mm) in diameter for insertion of viscometer holders, allowing up to seven viscosity measurements to be made simultaneously. Covers are supplied for capping unused holes. Two additional holes 10mm in diameter, are provided for thermometers. All wetted parts of the Constant Temperature Baths are made of stainless steel, glass, or Teflon. The frame is fabricated from heavy aluminum and coated with a corrosion-resistant epoxy finish. Viscometers, holders, bath oil, and thermometers must be purchased separately. Dimensions: 16"W x 14.25"D x 24"H (407 x 362 x 610mm). Shipping wt. 75 lbs (34kg).

Constant Temperature Bath, 120V 60Hz— H-1730
Constant Temperature Bath, 240V 50/60Hz— H-1730.4F
 (Cannon Model CT-1000)

The H-1730 Constant Temperature Bath maintains the accurate control required by ASTM D445 for kinematic viscosity measurements with glass capillary viscometers. Within the range of 20 to 100°C, temperature is controlled to 0.01°C; above 100°C temperature it is controlled to 0.03°C.

The H-1730 bath chamber is a cylindrical clear 17L Pyrex glass vessel 12" Dia x 12" H (305mm x 305mm). A stainless steel baffle coated with white Teflon® is located in the center of the bath to provide a good background for viewing viscometers. Two fluorescent lamps illuminate the interior of the bath brightly and uniformly, without glare. Two heating elements inside the bath rapidly heat the bath medium to any temperature within the bath range. The top cover contains seven round holes 2" (51mm) in diameter. Up to seven glass capillary viscometers (in holders) can be placed in the bath. Other hole configurations can be supplied on special order.

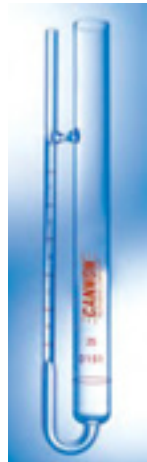
A solid-state control circuit, equipped with a stainless steel-encased thermistor provides proportional control of temperature. A motor-driven stirrer ensures a uniform temperature throughout the bath. All wetted parts of the bath are made of stainless steel, glass, or Teflon®. The bath housing is fabricated from heavy aluminum and coated with a corrosion-resistant epoxy finish. Viscometers, holders, bath oil, and thermometers must be purchased separately. Dimensions: 17.25"W x 18.25"D x 23"H (438 x 464 x 584mm). Shipping wt. 123 lbs (56kg).

Viscosity Bath Accessories

Description	Model
Vacuum Manifold (Canon Model 3VM for H-1720)	H-1745
Vacuum Manifold (Canon Model 3VM for H-1730)	H-1735
UBF Bath Oil for temp. <121°C, 6 gal. (23L)	H-1732
High-Temp. Bath Silicone for temp. > 125°C, .5 gal. (2L)	H-1733



H-1746.7



H-1747.1

Zeitfuchs® Cross-Arm Viscometer and Holder

These models are used to determine kinematic viscosity of liquid asphalts, road oils and distillation residues of liquid asphalts at 140°F (60°C) and of asphalt cements at 275°F (135°C), requiring a charge of only 1 to 3ml can easily be filled and cleaned while immersed in a temperature bath and need not be removed. Requires a liquid depth of 9" (229mm). Includes round metal holder for 2" (51mm) dia. hole and certificate of calibration. Complies with ASTM D2170; AASHTO T201.

Zeitfuchs® Cross-Arm Viscometer and Holder

Size	Approximate Constant Cs/Sec.	Range of Centistokes	Model
1	0.003	0.6 to 3	H-1746.1
2	0.01	2 to 10	H-1746.2
3	0.03	6 to 30	H-1746.3
4	0.1	20 to 100	H-1746.4
5	0.3	60 to 300	H-1746.5
6	1.0	200 to 1,000	H-1746.6
7	3.0	600 to 3,000	H-1746.7
8	10	2,000 to 10,000	H-1746.8
9	30	6,000 to 30,000	H-1746.9
10	100	20,000 to 100,000	H-1746.10

Asphalt Institute Vacuum Viscometer

Designed for highly viscous materials, such as asphalt cement, viscometer contains a graduated capillary instead of timing bulbs. Requires 7" (178mm) bath depth and 3ml sample size. Includes

Asphalt Institute Vacuum Viscometer

Viscometer Size/No.	Viscosity Range (Poise)	Approx. Constant poise/second at 300mm Hg Vacuum			Model
		at B	at C	at D	
25	42 to 800	2	1	0.7	H-1747.1
50	180 to 3,200	8	4	3	H-1747.2
100	600 to 12,800	32	16	10	H-1747.3
200	2,400 to 52,000	128	64	40	H-1747.4
400R	9,600 to 140,000	500	250	160	H-1747.5
800R	38,000 to 5,800,000	2000	1000	640	H-1747.6



H-1741H

H-1741V

Digital Vacuum Pressure Regulators, (Solid-State, Use no Mercury)
Horizontal, 120V 60Hz— H-1741H
Horizontal, 220V 50/60 Hz— H-1741H.4F

Vertical, 120V 60Hz— H-1741V
Vertical, 220V 50/60 Hz— H-1741V.4F

(Cannon DVR-1000 Series)

For precise measurement and control of vacuum at 300mm Hg below atmospheric pressure. Use with Cannon-Manning, Asphalt Institute, or Modified Koppers vacuum viscometers for measurement of asphalt cement and in other laboratory applications where accurate measurement and control of vacuum is required.

In normal mode, the amount of vacuum in mm Hg is displayed on the LCD screen. Or, user may select from nine other units of measurement via a membrane touchpad. Internal set points are preset to regulate vacuum at 300 +/-0.5mm Hg below atmospheric pressure. Set points may be altered to fit user's specific needs within the operating range of 1 to 410mm Hg below atmospheric pressure.


Reading accuracy: ±0.05% of reading ± the least significant digit (includes combined effects of linearity, repeatability, hysteresis, and temperature). NIST certification is supplied. Vacuum regulation accuracy: ±0.5mm HG. Operating temperature: 0 to 40°C (32 to 104°F). Upper/lower safety limit: 746mm HG below atmospheric pressure. Choice of horizontal: 18.5" w x 18" d x 6.75" h (470 x 457 x 171mm) or vertical: 6.75" w x 18" d x 18.5" h (171 x 457 x 470mm). Shipping wt. 55 lbs (22.7kg).

NOTE: Prices and delivery on Cannon-Manning, Cannon-Fenske, Lantz-Zeitfuchs, Modified Koppers and other viscometers are available upon request.

**Saybolt Viscometer Bath, 120V 60Hz— H-2165****Saybolt Viscometer Bath, 220V 50/60Hz— H-2165.4F**

Designed for Saybolt Universal and Furol viscosity testing, this constant temperature bath meets all ASTM and AASHTO requirements for precise temperature control. The micro-processor PID circuitry assures accurate temperature control within ASTM tolerances throughout the range of ambient to 464°F (240°C).

Simple push-button controls and dual digital displays are used for easy setting and monitoring of the bath's temperature. With a capacity of four viscometers and 60ml receiving flasks, the bath features sliding draft shields, chemical-resistant alignment plates for handling of flasks and a glare-free fluorescent backlight for easy viewing of test sample. The insulated bath interior is constructed entirely of heavy-gage stainless steel and the built-in overflow pipe and drain valve simplifies filling the bath oil to the required level.

A chemical resistant top plate provides insulation and is easily removed to allow for cleaning of the bath interior. The bath is supplied complete with four thermometer supports, four port covers, four chained corks, two port closures, tube nut wrench, orifice wrench, withdrawal tube and oil strainer. Viscometer tubes, orifices, receiving flasks, oil and thermometers are not included and must be ordered separately. Complies with ASTM D88, D244, E102, AASHTO T72. Shipping wt. 58 lbs. (26.3kg) 

Accessories

Description	Model
Tube cleaner	H-2175
Sayboldt viscosity flask, graduated 60ml volumetric receiving flask	H-2176
Sayboldt withdrawal pipette and aspirator	H-2177
White mineral oil, suitable for use up to 230°F (110°C)	H-2189
Strainer	H-2178
High-temp. Dow-Corning 200 Fluid, 100 centistroke oil, 5 gallon (wt.40lb (18kg)	H-2199
Displacement ring	H-2194
Thermometer support	H-2195
Orifice wrench	H-2196
Tube wrench	H-2197
Sayboldt viscosity thermometer (66 to 80°F)	H-2600.17F
Sayboldt viscosity thermometer (19 to 27°C)	H-2610.17C
Sayboldt viscosity thermometer (94 to 108°F)	H-2600.18F
Sayboldt viscosity thermometer (34 to 42°C)	H-2610.18C
Sayboldt viscosity thermometer (120 to 134°F)	H-2600.19F
Sayboldt viscosity thermometer (49 to 57°C)	H-2610.19C
Sayboldt viscosity thermometer (134 to 148°F)	H-2600.20F
Sayboldt viscosity thermometer (57 to 65°C)	H-2610.20C
Sayboldt viscosity thermometer (174 to 188°F)	H-2600.21F
Sayboldt viscosity thermometer (79 to 87°C)	H-2610.21C
Sayboldt viscosity thermometer (204 to 218°F)	H-2600.22F
Sayboldt viscosity thermometer (95 to 103°C)	H-2610.22C

Components

Description	Model
Orifices	
Stainless steel universal orifice only	H-2173
Stainless steel Furol orifice only	H-2174
Tubes with Orifices	
Brass Sayboldt viscometer tube w/ stainless steel universal orifice	H-2180
Brass with stainless steel Furol orifice Sayboldt viscosity tube	H-2182
Stainless steel with stainless steel Furol orifice Sayboldt viscosity tube, includes wrench	H-2183
Brass with stainless steel universal and Furol orifice Sayboldt viscosity tube, includes wrench	H-2184
Stainless steel with stainless steel universal and Furol orifice Sayboldt viscosity tuber, includes wrench	H-2185
Tubes	
Stainless steel Sayboldt viscometer tube	H-2171
Brass Sayboldt viscometer tube	H-2172

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.





Ford Viscosity Cup—

Used in determining viscosity of paint, lacquers and related coatings. Cup body is machined from aluminum; orifice is brass. Orifice not included with H-1530 cup, order from chart below. Cup-orifice combination (Ford 2, 3 or 4) should be selected to provide an efflux time within the 20 to 100-second range. Measurements with the Ford viscosity cup should be made at temperature of 25°C ±0.1° (77°F ±0.2°) with H-2610.17C (or H-2600.17F) thermometer. **Order thermometers and stand separately.** Complies with ASTM D333, D365, D1200.

Description	Model
Ford Viscosity Cup w/ No. 1 Orifice	H-1530.1
Ford Viscosity Cup w/ No. 2 Orifice	H-1530.2
Ford Viscosity Cup w/ No. 3 Orifice	H-1530.3
Ford Viscosity Cup w/ No. 4 Orifice	H-1530.4
Ford Viscosity Cup w/ No. 5 Orifice	H-1530.5

Viscosity Cup Stand— H-1535

Features leveling base and adjustable support bracket for H-1530 Ford viscosity cup.

Asphalt Viscosimeter Float Test Set— H-1400

Used to test flow behavior or consistency of certain bituminous materials and tar products via a float test. Includes calibrated aluminum float and three brass collars. Individual components can be ordered. **Order thermometer separately.** Complies with ASTM D139, AASHTO T50.

Description	Model
Float only	H-1410
Collars only (set of three)	H-1420

Cloud and Pour Point Apparatus Set— H-2560

Used to test flow characteristics of petroleum oils using cloud and pour points. Includes glass bath jar, polished brass cylinder mounted on metal tripod base, glass test cylinder, cork bottom disc and top rings. Complies with ASTM D97, D117, D2500. Shipping wt. 6 lbs. (2.7kg)

Order thermometer separately.

Description	Model
Metal tripod base	H-2560.1
Glass test jar	H-2560.3
Glass battery bath jar	H-2560.5
Brass cylinder	H-2560.2
Cork disks	H-2595
Cork rings	H-2598
Thermometer, -36 to 120°F	H-2600.5F
Thermometer, -38 to 50°C	H-2610.5C
Thermometer, -112 to 70°F	H-2600.6F
Thermometer, -80 to 20°C	H-2610.6C

Spot Test Set of Asphaltic Materials— H-1510

Spot test set only for asphaltic products derived from petroleum not to be used for natural asphalts containing nonbituminous matter insoluble in xylene. Includes 250ml flask, box of filter paper, cork stopper and 10ml pipette. Complies with AASHTO T102. Shipping wt. 5 lbs. (2.2kg)

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.

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Shown with
Thermometers,
not included,
order separately



H-1575



H-1588



H-8900



H-8950



H-1569

Single, Softening Point Apparatus Set— H-1595

Ring and ball method softening point apparatus used for single determinations, asphalts, pitches, tars and most resins. Includes burner, beaker, support stand, 1 ring, wire gauze with ceramic center, thermometer clamp, 1 shouldered ring and stem with hardened steel ball. Complies with ASTM D36, E28; AASHTO T53.

Shipping wt. 12 lbs. (5kg) **Order thermometer separately.**

Single, Softening Point Apparatus Set, 120V 60Hz— H-1596

Single, Softening Point Apparatus Set, 220V 50/60Hz— H-1596.4F

Uses a 6" x 6" hotplate as a heat source rather than a gas burner. The hotplate provides an easy-to-set analog temperature control knob with graduated scale and LED display. Temperature range is: ambient to 540°C (Ambient to 1004°F) Shipping wt. 15 lbs. (6.8kg)

Double, Softening Point Apparatus— H-1569

Includes 800ml beaker with brass, double set-up fixture with cover and thermometer port with stopper, 2 shouldered rings, 2 ball centering guides and 2 standard balls.

Order thermometer separately.

Quad, Softening Point Apparatus— H-1570

Includes 800ml beaker with brass, quad set-up fixture with cover and thermometer port with stopper, 4 shouldered rings, 4 ball centering guides and 4 standard balls. **Order thermometer separately.**

See all hotplates available on Page 244.

Thermometers for Softening Point Apparatus

Description	Model
30 to 180°F (ASTM 15F)	H-2600.15F
-2 to 80°C (ASTM 15C)	H-2610.15C
85 to 392°F (ASTM 16F)	H-2600.16F
30 to 200°C (ASTM 16C)	H-2610.16C
30 to 350°F (ASTM 113F)	H-2600.113F
-1 to 175°C (ASTM 113C)	H-2610.113C

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.



Softening Point Test Individual Components

Description	Model
Brass, shouldered ring, Top: 23mm OD, 19.8mm ID; Bottom: 19mm OD, 15.9mm ID; Top to Shoulder: 4.4mm High; Shoulder to Bottom: 2mm High, 10 per package	H-1575
Hardened steel ball, 3/8" 99.5mm) dia.; weight between 3.45 and 3.55g, 10 per package	H-1580
Ball centering guides for shouldered rings, ball is centered on specimen by 3 locator pins	H-1588
Ring and stem assembly with 16" (406mm) long brass wire stem with shouldered brass ring	H-1602
Steel clamp hook support suspended thermometers, locks into any position with check nut, Maximum distance from center of muff to hook: 4-1/4" (108mm), minimum distance is: 3-7/8" (89mm)	H-8900
Thermometer clamp with adjustable 360° muff, phosphor-bronze jaws, 3-1/2" (89mm) long	H-8950
Thermometer clamp similar to H-8950, but holds H-1602 ring and stem and thermometer together	H-8980
Base (Cast iron) and Support Rod	H-21220
Burner	H-6220
Beaker, 800ml, Graduated range	H-4911.800
Hot plate, 6" x 6" with LED Display	H-4942
Wire Gauze, 5" x 5" w/ceramic material center	H-25865



H-2405B



H-2400



H-2495



H-1990

8oz. (237ml) Bacon Bomb Sampler, Brass— H-2405B**8oz. (237ml) Bacon Bomb Sampler, Stainless Steel— H-2405S**

Obtains samples from storage tanks, tank cars and drums using thief method. Plunger opens to admit the sample when bomb is lowered to the bottom or when plunger is released at any desired level. Plunger seals tight when bomb is withdrawn; features o-ring-type valve seal. Available in plated brass or stainless steel. 2" dia. x 10" L. (51 x 254mm) Complies with ASTM D117, D270, D923, D943. Shipping wt. 5 lbs. (2.3kg)

16oz. (473ml) Bacon Bomb Sampler, Brass— H-2406B**16oz. (473ml) Bacon Bomb Sampler, Stainless Steel— H-2406S**

Larger capacity with same features as H-2405B. Dimensions: 2-3/4" dia. x 12"L (70 x 305mm). Shipping wt. 9 lbs. (4.1kg)

32oz. (946ml) Bacon Bomb Sampler, Brass— H-2407B**32oz. (946ml) Bacon Bomb Sampler, Stainless Steel— H-2407S**

Larger capacity with same features as H-2405B. Dimensions: 2-3/4" dia. x 15.25"L. (70 x 387mm) Shipping wt. 15 lbs. (6.8kg)

ASTM Oil Sampler, 3/4" Neck Opening— H-2400**ASTM Oil Sampler, 1-1/2" Neck Opening— H-2401**

Weighted beaker ASTM oil sampler collects crude petroleum, petroleum products, butane, propane and other petroleum products that are gases at atmospheric temperature and pressure. Copper construction with lead-weighted bottom and bail handle. Chained cork stopper seals tight. Brass disc and loop on top allow easy removal. Corrosion-resistant paint finish. 3/4" neck opening; body is 3-3/8" dia. x 14"L. (86 x 356mm) Complies with ASTM D270. Shipping wt. 6 lbs. (2.7kg)

Conradson Carbon Residue Apparatus— H-2495

Tests petroleum products to determine the amount of carbon residue left after evaporation and pyrolysis of an oil and to indicate relative coke-forming propensities. Includes burner, tripod, refractory block, nickel chrome triangle, nickel crucible and cover, Skidmore crucible, porcelain crucible and monel hood and bridge. Component parts available separately. Complies with ASTM D189, D2416. Shipping wt. 7 lbs. (3.2kg)

Replacement Parts

Description	Model
Porcelain crucible	H-2494
Skidmore crucible and cover	H-2497
Carbon residue apparatus hood	H-2496
Nickle crucible with cover	H-2498
Refractory block insulator ring	H-2505

Tag Open-Cup Flash Tester, Electric, 120V 60Hz— H-1990**Tag Open-Cup Flash Tester, Electric, 230V 50/60Hz— H-1990.4F**

For determination of flash points of liquids having a flash point up to 230°F (110°C) and cutback asphalts with flash points of less than 200°F (93°C). Includes Pyrex cup, base and liquid bath with overflow, pivoting ignition taper with pilot light and reference bead and thermometer holder. Order H-2610.9C thermometer, leveling device and draft shield separately. Complies with ASTM D1310, D3143; AASHTO T79. Shipping wt. 9-1/2 lbs. (4.3kg)

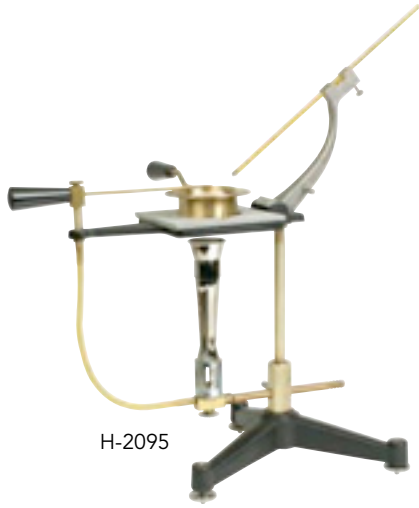
Tag Open-Cup Flash Tester, Gas— H-1995

Same unit as above, but uses gas to operate.

Replacement Parts

Description	Model
Replacement Pyrex cup	H-1990.1
Leveling device	H-1990.2
Draft shield	H-1990.3
Thermometer, range: 20 to 230°F	H-2600.9F
Thermometer, range: -5 to 110°C	H-2610.9C

CAUTION
 Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.



H-2095

Cleveland Flash and Fire Point Tester, Natural Gas— H-2095

One source supplies gas for both heating and test flame. Complies with ASTM D92, D117; AASHTO T48.

Order thermometer separately

Shipping wt. 20 lbs. (9.1kg)

Replacement Parts

Description	Model
Cast-Iron Support Base	H-21335
High-Temp Burner w/ Adjustable Valve Orifice	H-5605X
Test Burner w/ holder	H-2112
Flash-Point Platform	H-2095P
Supra-Board Plate	H-2095.4.2
Platform Coupling Assembly	H-2095.5
Flash Cup	H-2060
Thumb Screw	H-3050.7
Thermometer	H-2600.11F



H-2085

**Cleveland Open Cup Flash Tester, 220V 60Hz— H-2085
 220V 50/60Hz— H-2085.4F**

Thermometer position is adjustable. Complies with ASTM D92, D117; AASHTO T48. **Order thermometer separately**

Shipping wt. 20 lbs. (9.1kg)

Replacement Parts

Description	Model
Electric Heater with Rheostat	H-2085.1
Flash-Point Platform	H-2085P
Test Burner w/ holder	H-2112
Flash Cup	H-2060
Supra-Board Plate	H-2095.4.2
Thermometer	H-2600.11F



H-2100

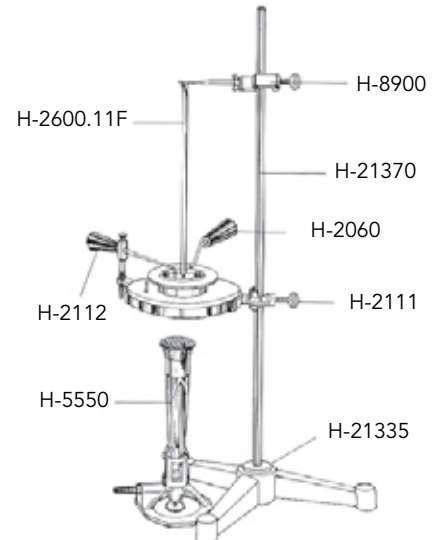
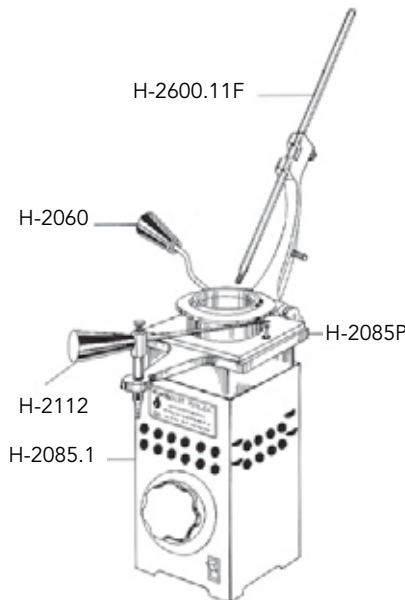
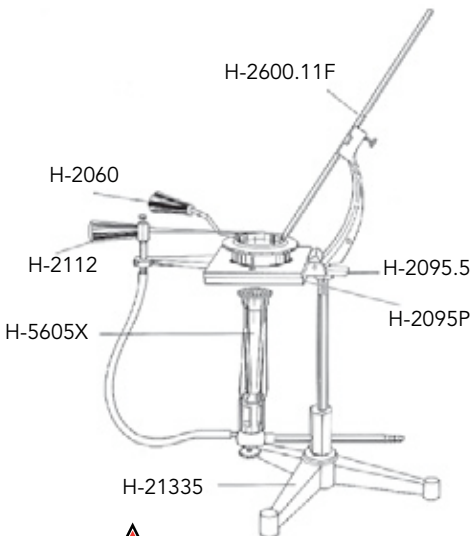
Cleveland Flash and Fire Point Tester Natural Gas— H-2100

Thermometer and cup platform positions are adjustable up and down on support rod. Complies with ASTM D92, D117; AASHTO T48. **Order thermometer separately**

Shipping wt. 17 lbs. (7.7kg)

Replacement Parts

Description	Model
Cast-Iron Support Base	H-21335
Support Rod	H-21370
High-Temp. Burner	H-5550
Test Burner	H-2112
Flash Cup Platform	H-2111
Flash Cup	H-2060
Thermometer clamp	H-2113
Thermometer	H-2600.11F





Aluminum Tar Still— H-1871

Used with H-2290 for determining water in crude petroleum, tars and derivatives of those materials. Cover has 1 tubulure. Dimensions: 3-1/2" (89mm) ID x 6" (152mm) Inside depth. 1 qt. (0.9 liter) capacity. Cast aluminum. Complies with ASTM D95, D370, D1461, AASHTO T55, T59, T83, T110.

Aluminum Alloy Still— H-2345

Used with H-2285 for identifying cationic emulsions and as a container to determine water content and residue by distillation and evaporation. Cover has 3 tubulures (2 drilled 10/18 and 1 drilled 24/40), 3-3/4" (95mm) ID x 9-1/2" (241mm) inside depth. Complies with ASTM D95, D244, AASHTO T55, T59, T110.

Aluminum Alloy Still— H-2346

Same as H-2345, except cover has 4 tubulures (3 drilled 10/18 and 1 drilled 24/40)

Stoppers for use with above Stills:

- Teflon, Glass Tube Stopper— H-2345TS**
- Teflon, Thermometer Stopper— H-2345TTS**

Ring Burner— H-1876

Can be used with all gases. 4-3/4" (121mm) ID x 5-1/2" (140mm) OD. Overall shank length is 11" (279mm) with 3/8" (10mm) serrated hose connection. Guide pins keep burner equidistant around still. Fletcher attachment regulates gas and air. Complies with ASTM D244, AASHTO T59.

Distillation Shield— H-1940

Use with H-1880. Flanged, open-end, stainless steel cylinder with 1/8" ceramic lining and two-part cover. For use with 500ml flask. Flame distillation only. Complies with ASTM D402, AASHTO T78.

Flame Shield— H-1945

Use with H-1880. Stainless steel, spot-welded cone 2" (51mm) dia. at bottom with spring clip to fit 7/16" to 5/8" (11 to 16mm) burner tubes. Complies with ASTM D402, AASHTO T78.

Burner Chimney— H-1946

Fits standard 4" (102mm) rings.

Condenser Jacket— H-2340

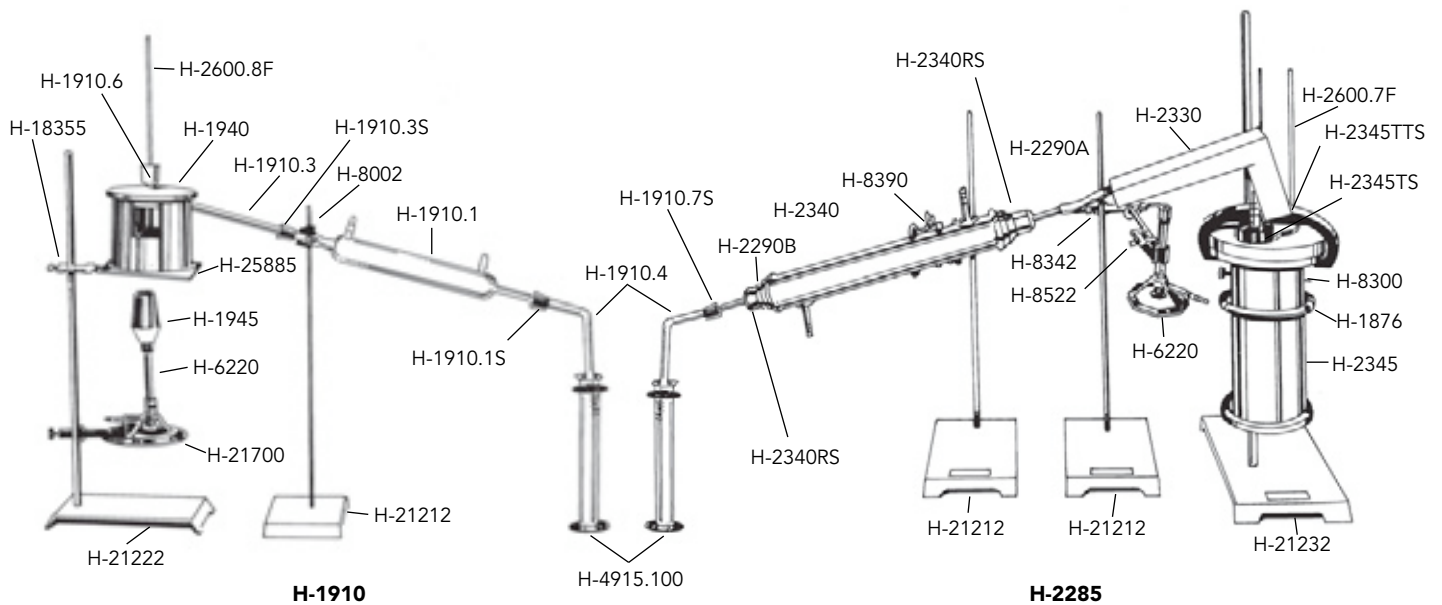
For use with H-2285 and H-2290. Brass, 15" long inlet/outlet tubulures on opposite sides of jacket. Complies with ASTM D244, AASHTO T59.

Connecting Tube Shield— H-2330

For use with H-2285 and H-2290. Stainless steel. Complies with ASTM D244, AASHTO T59.

Still Cleaner— H-2348

Use with H-1871 and H-2345. Tool to remove residue from interior of still, 13" x 4" (328 x 101mm) dia.



Distillation of Cut-Back Asphaltic (Bituminous) Products— H-1910

Distillation apparatus accurately determines residue content and separates volatile and non-volatile cut-back asphaltic products.

Order H-2600.8F thermometer separately. Complies with ASTM D402; AASHTO T78. Shipping wt. 18 lbs. (8.2kg)

Individual Items Included in H-1910

Description	Model
Flask	H-1910.3
Condenser	H-1910.1
Adapter	H-1910.4
Distillation Shield	H-1940
Flame Shield	H-1945
Graduated Cylinder	H-4915.100
Burner	H-6220
Clamp	H-8002
Support Ring	H-18355
Support Stand	H-21212
Support Stand	H-21222
Support Shelf	H-21700
Wire Gauze	H-25885

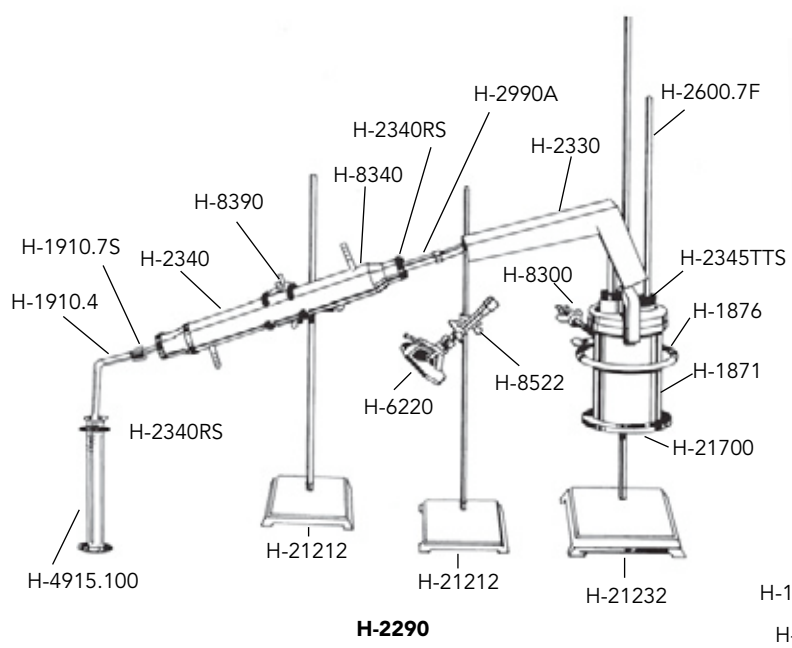
Emulsified Asphalts Distillation Apparatus— H-2285

Distillation apparatus accurately determines representative portion of residue in emulsified asphalts. **Order H-2600.7F thermometer separately.** Complies with ASTM D244; AASHTO T59.

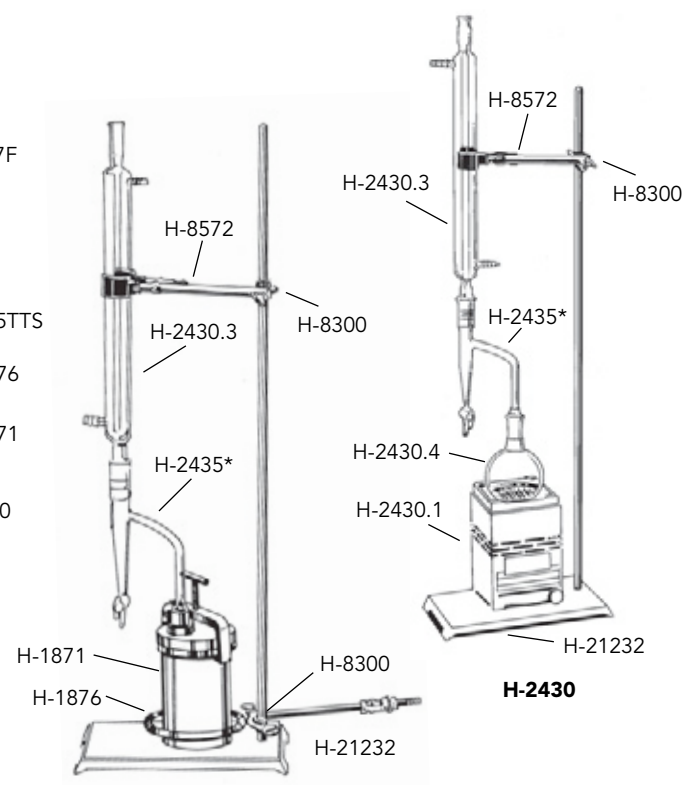
Shipping wt. 30 lbs. (13.6kg)

Individual Items Included in H-2285

Description	Model
Ring Burner	H-1876
Adapter	H-1910A
Bent Glass Tube	H-2290A
Funneled Tube	H-2290B
Tube Shield	H-2330
Condenser	H-2340
Aluminum Still	H-2345
Graduated Cylinder	H-4915.100
Burner	H-6220
Clamp	H-8300
Clamp Holders (2 in set)	H-8342
Clamp	H-8390
Clamp	H-8522
Ring	H-18355
Support Stands (2 in set)	H-21212
Support Stand	H-21232
Support Shelf	H-21700



H-2290



H-2440, H-2442

H-2430

Emulsified Asphalts Water Content Distillation Apparatus— H-2290

Same as H-2285 with smaller still, H-1871, substituted for H-2345 still. Complies with ASTM D244; AASHTO T59. Shipping wt. 30 lbs. (13.6 kg)

Dean-Stark Gas-Heated Apparatus— H-2440

Gas heated apparatus determines water content in petroleum products and other bituminous materials. Uses the same component parts as the H-2430, except instead of an electric heater and flask, it includes a Tar Still and Ring Burner (listed below).

Complies with ASTM D95, D244, E123; AASHTO T55, T59. Shipping wt. 30 lbs. (13.6kg)

Items Included in H-2440

Description	Model
Tar Still	H-1871
Ring Burner	H-1876

Distillation Apparatus for Volatile Distillates— H-2442.25

Same components as the H-2440, but the distilling receiver is a trap for volatile fractions of bitumen. Includes a 25ml Trap, graduated 0 to 5ml in 0.1ml divisions. Meets ASTM D1461; AASHTO T110. Shipping wt. 25 lbs. (11.3kg)

Distillation Apparatus for Moisture Distillates— H-2442.10

Same components as the H-2440, but the distilling receiver is a trap for moisture distillates of bitumen. Includes a 10ml Trap, graduated 0 to 5ml in 0.1ml divisions. Complies with ASTM D1461; AASHTO T110. Shipping wt. 25 lbs. (11.3kg)

Dean-Stark Electric Apparatus, 120V 60Hz— H-2430

Dean-Stark Electric Apparatus, 220V 50Hz— H-2430.4F

Electrically heated apparatus determines water content in petroleum products and other bituminous materials. Complies with ASTM D95, D244, E123; AASHTO T55, T59. Shipping wt. 30 lbs. (13.6kg)

Individual Items Included in H-2430

Description	Model
0 to 750W Electric Rheostat Heater	H-2430.1
Condenser	H-2430.3
Flask	H-2430.4
20ml Distilling Receiver Trap with Stopcock	H-2435.20
Clamp	H-8300
Burette Clamp	H-8572
Rectangular Support Stand with Rod	H-21232

*There are several choices of Traps for H-2435, see page 180.

Note: See following page for distillation accessories and replacement parts.





H-2435.25



H-2435.20



H-2435.10



H-2435.5



H-2450

25ml Cap Trap For Volatile Distillates— H-2435.25

25ml cap trap graduated 0.1ml from 0 to 25ml.
Complies with ASTM D95, D1461.

20ml Distillation Trap— H-2435.20

20ml distillation trap graduated in 0.2ml. Optional for ASTM D95

10ml Cap Trap For Moisture Distillates— H-2435.10

10ml cap trap graduated 0.1ml from 0 to 1ml, 0.2ml from 1ml to 10ml. Complies with ASTM D95, D1461.

5ml Cap Distillation Trap— H-2435.5

5ml cap distillation trap, graduated 0.1ml. Meets ASTM D95, D1461.

Particle Charge Meter, 110V 60Hz— H-2450**Particle Charge Meter, 220V 50/60Hz— H-2450.4F**

Particle charge meter identifies cationic emulsified asphalt, using 0-10DC millimeter controlled by variable resistor. Fail-safe design prevents exceeding meter capacity. Includes positive- and negative-identified test clips and 3-wire plug.

Shipping wt. 5 lbs. (2kg)

Order stainless steel plates separately.

Complies with ASTM D244; AASHTO T59.

Particle Charge Meter Plates— H-2452

Set of two 1" x 4" (25.4 x 101.6mm) stainless steel plates for use with H-2450.

Bitumen Soluble in Organic Solvents Set— H-1550

Used to determine solubility of asphalt cement materials.

Complies with ASTM D4, D2042; AASHTO T44. Shipping wt. 9 lbs.



H-1550

Replacement Parts, Model H-1550

Description	Model
Gooch crucible	H-1550.1
Crucible holder	H-1550.2
Buchner funnel	H-1550.3
Glass fiber filters	H-1550.8
Chapman filter pump	H-12020
3/8" Threaded coupling	H-12155
Flask filter ring	H-4913.500
Stopper #7	H-1550.5
Tubing	H-1448PT

Centrifuge Extractors

For quantitative determination of bitumen content in paving mixtures, centrifuge extractor operation requires relatively short time.

Sample is weighed, heated slightly until it starts crumbling, cooled, placed in rotor bowl and solvent is added. Centrifugal action forces liquid through a filter paper ring at bowl's periphery, and process is repeated until expelled solvent is clear color.

Aggregates are weighed and graded. Weight before and after extraction determines constituent proportions.

All motorized units have accurate, dependable electronic solid state speed control; rotation speed adjusts up and down.

Electric brake stops rotation in less than 10 seconds. Explosion-proof motorized units offer same features along with greater safety.

Hand-driven unit is ideal for field application or labs with light duty. Units are corrosion-resistant lightweight cast aluminum.

Includes 10 filter rings. Extra bowls recommended to speed multiple batching; order separately. Complies with ASTM D2172 (Method A).



H-1451
H-1452
H-1474



H-1456

Centrifuge Extractors, Analog Control, Value Line

Dimensions are: 12" x 22" x 20" (304 x 559 x 508mm)

Capacity	Open Motor		Explosion-Proof Motor		Shipping Wt.	Filter Ring Replacements
	115V 60Hz	220V 50/60Hz	115V 60Hz	220V 50/60Hz		
1500g	H-1452	H-1452.4F	H-1451	H-1451.4F	85 lb (39kg)	H-1481.627 6 micron retention 9-3/4" OD x 1-3/4" ID Package of 100
3000g			H-1474	H-1474.4F	140 lb (64kg)	H-1485.627 6 micron retention 11-5/8" OD x 5" ID Package of 100

Centrifuge Extractors, Analog Control, Cast Aluminum Construction

Dimensions are: 18" x 18" x 18" (457 x 457 x 457mm)

Capacity	Open Motor	Explosion-Proof Motor		Shipping Wt.	Filter Ring Replacements
	115V 60Hz	115V 60Hz	220V 50/60Hz		
1500g	H-1456	H-1466	H-1466.4F	75 lb (33kg)	H-1487.627 4 micron retention 10" OD x 5" ID Package of 100
3000g	H-1471	H-1473	H-1473.4F	80 lb (36kg)	H-1489.627 4 micron retention 12-1/4" OD x 5" ID Package of 100

Replacement Parts, Models H-1456 to H-1473

Description	Model	Description	Model
Aluminum Bowl, Model H-1456, H-1466	H-1456B	Clamp for all models	H-1471C
Aluminum Bowl, Model H-1471, H-1473	H-1471B	Rubber Viton O-ring for all models	H-1471RV
Bowl Cover, Model H-1456, H-1466	H-1456 BC	Brake band for all models	H-1456BB
Bowl Cover, Model H-1471, H-1473	H-1471BC	Brake Band Assembly for all models	H-1471BBA
Cover Nut	H-1456N		



H-1461

Centrifuge Extractors, Digital Control, Cast Aluminum Construction

Controller can be wall mounted to minimize vibrations. Push button and walk away while machine runs unattended. Memory holds "last test" cycle settings. Shuts off automatically at end of test cycle. Dimensions are: 18" x 18" x 18" (457 x 457 x 457mm)

Centrifuge Extractors, Analog Control, Cast Aluminum Construction

Dimensions are: 18" x 18" x 18" (457 x 457 x 457mm)

Capacity	Open Motor	Explosion-Proof Motor		Shipping Wt.	Filter Ring Replacements
	115V 60Hz	115V 60Hz	220V 50/60Hz		
1500g	H-1460	H-1461	H-1461.4F	76 lb (35kg)	H-1487.627 4 micron retention 10" OD x 5" ID Package of 100
3000g	H-1464	H-1465	H-1465.4F	80 lb (36kg)	H-1489.627 4 micron retention 12-1/4" OD x 5" ID Package of 100

Filter Papers For use with Centrifuge Extractors and Reflux Extraction Sets

Size	Filter Speed	Flow Rate (ml/min.)	Thickness	Retention (µm)	Per Pkg.	Model
9-3/4" x 2-1/2"	medium	85	0.71	4	100	H-1480.627
9-3/4" x 1-3/4"	medium	85	0.71	4	100	H-1481.627
10" x 5"	medium	85	0.71	4	100	H-1487.627
12-1/4" x 5"	medium	85	0.71	4	100	H-1489.627
11-5/8" x 1-3/4"	medium	85	0.71	4	100	H-1485.627
33cm dia.	Very Fast	360	0.51	48	50	H-1497.617
33cm dia.	Very Fast	435	1.02	31	100	H-1497.633
33cm dia.	Fast	235	0.25	24	100	H-1497.615
33cm dia.	Medium	60	0.17	6	100	H-1497.613
33cm dia.	Medium	85	0.71	4	100	H-1497.627
40cm dia.	Medium	85	0.71	4	100	H-1498.627
40cm dia.	Medium Fast	60	0.17	6	100	H-1498.613
40cm dia.	Medium Fast	235	0.25	24	100	H-1498.615
40cm dia.	Very Fast	300	0.51	48	50	H-1498.617



Vacuum Extractor— H-1449

Used for quantitative determination of bitumen in hot-mixed paving mixtures and pavement samples. Use with a H-4913.4M Erlenmeyer Flask. The H-1449 provides a 12" (305mm) dia. filtering surface. The unit includes connecting hose, (100) H-1497.613 filter papers and test procedure. For replacement filter paper, use H-1497 series. Complies with ASTM D2172 (Meth. E); AASHTO T164 (Method E). Shipping wt. 60 lbs. (27.2kg)

For vacuum pump, order H-1763A pump separately.

4000cc Erlenmeyer Flask— H-4913.4M

Meets ASTM D2172; AASHTO T164 (Method E)

8" Sieve Adapter for Vacuum Extractor— H-1447

Description	Model
Fluorosilicone o-ring	H-1448.1
Free-flow vacuum plate	H-1448GS
Stainless Steel Plate, as provided	H-1448P
Stainless Steel Plate, Heavy-Duty	H-1448HP
Rubber Tubing	H-1448RT
Clear, Heavy-wall, Vacuum Tubing	H-1446
4,000cc Erlenmeyer Flask, meets ASTM D2172 and AASHTO T164 (Method E)	H-4913.4M
8" Sieve adapter	H-1447


Free-Flow Vacuum Plate— H-1448GS

Prevents vacuum flow problems when performing vacuum extractor tests. This heavy-duty stainless steel plate won't draw down when vacuum is applied. Prevents blockage of flow holes. Solvent always passes through freely for consistently accurate test results. Eliminates problems and speeds testing. Can be used with the H-1449 Vacuum Extractor.

Filterless Centrifuge Extractor, 120V 60Hz— H-1857

Filterless Centrifuge Extractor, 230V 60Hz— H-1857.2F

Filterless Centrifuge Extractor, 230V 50Hz— H-1857.5F

The Continuous-flow Filterless Centrifuge Extractor is ideally suited for use in the extraction of mineral fines from bitumen-laden solvents obtained from standard asphalt extraction tests. In operation, the solvent suspension is fed through the top funnel into a special aluminum beaker. Using the high, 11,000 rpm centrifugal force, the liquid moves up the beaker wall and out the overflow tube while the solids remain for easy removal at test completion. The system allows the continuous feeding of the suspension until the solids-retaining capacity of the beaker is reached. The unit is supplied complete with a No. 18 (1.0mm) and No. 200 (75µm) sieve for placement at the top of the inlet funnel. Using this arrangement, an asphalt mix extraction test can be carried out by pre-dissolving the mix with solvent and then pouring the sample into the sieve. Complies with ASTM D1856; AASHTO T164, T170. Dimensions: 20" x 15" x 33" (508 x 380 x 840mm). Shipping wt. 150 lbs. (68kg) 

Aluminum Beaker— H-1857.5



H-1499

H-1495

H-1495.1
H-1499.1H-1495.2A
H-1499.2A

H-1494A



H-1440

Reflux Extractor Set, 1000g, 120V 60Hz— H-1495**Reflux Extractor Set, 220V 50/60Hz— H-1495.4F**

Used to determine the percentage of bitumen in a paving mixture using hot solvent extraction. Each cone has 500g capacity. Set includes: 2 Wire Screen Cones, Copper Condenser with 1/2" inlet/outlet water tubes, Glass Jar 6" OD x 18" H (152mm x 457mm) with ground open edges for a tight fit, a H-4942, 7" square Hot Plate and a 100-pack of 33cm Filter Paper. Components are available individually below. Complies with ASTM D2172; AASHTO T164 (Method B). Shipping wt. 30 lbs. (14kg)

H-1495 Extractor Components

Description	Model
Wire Screen Cone Sample Holder (set of 2)	H-1495.1
1/2" Tube Copper Condenser w/ inlet/outlet water tubes	H-1495.2A
Glass Jar with ground open edges	H-1495.3
Electric Hot Plate	H-4942
Filter Paper, 33cm, 100-pack	H-1497.613
FibreChem Circle, 8.5"	H-1496

Reflux Extractor Set, 2000g, 120V 60Hz— H-1499**Reflux Extractor Set, 220V 50/60Hz— H-1499.4F**

Similar to H-1495 except cones have 1000g capacity. Set includes: 2 Wire Screen Cones, Copper Condenser with 1/2" inlet/outlet water tubes, Glass Jar 8-3/4" OD x 18" H (222mm x 457mm) with ground open edges for a tight fit, a H-4943 10" square, digital Hot Plate and a 100-pack of 40cm Filter Paper. Components are available individually below. Complies with ASTM D2171; AASHTO T164 (Method B). Shipping wt. 50 lbs. (23kg)

H-1499 Extractor Components

Description	Model
Wire Screen Cone Sample Holder	H-1499.1
1/2" Tube Copper Condenser w/ inlet/outlet water tubes	H-1499.2A
Glass Jar with ground open edges	H-1499.3
Electric Hot Plate	H-4943
Filter Paper, 40cm, 100-pack	H-1498.613
FibreChem Circle, 8.5"	H-1496

Pressure Limit Device— H-1494A

For use with Reflux Extractor Kits to protect copper condenser from excessive pressure. For use with 1/2" tubes.

Asphalt Dispenser, 6 Qt., 120V 60Hz— H-1440**Asphalt Dispenser, 6 Qt., 220V 50/60Hz— H-1440.4F**

Round melting pot has stainless steel crucible (18 gauge) & shell (20 gauge) to facilitate easy clean up. Choice of 6 quart, or 12 quart model. Includes heavy duty, adjustable bench mounting stand which fits either size. Dual-point temperature control allows independent temperature for pot (0-350°) and for valve (1-10°). Digital display may be read in either Centigrade or Fahrenheit. Other features include: multiple-circuit blanket heater for very uniform heat; no-drip 1" ball valve dispenser, 7-1/4" (184mm) above work surface; 50 watt valve heater; 3" (76mm) fiberglass insulation; separate aluminum cover; 6' power cord. 6-qt Capacity— 800 watts; OD = 10-1/4" dia. x 14" height (260 x 356mm). ID = 6-3/4" dia. x 7-1/4" depth (171 x 184mm). 12-qt Capacity— 1,200 watts; OD = 15" dia. x 17" height (381 x 432mm). ID = 10" dia. x 9-1/2" depth (254 x 241mm). (Valve & controls excluded from dimensions.) Shipping wt. 30 lbs. (13.6kg)

Asphalt Dispenser, 12 Qt.— H-1442**Asphalt Dispenser, 12 Qt., 220V 50/60Hz— H-1442.4F**

Like H-1440, but has 12 quart capacity. Shipping wt. 43 lbs. (19.5kg)

Pavement

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Testing Equipment for



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Hand-Held Core Drill (only), 120V 60Hz— HR-2800

The HR-2800 Core Drill is available alone or in the HR-2850 kit with the optional, anchor-bolt base. The Core Drill provides a powerful 3-speed motor and comes standard with all fittings, including a 360° repositionable side, t-handle for support. It can be used with drill bits of up to 3" diameter in the hand-held mode, or up to 4" diameter with the optional stand. Includes positioning level on top of drill.

- Standard hand-held package includes:**
- Powerful 3-speed gear box
 - Repositionable side, t-handle

Core Drill with Base Stand, 120V 60Hz— HR-2850

The HR-2850 Core Drill combines the HR-2800 Hand-held, electric motor drill, described above with the optional, anchor-bolt base. The base is roughly 6" x 9" with a 31" tall column. It features a smooth gear action and a dumb bell handle for ease of use in tight areas. The drill features a hand rest on the back/top of the drill to ease drilling operations. And, the stand's locking collar holds the drill firmly for accurate drilling.

HR-2800	
Motor	1500 watta
Bit Capacity	3-4"
	900
Speeds (3)	2000
	4000
Auger Capacity	NA



HR-2508

Gas-Powered Core Drill— HR-2508

Handheld, Portable, Ultra Lightweight Core Drilling Machine, Gasoline powered; just add gasoline and water and start drilling! Perfect for road, bridge and fencing contractors.

For fast, economic drilling—either vertical or horizontal—of concrete/asphalt and/or auger drilling into soil. One-person drilling, easy-to-handle, 22 lbs. overall weight. Quick set-up, easy-to-use, reliable. Honda 31cc, 4-cycle gasoline engine, high performance water swivel, Bit Locator. Accepts up to 6" diameter bits. Shipping wt. 40 lbs. (18kg)

Features include:

- Designed for concrete/asphalt surfaces
- Minimize drilling time with gasoline power
- Easy-to-use and quick to set up
- One-person, handheld, core drill machine
- 31cc, gasoline powered engine - 4 cycle
- 7" bit diameter capacity
- Vertical or horizontal drilling
- Heavy-duty, quad precision ball bearing gear box

HR-2508	
Motor	31cc, 4-cycle
Bit Capacity	6"
Auger Capacity	NA



HR-2500

Electric Core Drill, 120 60Hz— HR-2500 Core Drill, 230 50/60Hz— HR-2500.4F

This core drill provides a flexible, multi-purpose vacuum/anchor bolt drilling system. It can be used for almost all applications involving floor, wall and ceiling placements, as well as hard-to-reach places. Includes a two-speed (350-900 RPM), 3.5 HP 20 amp heavy-duty motor, waterproof switch box, built-in water swivel, continuous duty oil-less vacuum pump, filter, hose, quick connections and has a 12-inch bit diameter capacity. The drill's 6" wheels provide easy maneuvering and its 10" (254mm) wide base is a vacuum pad anchor with more than 1000 pounds of vacuum force that solidly grips the drilling surface within seconds making it the ideal drill stand for floors, walls, ceilings, as well as, pavement. Requires water supply, if none is available order HR-2516 portable water pressure tank separately.

Shipping wt. 85 lbs. (38.5kg)

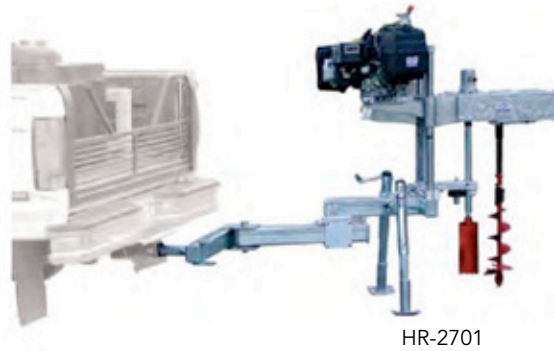
Standard package includes:

- 3.5 HP Milwaukee electric drill motor with 2-speed gear box
- Water swivel
- Drill Stand with combination vacuum pad/anchor bolt base
- Large (6") rubber wheels

HR-2500	
Horse Power	3.5
Motor: Volts/Amps	115/20
Cycle	50/60
Bit Capacity	12"
Auger Capacity	NA
Column Dimensions	2.5" x 35"
Carriage Travel	22"



HR-2503E



HR-2701



HR-2600

Gas-Powered Core Drill— HR-2503E

This core drill reduces job costs through the faster drilling speeds gained from the use of a gas-powered motor. This drill can be wheeled into place easily when mounted on its heavy-duty, sturdy platform or can also be mounted to a trailer, pickup or van.

Features include:

- a 17 HP gas-powered, electric-start drill head with electric start, with 8" bit capacity
- Accurate and easy drill positioning and easy movement of platform with its 4" Delrin wheels
- Dead-weight base no anchor bolts required

Standard package includes:

- Drill Stand
- 17 HP gasoline-powered, electric-start engine
- Variable RPM (300-1500 bit RPM)
- Water Swivel

HR-2503E	
Horse Power	17
Cycle	4
Bit Capacity	8"
Auger Capacity	NA

Gas-Powered Core Drill— HR-2504

Gas-powered core drill that offers all the features of the HR-2503 above and adds up to 16" bit capacity.

HR-2504	
Horse Power	17
Cycle	4
Bit Capacity	16"
Auger Capacity	NA

Hitch-Mounted Core Drill— HR-2700

This hitch-mounted system provides a mobile system, which provides fast set-up and drilling while ensuring consistent quality. Setup minimizes time required to do jobs reducing job costs.

Features include:

- 15 HP gas-powered, electric-start drill head with electric start, with 16" bit capacity
- Accurate drilling with easy positioning and alignment of drill head
- Positioning arm swings 180° in semi-circle
- Multi-jointed arm allows drilling anyway within the arc of trailer-hitch mount
- Stand-alone, gasoline-powered system— no additional power supplies needed
- Easy, one-person mounting or removal using machine's own drill caddy

Standard package includes:

- Drill Head with up to 16" bit capacity
- Flexible position receiver mount bracket
- Drill Caddy
- Variable RPM (300-1500 bit RPM)
- Water Swivel
- Drive Shaft Stabilizer System

HR-2700	
Horse Power	15
Cycle	4
Bit Capacity	16"
Auger Capacity	NA

Hitch-Mounted Core Drill— HR-2701

Hitch-mounted core drill rig that offers all the features of the HR-2700 above and adds auger capability up to 8".

HR-2701	
Horse Power	15
Cycle	4
Bit Capacity	16"
Auger Capacity	8"

Trailer-Mounted Core Drill— HR-2600

This complete stand-alone core drill rig offers field independence, versatility, dependability, and easy single-person operation. Provides mobile yet very stable drilling platform, which extends bit life. Provides exceptional solution for remote locations.

Shipping wt. 2000 lbs. (907kg)

Features include:

- 17 HP gasoline-powered drill head with electric start, with 16" bit capacity and a 24" travel;
- Variable drill head positioning system, which allows drill head movement of approx. 43" side-to-side and 12" fore and aft for accurate hole placement;
- Hydraulic-assisted machine lift for single-handed removal and replacement of drill;
- Lockable, weather-resistant toolbox;
- 200-gallon water tank and 12 VDC water pump;
- 5' x 8' steel-construction trailer, equipped with electric brakes and pre-wired for brake and tail lights.

HR-2600	
Horse Power	17
Cycle	4
Bit Capacity	16"
Auger Capacity	NA
Carriage Travel	24"

Trailer-Mounted Core Drill— HR-2601

Stand-alone core drill rig that offers all the features of the HR-2600 above and adds auger capability up to 8".

HR-2601	
Horse Power	17
Cycle	4
Bit Capacity	16"
Auger Capacity	8"
Carriage Travel	24"



HR-2530.4



HR-2550.25



Be advised that Core Drill Bits have 1/8" walls and produce a core 1/4" smaller than the OD of the Drill Bit.



HR-2514



HR-2512



HR-2516



HR-2554

Professional Quality Diamond Drill Bits

Professional-Quality, Diamond Drill Bits are designed for use-specific applications and available for use with either concrete or asphalt. Drill bits are available in a multitude of sizes (see chart on right). These drill bits have a total segment height of .320" (8.128mm), a diamond depth of .250" (6.350mm) and a segment base of .070" (1.778mm). The standard bit length is 13" (330.200mm) and the integral thread adapter is 1-1/4" – 7 thread.

Size		For Concrete*	For Asphalt**
Inches	mm		
1	25	HR-2530.1	H-2550.1
1.125	29	HR-2530.1125	HR-2550.1125
1.25	32	HR-2530.125	HR-2550.125
1.5	38	HR-2530.15	HR-2530.15
1.75	44	HR-2530.175	HR-2550.175
1.875	63	HR-2530.1875	HR-2550.1875
2	51	HR-2530.2	HR-2550.2
2.25	57	HR-2530.225	HR-2550.225
2.5	63	HR-2530.25	HR-2550.25
2.75	70	HR-2530.275	HR-2550.275
3	76	HR-2530.3	HR-2550.3
3.5	89	HR-2530.35	HR-2550.35
4	100	HR-2530.4	HR-2550.4
4.25	108	HR-2530.425	HR-2550.425
4.5	114	HR-2530.45	HR-2550.45
5	127	HR-2530.5	HR-2550.5
5.5	140	HR-2530.55	HR-2550.55
6	152	HR-2530.6	HR-2550.6
6.25	159	HR-2530.625	HR-2550.625
7	178	HR-2530.7	HR-2550.7
8	203	HR-2530.8	HR-2550.8
9	230	HR-2530.9	HR-2550.9
10	254	HR-2530.10	HR-2550.10
11	280	HR-2530.11	HR-2550.11
12	305	HR-2530.12	HR-2550.12
13	330	HR-2530.13	HR-2550.13
14	350	HR-2530.14	HR-2550.14

* Concrete drill bits are for critically hard concrete with heavy steel reinforcement
 ** Asphalt drill bits are for asphalt and concrete with soft, abrasive aggregate

High-Performance, Small-Size Diamond Drill Bits

Professional Quality Diamond Drill Bits have a total segment height of .400" (10.160mm) (.300" (7.620mm) diamond depth and .100" (2.54mm) segment base. The standard bit length is 13" (330.200mm) and the integral thread adapter is 1-1/4" – 7 thread.

*** For drilling cured concrete with medium to soft aggregates with or without steel reinforcement

Size		Medium***
Inches	mm	
1/2	13	H-2570.5
5/8	17	HR-2570.625
3/4	19	HR-2570.75
7/8	22	HR-2570.875
1	28	HR-2570.1

Core Drilling Machine Accessories

Description	Models
Extension Rod, 9" (229mm); for drilling holes deeper than 12" (305mm)	HR-2510
Strap wrench, 18" (457mm) allows bit removal from drill spindle without damage to bit barrel	HR-2514
Angle drilling attachment for HR-2500. Tilts column to allow drilling from 90° to 45° angle from surface	HR-2515
Portable water pressure tank. Hand-operated. 4 gallon (15 liter), delivers water under pressure when water supply is not available.	HR-2516
Water Trapping Assembly, confines wastewater on surface and electric pump moves water into container	HR-2511
Diamond bit edge dresser	HR-2512
Replacement wheel for diamond bit edge dresser (HR-2512)	HR-2513

CoreSnap, 4" — HR-2554

CoreSnap, 6" — HR-2556

The CoreSnap allows you to remove a drilled sample from a roadbed at or below the tackline without prying or drilling completely through the old roadbed. The CoreSnap is placed down over a normally cut core and tighten the binding bolt with a 1/2"-drive socket/ratchet. A quick lateral motion of the handle breaks the core sample away from the older mat beneath, allowing the core to be removed easily.

Shown with H-3221HA Horizontal Digital Gauge and cover removed.



H-3220A



H-2790

Benkelman Beam— H-3220A

The Benkelman Beam measures the deflection of a flexible pavement under moving wheel loads. Extremely accurate and easy to use. Direct-reading dial indicator eliminates need for conversion tables or field calculations. This pavement analysis tool provides the following features:

- Precision accuracy
- Easy to use on test site
- Lightweight, quick set-up
- Easy to transport, easy to store
- No need for conversions or field calculations

Dial indicator vibrator system assures accurate pavement measurements. Telescoping design adds convenience, reduces weight, and saves storage space. Lightweight aluminum construction.

Order dial gauge separately. AASHTO T256.

Specifications

Main Body	Aluminum with black finish 55" (1397mm)
Probe Beam	Telescopes into body, aluminum 8 ft. (2.4m)
Probe Fulcrum	Provides lever ratio of 2:1, ball pivot bearing
Vibrator System	Assures measurement accuracy. Operating switch mounted on top of instrument section. Requires 4 "D" size batteries
Dial Indicators	Ordered separately. Compensated for direct reading
Leveling Wheel	Adjusts beams to proper elevation
Overall Length	With beam fully extended 12 ft. (3.7m).
Shipping Weight	40lbs. (18kg)

Horizontal Digital Indicator— H-3221HA

Now you can get a horizontal-reading, digital gauge for use with the H-3220A Benkelman Beam. No more laying on the ground to read a dial indicator. We've also redesigned the gauge cover on the beam, so that you can now store the new digital gauge mounted to the Benkelman Beam, speeding set up and keeping the gauge and beam together, eliminating the chance of forgetting the gauge. Horizontal Digital Indicator: 1.0" range x 0.001" resolution. Designed for use with the Humboldt H-3220A Benkelman Beam. The gauge's 2:1 logic ratio allows it to provide direct readings of Benkelman Beam results without manual computations. Can be read in inches or metric units.

Vertical Dial Indicator, 1" range x 0.002" divisions — H-3222

Vertical Dial Indicator, 25mm range x 0.02mm divisions— H-3222M

High-Low Detector (Rolling Straight Edge)

High-Low Detector, 10 ft. (3m) Span— H-2790

High-Low Detector, 12 ft. (3.7m) Span— H-2791

High-Low Detector, 16 ft. (4.9m) Span— H-2792

Used to measure planeness of pavement surfaces, such as highways, airport runways, bridge decks, etc. Requires only one operator to detect, register, and dye mark high and low areas that need to be ground down or filled.

- Easy-to-use
- One-person operation
- Vertical sweep vertical indicator

Operator has full view of variations which are magnified 16 times, on a vertical scale graduated in 1/8" (1mm) increments, so that magnified readings range up to 1/4" (6.4mm), high or low. The 16 ft. long model incorporates aluminum reinforcing riveted along both sides of the frame for added support and rigidity.

Specifications

Frame	Rectangular aluminum
Wheels	One front, one rear for support, with one indicator wheel, center. Provision to check wheel alignment. Precision ball bearings, neoprene tires. Scraper blades keep wheels clean to maximize accuracy. Includes wheel stands for stabilizing during calibration, transport, and storage.
Dye	Bright orange, 12 oz. (340g) aerosol can. Non-clogging, contains no fluorocarbons. Mounts beside indicator wheel.
Steering Handle	T-type with button for discharge of dye
Scale	Vertical with large pointer, magnifies variations 16x, mounted above indicator wheel
Graduations	1/8" or 1mm
Readings	Magnified, High or Low Range: 0 to 1/4" (6.4mm),
Weights	H-2790: 140 lbs. (64kg) H-2791: 220 lbs. (100kg) H-2792: 414 lbs. (188kg)

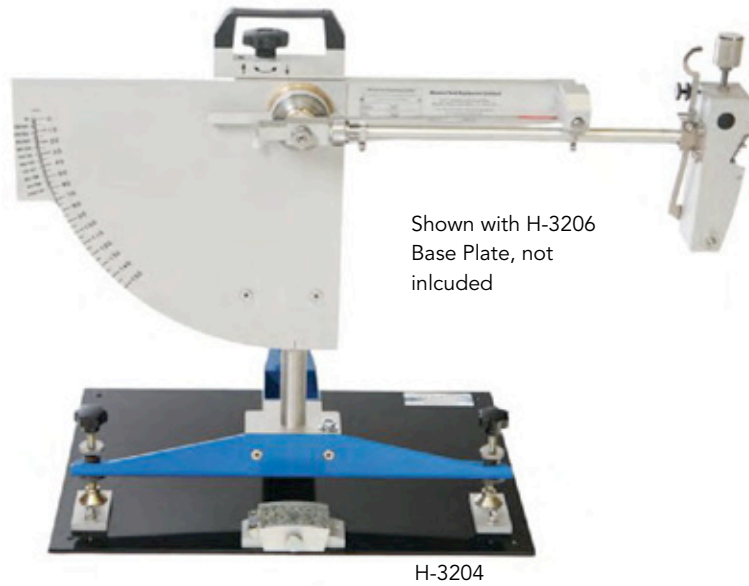
Bell/Buzzer Indicator— H-2790B

Sounds simultaneously with visual indicator, 9V DC battery

Aerosol Dye, 12 Pack— H-2790D

12 pack of 16oz. (454g) spray cans





Portable Skid Resistance Tester— H-3204

Measures friction (skid resistance) on flat, cambered, or gradient road surfaces. Originally developed by the Transport and Road Research Laboratory of Great Britain.

- Compact, easily transported & used in the field
- Can be used in remote locations, independent of any vehicle
- Enclosed bearings & working parts for protection against wear and contamination
- Heavy-duty frame construction
- Adjustable feet on base

A pendulum arm, having a spring-loaded rubber slider on the pendulum foot. Device is placed on the portion of the road surface to be tested. It is then leveled, and the height of the center of suspension of the pendulum is adjusted to a fixed value which is read on a special gauge.

The pendulum is then released from its horizontal position, to swing down freely until the rubber slider contacts the test surface. As the slider travels across the surface for a fixed distance, the pendulum is slowed and a frictionally-constrained pointer affixed to the pendulum arm measures the highest point in the pendulum arc. The position of the pointer is then read on a measuring arc graduated from 0 to 150. Pointer readings indicate the resistance to skidding of the test surface. Dimensions (include carrying case): 31" x 25.5" x 9" (787 x 648 x 229mm). Complies with ASTM E303., BS EN 1097-8; BS 812 Pt 114. Shipping wt. 75 lbs. (34.0kg)

H-3204 Accessories	Model
Rubber Slider, 1-1/4", for lab use	H-3207
Rubber Slider, 3", for field use	H-3208
Laboratory Base Plate	H-3206



Accelerated Polishing Machine, 110/230V 50/60Hz— H-3205.3F

The Accelerated Polishing Machine polishes samples of aggregates, simulating actual road conditions, and is used in conjunction with the Portable Skid Resistance Tester to determine the Polished Stone Value for aggregates used in road surfaces, and gives a measure of the resistance to skidding. Fourteen specimens are clamped around the "road wheel" of the polishing machine, and subjected to two stages of polishing by a loaded rubber tire. First by corn emery, and secondly by emery flour. Use of the Accelerated Polishing Machine and the Skid Resistance Tester in road construction has had a major influence in reduction of accidents.

The H-3205 features:

- Heavy welded steel mainframe, standing in adjustable pads
- Digital display preset timer and revolution counter.
- Specimens are easily affixed and removed from testing wheel
- Water gravity fed from high level tank through calibrated flowmeter.
- Used abrasive and water collected in removable tray.
- Loaded tire raised and lowered to the running surface by mechanical lifting device.
- Easily removed covers and guards protect operator during testing and safety switch ensures removable safety covers are in place.
- Comes with four molds and two mold plates.

Complies with BS 812 Pt 114 EN 1097-8. Dimensions: 32"x 32"x 48" (82 x 82 x 123cms) Shipping Weight: 440lbs (200kg).

Aggregate

Sample Splitters

<u>16 to 1</u>	<u>195</u>
<u>California</u>	<u>195</u>
<u>Gilson Universal</u>	<u>194</u>
<u>Humboldt</u>	<u>193</u>
<u>Micro</u>	<u>195</u>

Shakers

<u>Air Jet</u>	<u>211</u>
<u>Screen Shakers</u>	<u>196-197</u>
<u>Screen Trays</u>	<u>198</u>
<u>Sieve Shakers</u>	<u>206-207</u>

Sieves

<u>8-inch</u>	<u>200</u>
<u>12-inch</u>	<u>201,202</u>
<u>4-inch</u>	<u>202</u>
<u>3, 5, 6, 10-inch</u>	<u>203</u>
<u>200mm</u>	<u>204</u>
<u>Covers, Pans, Brushes</u>	<u>205</u>
<u>18-inch Riddles</u>	<u>208</u>
<u>Deep Frame, Wet Washing</u>	<u>209</u>
<u>Micron, Air-Jet Sieves</u>	<u>211</u>

Specific Gravity

<u>Pycnometer</u>	<u>211, 213</u>
<u>Conical Mold & Tamper</u>	<u>211</u>
<u>Bench</u>	<u>212</u>
<u>Containers</u>	<u>213</u>
<u>Tank & Heater</u>	<u>212</u>
<u>Flasks</u>	<u>213</u>

Moisture

<u>Speedy</u>	<u>214</u>
<u>Trident</u>	<u>214</u>

Classification

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<u>Elongation</u>	<u>215</u>
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<u>L.A. Abrasion</u>	<u>216</u>
<u>Slake Durability</u>	<u>216</u>
<u>Micro-Deval</u>	<u>217</u>
<u>Falling Sand</u>	<u>217</u>

Testing Equipment for  Construction Materials

HUMBOLDT

www.humboldtmfg.com
1.800.544.7220 • 708.468.6300



H-3966, H-3987, H-3989,
H-3990, H-3992
Removable Hopper:
H-3980, H-3985



H-3962, H-3964

H-3970,
H-3975

Humboldt Sample Splitters

Riffle-type sample splitters divide or halve dry materials such as cement, gravel, powdered ores, coal, coke, sand, soils, etc. Material poured into the hopper is divided into two equal portions by a series of chutes that discharge the material alternately in opposite directions into separate pans. Humboldt splitters are constructed of cold-rolled steel, or in some cases, stainless steel—see chart below for quantity and construction of pans included. Also refer to the chart below for ordering replacement or extra pans. All splitters include pans, scoop and cleaning brush. See chart below for product details on specific models. All splitters comply with ASTM B215, C136, C702, C778, D421, D424, D457, D806, AASHTO T27, T144, T248.

One-Piece Construction Sample Splitters

For rapid, single-step reduction of large sample volumes—ideal for field applications. See models: H-3962, H-3964, H-3966, H-3987, H-3989, H-3990, H-3992.

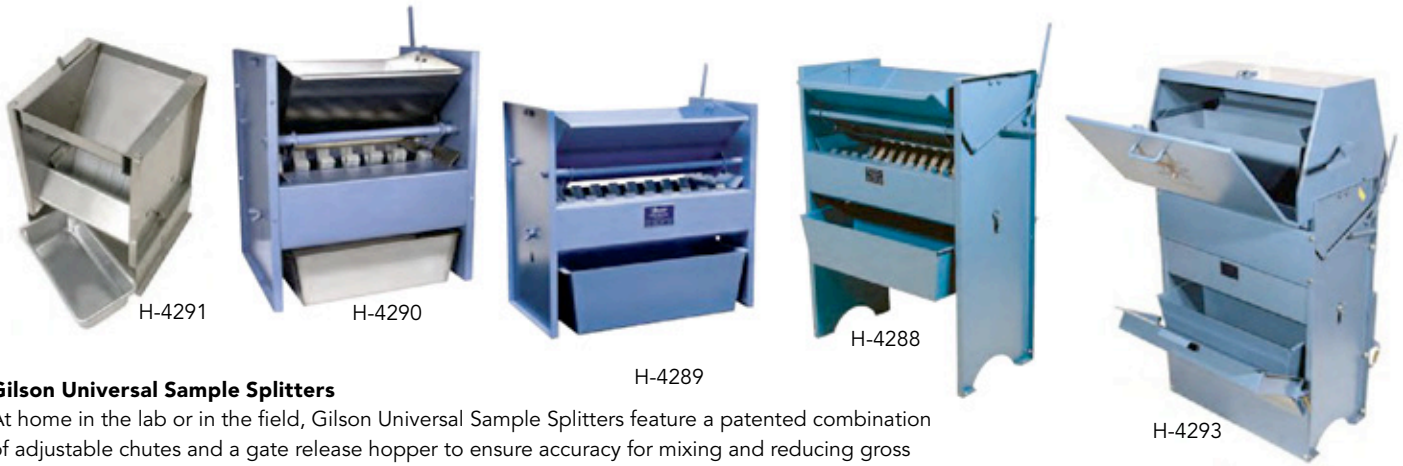
Removable Hopper Sample Splitters

Same design as above models except these have a removable hopper for easier cleaning. See models: H-3980 and H-3985.

Enclosed Sample Splitters

Enclosed Sample Splitters are ideal for dusty samples, including coal, coke and chaff. Comply with ASTM C702, D410, D2013, D3176, D3180; AASHTO T248. See models: H-3970 and H-3975.

Model	Material Size (max.)	Chutes		Hopper W x L inches (mm)	Pans (incl.)	Ship Wgt. lbs. (kg)	Steel Pan		Stainless Steel Pan		
		Number	Width				Pan Model #	H x L x W (L x W) in. (mm)	Pan Model #	L x W x D in. (mm)	
One-Piece Construction Sample Splitters							Replacement Pans for Sample Splitters				
H-3962	.125" (3.18mm)	14	.375" (9.52mm)	6.75" x 8" (171 x 203mm)	4	14 lb (6.3 kg)	H-3981	4.25" x 8.0" x 5.25" (108 x 203 x 133mm)	H-3981S	6.5" x 6.5" x 4.5" (165 x 165 x 114mm)	
H-3964	.166" (4.22mm)	14	.500" (12.7mm)	6.75" x 11" (171 x 279mm)	4	17 lb (7.7 kg)	H-3986	4.5" x 10.5" x 5.5" (114 x 267 x 140mm)	H-3986S	11.25" x 6.5" x 5.5" (286 x 165 x 140mm)	
H-3966	.250" (6.35mm)	14	.750" (19mm)	6.75" x 14.75" (171 x 375mm)	4	27 lb (12.3 kg)	NA	NA	H-3967S	5.125" x 13.25" x 6.625" (130 x 337 x 168mm)	
H-3987	.333" (8.46mm)	16	1.00" (25.4mm)	9" x 20" (171 x 375mm)	4	31 lb (14.1 kg)	H-3988	4.875" x 19" x 6.375" (124 x 483 x 162mm)	H-3988AS	16.375" x 6.5" x 5.25" (416 x 165 x 133mm)	
H-3989	.666" (16.92mm)	8	2.00" (50.8mm)	9.5" x 19.5" (171 x 375mm)	4	27 lb (12.3 kg)	H-3988	4.875" x 19" x 6.375" (124 x 483 x 162mm)	H-3988AS	16.375" x 6.5" x 5.25" (416 x 165 x 133mm)	
H-3990	.500" (12.70mm)	10	1.50" (38mm)	9" x 20" (171 x 375mm)	4	50 lb (22.7 kg)	H-3988	4.875" x 19" x 6.375" (124 x 483 x 162mm)	H-3988AS	16.375" x 6.5" x 5.25" (416 x 165 x 133mm)	
H-3992	.833" (21.16mm)	8	2.50" (63.5mm)	9" x 24" (229 x 610mm)	4	50 lb (22.7 kg)	NA	NA	H-3993S	5.125" x 22" x 6.75" (130 x 559 x 171mm)	
Removable Hopper Model Sample Splitters											
H-3980	.166" (21.16mm)	12	.500" (12.7mm)	8.5" x 11" (171 x 375mm)	4	18 lb (8.2 kg)	H-3981	4.25" x 8.0" x 5.25" (108 x 203 x 133mm)	H-3981S	6.5" x 6.5" x 5.5" (165 x 165 x 140mm)	
H-3985	.250" (6.35mm)	12	.75" (19mm)	8.5" x 14" (171 x 279mm)	4	21 lb (9.5 kg)	H-3986	4.5" x 10.5" x 5.5" (114 x 267 x 140mm)	H-3986S	11.25" x 6.5" x 5.5" (283 x 165 x 140mm)	
Enclosed Model Sample Splitters											
H-3970	.125" (3.18mm)	14	.375" (9.52mm)	6.5" x 8" (165 x 203mm)	2	22 lb (10 kg)	NA	NA	H-3977S	7" x 5.75" x 3.75" (178 x 146 x 95mm)	
H-3975	.125" (3.18mm)	24	.375" (9.52mm)	4.5" x 11" (114 x 279mm)	2	28 lb (12.7 kg)	NA	NA	H-3976S	5" x 11.875" x 6.125" (127 x 302 x 156mm)	



Gilson Universal Sample Splitters

At home in the lab or in the field, Gilson Universal Sample Splitters feature a patented combination of adjustable chutes and a gate release hopper to ensure accuracy for mixing and reducing gross samples to representative smaller test quantities. See chart below for specifications.

Mini-Splitter— H-4291

The smallest of the bench-top units is all stainless steel except for aluminum chute bars and pans. Can be used to split powders to 1/4" (6.4mm) aggregate. See chart below for more information. The optional H-4289.5 Dust Enclosure accessory consists of two stainless steel panels held to front and back of the unit by springs. Includes 2 pans.

Mini-Splitter Dust Enclosure— H-4289.5

Versa-Splitter— H-4290

The Versa-Splitter can be used for fine aggregates up to 3/4" (19mm) aggregate. Contact parts and pans are stainless steel except for aluminum chute bars, which are anodized for corrosion resistance. See chart below for more information. The optional H-4290.5 Dust Enclosure accessory consists of two stainless steel panels held to front and back of the unit by springs. Includes 2 pans.

Versa-Splitter Dust Enclosure— H-4290.5

Porta-Splitter— H-4289

The Porta-Splitter is designed to split most fine gravels and sands up to 2" (51mm) in size. Lightweight with a large hopper capacity, this splitter provides extreme durability in a portable model. Chute slope is 45°, but a 60° adapter kit is available. Includes 2 pans. See chart below for more information. Shipping Wt. 68 lbs. (31 kg).

60° Adapter Kit— H-4290.4

Universal Splitter— H-4288

Rugged, large-capacity floor model for field or lab use. Can split materials from fine sand to 4" (102mm) in size. Features adjustable chutes and gate release 1 ft³ (28.3L) hopper. See chart below for more information. Includes 2 pans. Shipping Wt. 165 lbs. (75kg).

Wheel Kit (set of 2)— H-4288.1

Bag Loading Chute— H-4288.3

60° Adapter Kit— H-4288.4

Total Enclosure Upgrade—H-4288.7

Universal Splitter, Fixed Chute— H-4288FC

Fixed chute model of the H-4288 Universal Splitter. Features 10 fixed-width chutes, 2.25" (57mm) See chart below for more information. Includes 2 pans.

Totally Enclosed Splitter— H-4293

A totally enclosed version of the H-4288 Universal Splitter. Hinged doors provide access to hopper and pans while keeping dust to a minimum. Unlike other enclosed splitter designs, the H-4293 is designed so that all splitting operations are done in the enclosed splitter, including initial dumping of the sample pan. Bottom pans are also enclosed. Shipping Wt. 370 lbs. (168kg).

Chute Settings—Width and Number of Chutes

Chute Width		Number of Chutes (openings)				
		H-4291	H-4290	H-4289	H-4288	H-4293
1/8"	(3.2mm)	48	—	—	—	—
1/4"	(6.4mm)	24	48	—	—	—
3/8"	(9.5mm)	16	—	—	—	—
1/2"	(12.7mm)	12	24	36	48	48
3/4"	(19.1mm)	8	16	—	—	—
1"	(25.4mm)	6	12	18	24	24
1-1/2"	(38.1mm)	4	8	12	16	16
2"	(51mm)	—	6	—	12	12
3"	(76mm)	—	4	6	8	8
4"	(102mm)	—	—	—	6	6
6"	(152mm)	—	—	—	4	4

Capacity Hopper/Pans in ³ /ft ³ (liters)	Chute Bar Width	Chute Bar Number of	Chute Slope	Dimensions L x W x H inches (mm)	Gilson#	Model	Pans Replacements
104 in ³ (1.7)	1/8" (3mm)	48	60°	9-1/2 x 8-1/2 x 13-1/2 (214 x 216 x 343)	SP-3	H-4291	H-4291.1
.28 ft ³ (7.9)	1/4" (6mm)	48	60°	15-1/2 x 12-1/2 x 17-1/2 (394 x 318 x 445)	SP-2.5	H-4290	H-4290.1
0.55 ft ³ (15.6)	1/2" (13mm)	36	45°	22 x 14-1/2 x 20-1/2 (559 x 368 x 521)	SP-2	H-4289	H-4289.1
1.0 ft ³ (28.3)	1/2" (13mm)	48	45°	29 x 19 x 39 (737 x 483 x 991)	SP-1	H-4288	H-4288.2
1.0 ft ³ (28.3)	1/2" (13mm)	10 Chutes Fixed	45°	29 x 19 x 39 (737 x 483 x 991)	SP-1C	H-4288FC	H-4288.2
1.0 ft ³ (28.3)	1" (25mm)	48	60°	29 x 19 x 39 (737 x 483 x 991)	SP-0	H-4293	H-4288.2

Wheels (set of 2) are available (rubber tires w/ ball bearing races) for above sample splitters, H-4288.1





H-4287

California Sample Splitter—H-4287

Designed and constructed for the California Department of Transportation, this splitter meets CalTrans C 201 requirements. For use with 1-1/8" (28.6mm) to sand sized aggregate. Large capacity, 1.9 Cu. Ft. (53.8L) gate release hopper. Ten 2-1/4" (57.2mm) fixed chutes process particle sizes up to 1-1/8" (28.6mm). Sturdy, heavy-gauge steel frame with painted and baked finish is built for extended service life under heavy use. Four swivel casters permit mobility and easy storage in busy, crowded labs. Two 1.2 Cu. Ft. (34L) capacity, welded-steel sample pans are included. Reinforced pans have sturdy handles at each end for safe and convenient handling of heavy samples. Overall dimensions: 29" x 28" x 46" (74 x 71 x 117cm).

Replacement Materials Pan for above—H-4287.1



H-3994

16-to-1 Sample Reducer— H-3994

Produces 10-lb.-or-greater representative samples with maximum particle size 1/2" (13mm). Reducer cuts out 1/16th of the material fed through in one pass. (a one-pound sample can be obtained from a 256-pound original by passing it through twice). Shipping Wt. 30 lbs. (14 kg).

Materials Pan for Reducer—H-3996S

Wash Tub— H-3997

Quartering Canvas—

5' Square (1.5m)— H-4135

5' x 8' (2m x 2.5m)— H-4136

Heavy-duty quartering canvas for use in selecting and quartering soils and aggregates. All edges are seamed and stitched. H-4135 does not comply with ASTM and AASHTO specs. H-4136 complies with ASTM C109, C702; AASTO T248.

H-4135



H-3996S

Micro and Precision Riffle Splitters & Pans

Micro and Precision Riffle Splitters (Jones Type) are designed to reduce bulk material into a convenient representative sample for laboratory analysis. A hopper, with a manual control gate, receives the material to be split, then upon opening the gate, the material flows through a series of equally divided compartments of chutes, sending 50% of the sample to the left side pan and 50% of the sample to the right side

pan. These Splitters consist of a stainless steel hop-per with a manually actuated flow gate, stainless steel and anodized aluminum riffle bank, and stainless steel frame with support legs. Four (4) aluminum Hy-Back (notched L-shape) pans are supplied with the micro-splitter and two (2) stainless steel sample pans are supplied with each Precision Riffle Splitter.



H-3971C



H-3973



H-3974

Chutes		Hopper Size L x W— inches (mm)	Hopper Volume cu. inch (mm)	Pans (furnished)	Pan Capacity cu. inch (mm)	Ship wt. lbs. (kg)	Model	Replacement Pan
Number	Width in. (mm)							
14	1/8 (3)	4.5 x 4.5	—	4	—	7 lbs (3.2 Kg)	H-3971C	H-3972
32	1/4 (6)	8.9 x 8.3	160	2	160	23 lbs (10.4 Kg)	H-3973	H-3973.1
16	1/2 (13)	8.8 x 8.0	150	2	150	21 lbs (9.5 Kg)	H-3974	H-3973.1



H-4283



H-4276



H-4273

Gilson Testing Screens (Hydraulic Clamping), 120V 60Hz— H-4283 (Hydraulic Clamping), 220V 50Hz— H-4283.5F

Gilson Testing Screens (Hand Clamping), 120V 60Hz— H-4276 (Hand Clamping), 220V 50Hz— H-4276.5F

Both models H-4283 (with hydraulic clamping) and H-4276 (with hand clamping) are ideal for sizing samples of crushed stone, sand gravel, slag, coal, coke, wood chips, ores, pellets, and similar materials. The hydraulic clamping model is recommended for heavy-use situations.

These testing screens with hydraulic or hand clamping are ideal for particle size determinations of crushed stone, sand and gravel, slag, ores, woodchips and similar coarse materials. Samples are quickly processed into as many as seven separations in as little as three to five minutes. Typical batch sizes up to one cubic foot (0.028m³) or more vary with material type.

Both testing screens are often used with fine mesh sizes down to #200 on larger samples when less efficient separation is acceptable. Low-amplitude drive shafts and speed variation accessories are available to optimize machine performance when testing finer samples or special materials. Both units feature high capacity screening for large samples, enclosed drive mechanism for safety, and sturdy feet designed for permanent mounting.

Five Course-Series Screen Trays (specify sizes when ordering) and one Standard Dustpan are included with each unit. The Dustpan may optionally be placed on the bottom shelf of the unit, freeing-up a slot for an additional screen tray.

See the chart on the opposite page for complete specifications and ordering information. Shipping Wt. 470 lbs. (214 kg).

Dustpan Tray— H-4283P

Sand Attachment— H-4281T

Tray Rack— H-4285

Door Enclosure— H-4286

Clean-n-Weigh Accessory— H-4307

Gilson Test-Master® (6-Slot Model), 120V 60Hz— H-4273 (6-Slot Model), 220V 50Hz— H-4273.5F

Gilson Test-Master® (7-Slot Model), 120V 60Hz— H-4274 (7-Slot Model), 220V 50Hz— H-4274.5F

Gilson Test-Master Testing Screens feature an integrated, moveable material hopper for easier sample introduction and vertically-hinged panel doors for improved access and clearance. The 1.6 ft³ (45.3L) hopper is hinged at the rear and allows the sample to be introduced incrementally if desired, as the machine is running. When the hopper is closed, a panel blocks dust from escaping through the opening. The units feature reliable counter-balanced drive assembly, fully enclosed operation and electronic digital controller. Internal rotating counterweights of the drive system equalize the vertical screening action to assure smooth, quiet operation and prevent transfer of vibrations to other lab instruments. Factory-installed options allow greater versatility for processing a wider range of materials. These accessories also reduce particle breakage during screening of sensitive materials such as coal and coke. Shipping Wt. 660 lbs. (299kg).

Screen tray capacity of the H-4273 model is 5 (five included) plus the dust pan while the H-4274 will hold 6 trays (six included) plus the dust pan. Both units are fully enclosed to minimize dust and have built-in digital timers for maximum test repeatability.

Included are five course screen trays with mesh up to #4 screen and one dustpan tray (specify desired mesh sizes when ordering). See the chart on the facing page for more information.

Shipping Wt. both models is 650 lbs. (295 kg).

Dustpan Tray— H-4273P

Stationary Dustpan Tray with Adapter— H-4273DP

Sand Attachment— H-4281M

Tray Rack— H-4285

Clean-n-Weigh Accessory— H-4307



H-4285



H-4273DP



H-4281M



Gilson Porta-Screen® (8 Slot Capacity)— H-4295
(8 Slot Capacity) 220V 50Hz— H-4295.5F

Gilson Porta-Screen® (6 Slot Capacity)— H-4297
(6 Slot Capacity) 220V 50Hz— H-4297.5F

The H-4295 and H-4297 Porta-Screen® have long been the accepted standard portable screens for field control of construction aggregates and quality control of asphalt and ready to mix plants. These units are also useful for size separations of many other materials. Capacity depends on test material, but may range up to 60 lb (27.3 kg) per test. Vibration of both models is mechanically counterbalanced for smooth, stable operation with no required mounting.

Porta-Screen models are designed for performance durability, yet are light enough to be portable. Trays are quickly secured for operation by dual hand clamp levers. When levers are released, trays are individually removable for emptying, cleaning and weighing.

The vibrating assembly is held top and bottom on hardened guide pins. The 1/4-HP motor, drive shaft, and connecting rod are synchronized with a rotating weight counterbalance system. All are enclosed by the enameled steel protective outer case.

Included with the H-4295 are 5 course screen trays with mesh up to a #4 screen and one pan (specify desired mesh sizes when ordering).

Included with the H-4297 are 5 course screen trays with mesh up to a #4 screen and one pan (specify desired mesh sizes when ordering).

See the chart below for complete specifications and ordering information. Shipping Wt. both models is 225 lbs. (102kg).



H-4295
H-4297

Porta Wheels — H-4288.1

Dustpan Tray— H-4302

Porta-Screen® Cover— H-4305

Gilson Porta-Pan— H-4306



H-4288.1

Screen Shakers

Description	Material Size	Maximum Capacity	Model	Gilson No.	Overall Tray Size	Features (see chart)	Motor	Dimensions inches (mm)
Testing Screen with hydraulic clamping	4" (104mm) to No. 200 mesh (14.75mm)	1 cu.ft. (0.3m ³) 80 lbs (36kg)	H-4283	TS1	18" x 26" (457 x 660mm)	1, 2, 3	1/3 HP capacitor	23 x 31 x 33 (584 x 787 x 838)
Testing Screen with hand clamping			H-4276	TS2		1, 2	1/2 HP*	
Porta-Screen® (8-slot)	2" (51mm) to No. 16 mesh (1.18mm) or finer meshes to No. 200 (75mm)	.75 cu.ft. (0.23m ³) 60 lbs (27kg)	H-4295	PS4	16" x 16.5" (406 x 419mm)	1, 4, 5, 6	1/4 HP	19 x 16.5 x 48.3 (483 x 419 x 1222)
Porta-Screen® (6-slot)			H-4297	PS3				19 x 16.5 x 42 (483 x 419 x 1067)
Test-Master® (6-slot)	4" (104mm) to No. 200 mesh (14.75mm)	1 cu.ft. (0.3m ³) 80 lbs (36kg)	H-4273	TM5	18" x 26" (457 x 660mm)	5, 6, 7	1/3 HP	27 x 33 x 45 (686 x 838 x 1143)
Test-Master® (7-slot)			H-4274	TM6	18" x 26" (457 x 660mm)	5, 6, 7	1/3 HP	27 x 33 x 45 (686 x 838 x 1143)

* H-4276.5F has a 1/3hp motor.

TEFC or explosion-proof motors can be quoted upon request.

Features Key:

- 1. Trays independently removable
- 2. In-progress viewing
- 3. Special speed and/or amplitude available
- 4. Portable-mounting not required
- 5. Counter-balanced
- 6. Digital timer
- 7. Totally enclosed

Screen Trays for Testing Screens

Use these tables to order replacement Screen Trays, Wire Cloth and Round Hole Plate Screens for Gilson Testing Screens, Test-Masters and Porta-Screens— Models: H-4283, H-4273, H-4274, H-4295, H-4297.



ASTM sizes are manufactured to comply with wire cloth specifications of ASTM E11 and AASHTO M92. Cloth is designated S for plain steel or SS for stainless steel. Replacement wire cloth is cut to size for specified machines. Trays with cloth No. 16 (1.18mm) and finer incorporate lateral support ribs or coarse backup cloth to support mesh. Backup cloth may be added to trays with or without support ribs as desired. Blank trays (with no cloth) are available, please inquire.

Standard ASTM Testing Screen Trays and Cloth

ASTM Sizes		Cloth Material	18" x 26" (457 x 660mm) Models: H-4273, H-4274, H-4276, H-4283		16" x 16.5" (406 x 419mm) Models: H-4295, H-4297,	
			Tray/Cloth	Cloth only	Tray/Cloth	Cloth only
125mm	5"	S	H-4278C5.000	H-4278WC5.000	NA	NA
106mm	4.24"	SS	H-4278C4.240	H-4278WC4.240	NA	NA
100mm	4"	S	H-4278C4.000	H-4278WC4.000	NA	NA
90mm	3.5"	S	H-4278C3.500	H-4278WC3.500	NA	NA
75mm	3"	S	H-4278C3.000	H-4278WC3.000	INQUIRE	INQUIRE
63mm	2.5"	S	H-4278C2.500	H-4278WC2.500	INQUIRE	INQUIRE
53mm	2.12"	SS	H-4278C2.120	H-4278WC2.120	INQUIRE	INQUIRE
50mm	2.00"	S	H-4278C2.000	H-34278WC2.000	H-4398C2.000	H-4398WC2.000
45mm	1.75"	S	H-4278C1.750	H-4278WC1.750	H-4398C1.750	H-4398WC1.750
37.5mm	1.50"	S	H-4278C1.500	H-4278WC1.500	H-4398C1.500	H-4398WC1.500
31.5mm	1.25"	S	H-4278C1.250	H-4278WC1.250	H-4398C1.250	H-4398WC1.250
26.5mm	1.06"	SS	H-4278C1.060	H-4278WC1.060	H-4398C1.060	H-4398WC1.060
25.0mm	1.00"	S	H-4278C1.000	H-4278WC1.000	H-4398C1.000	H-4398WC1.000
22.4mm	.875"	S	H-4278C.875	H-4278WC.875	H-4398C.875	H-4398WC.875
19.0mm	.750"	S	H-4278C.750	H-4278WC.750	H-4398C.750	H-4398WC.750
16.0mm	.625"	S	H-4278C.625	H-4278WC.625	H-4398C.625	H-4398WC.625
13.2mm	.530"	SS	H-4278C.530	H-4278WC.530	H-4398C.530	H-4398WC.530
12.5mm	.500"	S	H-4278C.500	H-4278WC.500	H-4398C.500	H-4398WC.500
11.2mm	.438"	S	H-4278C.438	H-4278WC.438	H-4398C.438	H-4398WC.438
9.5mm	.375"	S	H-4278C.375	H-4278WC.375	H-4398C.375	H-4398WC.375
8.0mm	.312"	S	H-4278C.312	H-4278WC.312	H-4398C.312	H-4398WC.312
6.7mm	.265"	SS	H-4278C.265	H-3910WC.265	H-4398C.265	H-4398WC.265
6.3mm	.250"	S	H-4278C.250	H-4278WC.250	H-4398C.250	H-4398WC.250
5.6mm	No. 3-1/2	SS	H-4278F3-1/2	H-4278WF3-1/2	H-4398F3-1/2	H-4398WF3-1/2
4.75mm	No. 4	S	H-4278F4	H-4278WF4	H-4398F4	H-4398WF4
4.00mm	No. 5	SS	H-4278F5	H-4278WF5	H-4398F5	H-4398WF5
3.35mm	No. 6	SS	H-4278F6	H-4278WF6	H-4398F6	H-4398WF6
2.80mm	No. 7	SS	H-4278F7	H-4278WF7	H-4398F7	H-4398WF7
2.36mm	No. 8	SS	H-4278F8	H-4278WF8	H-4398F8	H-4398WF8
2.00mm	No. 10	SS	H-4278F10	H-4278WF10	H-4398F10	H-4398WF10
1.70mm	No. 12	SS	H-4278F12	H-4278WF12	H-4398F12	H-4398WF12
1.40mm	No. 14	SS	H-4278F14	H-4278WF14	H-4398F14	H-4398WF14
1.18mm	No. 16	SS	H-4278F16	H-4278WF16	H-4398F16	H-4398WF16
1.00mm	No. 18	SS	H-4278F18	H-4278WF18	H-4398F18	H-4398WF18
850 m	No. 20	SS	H-4278F20	H-4278WF20	H-4398F20	H-4398WF20
710 m	No. 25	SS	H-4278F25	H-4278WF25	H-4398F25	H-4398WF25
600 m	No. 30	SS	H-4278F30	H-4278WF30	H-4398F30	H-4398WF30
500 m	No. 35	SS	H-4278F35	H-4278WF35	H-4398F35	H-4398WF35
425 m	No. 40	SS	H-4278F40	H-4278WF40	H-4398F40	H-4398WF40
355 m	No. 45	SS	H-4278F45	H-4278WF45	H-4398F45	H-4398WF45
300 m	No. 50	SS	H-4278F50	H-4278WF50	H-4398F50	H-4398WF50
250 m	No. 60	SS	H-4278F60	H-4278WF60	H-4398F60	H-4398WF60
212 m	No. 70	SS	H-4278F70	H-4278WF70	H-4398F70	H-4398WF70
180 m	No. 80	SS	H-4278F80	H-4278WF80	H-4398F80	H-4398WF80
150 m	No. 100	SS	H-4278F100	H-4278WF100	H-4398F100	H-4398WF100
125 m	No. 120	SS	H-4278F120	H-4278WF120	H-4398F120	H-4398WF120
106 m	No. 140	SS	H-4278F140	H-4278WF140	H-4398F140	H-4398WF140
90 m	No. 170	SS	H-4278F170	H-4278WF170	H-4398F170	H-4398WF170
75 m	No. 200	SS	H-4278F200	H-4278WF200	H-4398F200	H-4398WF200
63 m	No. 230	SS	H-4278F230	H-4278WF230	H-4398F230	H-4398WF230
53 m	No. 270	SS	H-4278F270	H-4278WF270	H-4398F270	H-4398WF270
45 m	No. 325	SS	H-4278F325	H-4278WF325	H-4398F325	H-4398WF325
38 m	No. 400	SS	H-4278F400	H-4278WF400	H-4398F400	H-4398WF400

Non-ASTM sizes— 1/8" and 1/16"— are available, please inquire.

ISO Testing Screen Trays and Cloth

ISO Sizes	Cloth Material	ISO SCREENS	
		Tray/Cloth	Cloth only
112mm	SS	H-8900TC.112	H-8900C.112
80mm	SS	H-8900TC.80	H-8900C.80
56mm	SS	H-8900TC.56	H-8900C.56
40mm	SS	H-8900TC.40	H-8900C.40
28mm	SS	H-8900TC.28	H-8900C.28
20mm	SS	H-8900TC.20	H-8900C.20
18mm	SS	H-8900TC.18	H-8900C.18
14mm	SS	H-8900TC.14	H-8900C.14
10mm	SS	H-8900TC.10	H-8900C.10
9mm	SS	H-8900TC.9	H-8900C.9
5mm	S	H-8900TC.5	H-8900C.5
2.5mm	SS	H-8900TC.25	H-8900C.25
1.25mm	SS	H-8900TC.125	H-8900C.125
900 m	SS	H-8900TC.900	H-8900C.900
400 m	SS	H-8900TC.400	H-8900C.400
160 m	SS	H-8900TC.160	H-8900C.160

ISO screens for models H-4295 and H-4297 are also available, please inquire.

Round Hole Testing Screen

Trays and Plate

ASTM Sizes		ROUND HOLE PLATE	
		Tray/Plate	Plate only
4.0"	101.6mm	H-9900TP.40	H-9900P.40
3.5"	88.9mm	H-9900TP.35	H-9900P.35
3.0"	76.2mm	H-9900TP.30	H-9900P.30
2.5"	63.5mm	H-9900TP.25	H-9900P.25
2.25"	57.2mm	H-9900TP.22	H-9900P.22
2.0"	50.8mm	H-9900TP.20	H-9900P.20
1.75"	44.5mm	H-9900TP.15	H-9900P.15
1.5"	38.1mm	H-9900TP.15	H-9900P.15
1.375"	34.9mm	H-9900TP.37	H-9900P.37
1.25"	31.8mm	H-9900TP.12	H-9900P.12
1.0"	25.4mm	H-9900TP.10	H-9900P.10
.875"	22.2mm	H-9900TP.87	H-9900P.87
.75"	19.1mm	H-9900TP.75	H-9900P.75
.625"	15.9mm	H-9900TP.62	H-9900P.62
.5"	12.7mm	H-9900TP.50	H-9900P.50
.375"	9.5mm	H-9900TP.37	H-9900P.37
.312"	8.0mm	H-9900TP.31	H-9900P.31
.25"	6.4mm	H-9900TP.25	H-9900P.25
.187"	4.75mm	H-9900TP.18	H-9900P.18
.125"	3.2mm	H-9900TP.12	H-9900P.12

Round hole sizes are punched round hole openings in steel plate as used for coal testing (ASTM D4749) and other special materials. Non-ASTM sizes— 1/8" and 1/16"— are available, please inquire.

Sieves

sampling, classification and ASTM standard tests
in all popular sizes and configurations

U.S.A. Standard Sieve Sizes and Equivalents

Alternative Number	Nominal Opening	Standard (mm)
4"	4.000	100mm
3.5"	3.500	90mm
3"	3.000	75mm
2.5"	2.500	63mm
2.12"	2.120	53mm
2"	2.000	50mm
1.75"	1.750	45mm
1.5"	1.500	37.5mm
1.25"	1.250	31.5mm
1.06"	1.060	26.5mm
1"	1.000	25.0mm
.875"	0.875	22.4mm
.75"	0.750	19.0mm
.625"	0.625	16.0mm
.530"	0.530	13.2mm
.500"	0.500	12.5mm
.434"	0.434	11.2mm
.375"	0.375	9.5mm
.312"	0.312	8.0mm
.265"	0.265	6.7mm
.25"	0.250	6.3mm
.125"	0.125	3.17mm
No. 3-1/2	0.223	5.6mm
No. 4	0.187	4.75mm
No. 5	0.157	4.00mm
No. 6	0.131	3.35mm
No. 7	0.110	2.80mm
No. 8	0.094	2.36mm
No. 10	0.078	2.00mm
No. 12	0.066	1.70mm
No. 14	0.055	1.40mm
No. 16	0.046	1.18mm
No. 18	0.039	1.00mm
No. 20	0.033	850μ
No. 25	0.027	710μ
No. 30	0.023	600μ
No. 35	0.019	50μ
No. 40	0.016	425μ
No. 45	0.013	355μ
No. 50	0.011	300μ
No. 60	0.009	250μ
No. 70	0.008	212μ
No. 80	0.007	180μ
No. 100	0.005	150μ
No. 120	0.0049	125μ
No. 140	0.0041	106μ
No. 170	0.0035	90μ
No. 200	0.0029	75μ
No. 230	0.0024	62μ
No. 270	0.0020	53μ
No. 32	0.0017	45μ
No. 400	0.0014	38μ
No. 450	0.0012	32μ
No. 500	0.0009	25μ
No. 635	0.0007	20μ

U.S.A. Standard Sieve Series

Looking for sieves? Humboldt stocks an extensive offering of sieves for use in all types of sieve testing applications, from sampling and classification of soils, aggregates and other powdered and granular materials to specific ASTM standard tests. Humboldt carries an extensive inventory of sieves in all popular sizes and mesh/frame material configurations. We try to maintain a complete stock of 8" and 12" sieves in both full and half heights for quick turnaround, as well as keeping a large inventory of other sieve sizes and frame and mesh configurations.

Our sieves are of the highest quality to ensure consistent fit, accurate specifications and durable construction. All our sieves comply with ASTM E11 and AASHTO M92; and, are given individual serial numbers for traceability. Certified sieves are also available as an option, please inquire.

Humboldt sieves are available with brass frame and mesh, brass frame with stainless steel mesh or stainless frame and mesh. Brass sieves are cost efficient while stainless sieves tend to last longer and have sag-resistant mesh. Sieve frames are seamless spun brass or stainless steel with rigid rolled edges and extended bottoms (skirts) to ensure a good fit between frames, pans and separators of the same diameter; and ensuring that your set of sieves stacks properly.

All sieves include a permanently attached metal plate that includes the sieve number, micron size and the nominal opening in millimeters and inches. Sieve covers, bottom pans and separator pans are also in stock and ready for shipment.



**USA Standard
ASTM Test Sieves**

Sieves

200

Aggregate



8"
203mm



Coarse Sieve Size	Brass Frame Stainless Mesh		Stainless Frame Stainless Mesh	
	Full Height 2" (50mm)	Half Height 1" (25mm)	Full Height 2" (50mm)	Half Height 1" (25mm)
4" (100mm)	H-3920CS4.000	H-3910CS4.000	H-3920CSS4.000	H-3910CSS4.000
3-1/2" (90mm)	H-3920CS3.500	H-3910CS3.500	H-3920CSS3.500	H-3910CSS3.500
3" (75mm)	H-3920CS3.000	H-3910CS3.000	H-3920CSS3.000	H-3910CSS3.000
2-1/2" (63mm)	H-3920CS2.500	H-3910CS2.500	H-3920CSS2.500	H-3910CSS2.500
2.12" (53mm)	H-3920CS2.120	H-3910CS2.120	H-3920CSS2.120	H-3910CSS2.120
2" (50mm)	H-3920CS2.000	H-3910CS2.000	H-3920CSS2.000	H-3910CSS2.000
1-3/4" (45mm)	H-3920CS1.750	H-3910CS1.750	H-3920CSS1.750	H-3910CSS1.750
1-1/2" (37.5mm)	H-3920CS1.500	H-3910CS1.500	H-3920CSS1.500	H-3910CSS1.500
1-1/4" (31.5mm)	H-3920CS1.250	H-3910CS1.250	H-3920CSS1.250	H-3910CSS1.250
1.06" (26.5mm)	H-3920CS1.060	H-3910CS1.060	H-3920CSS1.060	H-3910CSS1.060
1" (25.0mm)	H-3920CS1.000	H-3910CS1.000	H-3920CSS1.000	H-3910CSS1.000
7/8" (22.4mm)	H-3920CS.875	H-3910CS.875	H-3920CSS.875	H-3910CSS.875
3/4" (19.0mm)	H-3920CS.750	H-3910CS.750	H-3920CSS.750	H-3910CSS.750
5/8" (16.0mm)	H-3920CS.625	H-3910CS.625	H-3920CSS.625	H-3910CSS.625
0.530" (13.2mm)	H-3920CS.530	H-3910CS.530	H-3920CSS.530	H-3910CSS.530
1/2" (12.5mm)	H-3920CS.500	H-3910CS.500	H-3920CSS.500	H-3910CSS.500
7/16" (11.2mm)	H-3920CS.438	H-3910CS.438	H-3920CSS.438	H-3910CSS.438
3/8" (9.5mm)	H-3920CS.375	H-3910CS.375	H-3920CSS.375	H-3910CSS.375
5/16" (8.0mm)	H-3920CS.312	H-3910CS.312	H-3920CSS.312	H-3910CSS.312
0.265" (6.7mm)	H-3920CS.265	H-3910CS.265	H-3920CSS.265	H-3910CSS.265
1/4" (6.3mm)	H-3920CS.250	H-3910CS.250	H-3920CSS.250	H-3910CSS.250
1/8" (3.17mm)	H-3920CS.125	H-3910CS.125	H-3920CSS.125	H-3910CSS.125

Fine Sieve Size	Brass Frame Stainless Mesh		Stainless Frame Stainless Mesh	
	Full Height 2" (50mm)	Half Height 1" (25mm)	Full Height 2" (50mm)	Half Height 1" (25mm)
No. 3-1/2 (5.6mm)	H-3920FS3-1/2	H-3910FS3-1/2	H-3920FSS3-1/2	H-3910FSS3-1/2
No. 4 (4.75mm)	H-3920FS4	H-3910FS4	H-3920FSS4	H-3910FSS4
No. 5 (4.0mm)	H-3920FS5	H-3910FS5	H-3920FSS5	H-3910FSS5
No. 6 (3.35mm)	H-3920FS6	H-3910FS6	H-3920FSS6	H-3910FSS6
No. 7 (2.80mm)	H-3920FS7	H-3910FS7	H-3920FSS7	H-3910FSS7
No. 8 (2.36mm)	H-3920FS8	H-3910FS8	H-3920FSS8	H-3910FSS8
No. 10 (2.00mm)	H-3920FS10	H-3910FS10	H-3920FSS10	H-3910FSS10
No. 12 (1.70mm)	H-3920FS12	H-3910FS12	H-3920FSS12	H-3910FSS12
No. 14 (1.40mm)	H-3920FS14	H-3910FS14	H-3920FSS14	H-3910FSS14
No. 16 (1.18mm)	H-3920FS16	H-3910FS16	H-3920FSS16	H-3910FSS16
No. 18 (1.0mm)	H-3920FS18	H-3910FS18	H-3920FSS18	H-3910FSS18
No. 20 (850µ)	H-3920FS20	H-3910FS20	H-3920FSS20	H-3910FSS20
No. 25 (710µ)	H-3920FS25	H-3910FS25	H-3920FSS25	H-3910FSS25
No. 30 (600µ)	H-3920FS30	H-3910FS30	H-3920FSS30	H-3910FSS30
No. 35 (500µ)	H-3920FS35	H-3910FS35	H-3920FSS35	H-3910FSS35
No. 40 (425µ)	H-3920FS40	H-3910FS40	H-3920FSS40	H-3910FSS40
No. 45 (355µ)	H-3920FS45	H-3910FS45	H-3920FSS45	H-3910FSS45
No. 50 (300µ)	H-3920FS50	H-3910FS50	H-3920FSS50	H-3910FSS50
No. 60 (250µ)	H-3920FS60	H-3910FS60	H-3920FSS60	H-3910FSS60
No. 70 (212µ)	H-3920FS70	H-3910FS70	H-3920FSS70	H-3910FSS70
No. 80 (180µ)	H-3920FS80	H-3910FS80	H-3920FSS80	H-3910FSS80
No. 100 (150µ)	H-3920FS100	H-3910FS100	H-3920FSS100	H-3910FSS100
No. 120 (125µ)	H-3920FS120	H-3910FS120	H-3920FSS120	H-3910FSS120
No. 140 (106µ)	H-3920FS140	H-3910FS140	H-3920FSS140	H-3910FSS140
No. 170 (90µ)	H-3920FS170	H-3910FS170	H-3920FSS170	H-3910FSS170
No. 200 (75µ)	H-3920FS200	H-3910FS200	H-3920FSS200	H-3910FSS200
No. 230 (63µ)	H-3920FS230	H-3910FS230	H-3920FSS230	H-3910FSS230
No. 270 (53µ)	H-3920FS270	H-3910FS270	H-3920FSS270	H-3910FSS270
No. 325 (45µ)	H-3920FS325	H-3910FS325	H-3920FSS325	H-3910FSS325
No. 400 (38µ)	H-3920FS400	H-3910FS400	H-3920FSS400	H-3910FSS400
No. 450 (32µ)	H-3920FS450	H-3910FS450	H-3920FSS450	H-3910FSS450
No. 500 (25µ)	H-3920FS500	H-3910FS500	H-3920FSS500	H-3910FSS500
No. 635 (20µ)	H-3920FS635	H-3910FS635	H-3920FSS635	H-3910FSS635
No. 850 (10µ)	H-3920FS850	H-3910FS850	-	-
No. 1000 (2µ)	H-3920FS1000	H-3910FS1000	-	-

**USA Standard
ASTM Test Sieves**



Sieves

201

Aggregate

12"
305mm



Coarse Sieve Size	Brass Frame Stainless Mesh			Stainless Frame Stainless Mesh	
	Full Height 3" (75mm)	Inter. Height 2" (50mm)	Half Height 1 5/8" (41mm)	Full Height 3" (75mm)	Half Height 1 5/8" (41mm)
4" (100mm)	H-3912CS4.000	H-3922CS4.000	H-3932CS4.000	H-3912CSS4.000	H-3932CSS4.000
3-1/2" (90mm)	H-3912CS3.500	H-3922CS3.500	H-3932CS3.500	H-3912CSS3.500	H-3932CSS3.500
3" (75mm)	H-3912CS3.000	H-3922CS3.000	H-3932CS3.000	H-3912CSS3.000	H-3932CSS3.000
2-1/2" (63mm)	H-3912CS2.500	H-3922CS2.500	H-3932CS2.500	H-3912CSS2.500	H-3932CSS2.500
2.12" (53mm)	H-3912CS2.120	H-3922CS2.120	H-3932CS2.120	H-3912CSS2.120	H-3932CSS2.120
2" (50mm)	H-3912CS2.000	H-3922CS2.000	H-3932CS2.000	H-3912CSS2.000	H-3932CSS2.000
1-3/4" (45mm)	H-3912CS1.750	H-3922CS1.750	H-3932CS1.750	H-3912CSS1.750	H-3932CSS1.750
1-1/2" (37.5mm)	1H-3912CS1.500	H-3922CS1.500	H-3932CS1.500	H-3912CSS1.500	H-3932CSS1.500
1-1/4" (31.5mm)	H-3912CS1.250	H-3922CS1.250	H-3932CS1.250	H-3912CSS1.250	H-3932CSS1.250
1.06" (26.5mm)	H-3912CS1.060	H-3922CS1.060	H-3932CS1.060	H-3912CSS1.060	H-3932CSS1.060
1" (25.0mm)	H-3912CS1.000	H-3922CS1.000	H-3932CS1.000	H-3912CSS1.000	H-3932CSS1.000
7/8" (22.4mm)	H-3912CS.875	H-3922CS.875	H-3932CS.875	H-3912CSS.875	H-3932CSS.875
3/4" (19.0mm)	H-3912CS.750	H-3922CS.750	H-3932CS.750	H-3912CSS.750	H-3932CSS.750
5/8" (16.0mm)	H-3912CS.625	H-3922CS.625	H-3932CS.625	H-3912CSS.625	H-3932CSS.625
0.530" (13.2mm)	H-3912CS.530	H-3922CS.530	H-3932CS.530	H-3912CSS.530	H-3932CSS.530
1/2" (12.5mm)	H-3912CS.500	H-3922CS.500	H-3932CS.500	H-3912CSS.500	H-3932CSS.500
7/16" (11.2mm)	H-3912CS.438	H-3922CS.438	H-3932CS.438	H-3912CSS.438	H-3932CSS.438
3/8" (9.5mm)	H-3912CS.375	H-3922CS.375	H-3932CS.375	H-3912CSS.375	H-3932CSS.375
5/16" (8.0mm)	H-3912CS.312	H-3922CS.312	H-3932CS.312	H-3912CSS.312	H-3932CSS.312
0.265" (6.7mm)	H-3912CS.265	H-3922CS.265	H-3932CS.265	H-3912CSS.265	H-3932CSS.265
1/4" (6.3mm)	H-3912CS.250	H-3922CS.250	H-3932CS.250	H-3912CSS.250	H-3932CSS.250
1/8" (3.17mm)	H-3912CS.125	H-3922CS.125	H-3932CS.125	-	H-3932CSS.125

Fine Sieve Size	Brass Frame Stainless Mesh			Stainless Frame Stainless Mesh	
	Full Height 3" (75mm)	Inter. Height 2" (50mm)	Half Height 1 5/8" (41mm)	Full Height 3" (75mm)	Half Height 1 5/8" (41mm)
No. 3-1/2 (5.6mm)	H-3912FS3-1/2	H-3922FS3-1/2	H-3932FS3-1/2	H-3912FSS3-1/2	H-3932FSS3-1/2
No. 4 (4.75mm)	H-3912FS4	H-3922FS4	H-3932FS4	H-3912FSS4	H-3932FSS4
No. 5 (4.0mm)	H-3912FS5	H-3922FS5	H-3932FS5	H-3912FSS5	H-3932FSS5
No. 6 (3.35mm)	H-3912FS6	H-3922FS6	H-3932FS6	H-3912FSS6	H-3932FSS6
No. 7 (2.80mm)	H-3912FS7	H-3922FS7	H-3932FS7	H-3912FSS7	H-3932FSS7
No. 8 (2.36mm)	H-3912FS8	H-3922FS8	H-3932FS8	H-3912FSS8	H-3932FSS8
No. 10 (2.00mm)	H-3912FS10	H-3922FS10	H-3932FS10	H-3912FSS10	H-3932FSS10
No. 12 (1.70mm)	H-3912FS12	H-3922FS12	H-3932FS12	H-3912FSS12	H-3932FSS12
No. 14 (1.40mm)	H-3912FS14	H-3922FS14	H-3932FS14	H-3912FSS14	H-3932FSS14
No. 16 (1.18mm)	H-3912FS16	H-3922FS16	H-3932FS16	H-3912FSS16	H-3932FSS16
No. 18 (1.0mm)	H-3912FS18	H-3922FS18	H-3932FS18	H-3912FSS18	H-3932FSS18
No. 20 (850µ)	H-3912FS20	H-3922FS20	H-3932FS20	H-3912FSS20	H-3932FSS20
No. 25 (710µ)	H-3912FS25	H-3922FS25	H-3932FS25	H-3912FSS25	H-3932FSS25
No. 30 (600µ)	H-3912FS30	H-3922FS30	H-3932FS30	H-3912FSS30	H-3932FSS30
No. 35 (500µ)	H-3912FS35	H-3922FS35	H-3932FS35	H-3912FSS35	H-3932FSS35
No. 40 (425µ)	H-3912FS40	H-3922FS40	H-3932FS40	H-3912FSS40	H-3932FSS40
No. 45 (355µ)	H-3912FS45	H-3922FS45	H-3932FS45	H-3912FSS45	H-3932FSS45
No. 50 (300µ)	H-3912FS50	H-3922FS50	H-3932FS50	H-3912FSS50	H-3932FSS50
No. 60 (250µ)	H-3912FS60	H-3922FS60	H-3932FS60	H-3912FSS60	H-3932FSS60
No. 70 (212µ)	H-3912FS70	H-3922FS70	H-3932FS70	H-3912FSS70	H-3932FSS70
No. 80 (180µ)	H-3912FS80	H-3922FS80	H-3932FS80	H-3912FSS80	H-3932FSS80
No. 100 (150µ)	H-3912FS100	H-3922FS100	H-3932FS100	H-3912FSS100	H-3932FSS100
No. 120 (125µ)	H-3912FS120	H-3922FS120	H-3932FS120	H-3912FSS120	H-3932FSS120
No. 140 (106µ)	H-3912FS140	H-3922FS140	H-3932FS140	H-3912FSS140	H-3932FSS140
No. 170 (90µ)	H-3912FS170	H-3922FS170	H-3932FS170	H-3912FSS170	H-3932FSS170
No. 200 (75µ)	H-3912FS200	H-3922FS200	H-3932FS200	H-3912FSS200	H-3932FSS200
No. 230 (63µ)	H-3912FS230	H-3922FS230	H-3932FS230	H-3912FSS230	H-3932FSS230
No. 270 (53µ)	H-3912FS270	H-3922FS270	H-3932FS270	H-3912FSS270	H-3932FSS270
No. 325 (45µ)	H-3912FS325	H-3922FS325	H-3932FS325	H-3912FSS325	H-3932FSS325
No. 400 (38µ)	H-3912FS400	H-3922FS400	H-3932FS400	H-3912FSS400	H-3932FSS400
No. 450 (32µ)	H-3912FS450	H-3922FS450	H-3932FS450	H-3912FSS450	H-3932FSS450
No. 500 (25µ)	H-3912FS500	H-3922FS500	H-3932FS500	H-3912FSS500	H-3932FSS500
No. 635 (20µ)	H-3912FS635	H-3922FS635	H-3932FS635	H-3912FSS635	H-3932FSS635
No. 850 (10µ)	H-3912FS850	H-3922FS850	H-3932FS850	-	-
No. 1000 (2µ)	H-3912FS1000	H-3922FS1000	H-3932FS1000	-	-

**USA Standard
ASTM Test Sieves**



Sieves

202

Aggregate

4"
101mm

12"
305mm



Coarse Sieve Size	4" Diameter		12" Diameter	
	Brass Frame, Stainless Mesh		Brass Frame, Stainless Mesh	
	1-1/2" Deep	4" Deep	4" Deep	8" Deep
4" (100mm)	-	-	H-3928CS4.000	H-3938CS4.000
3-1/2" (90mm)	-	-	H-3928CS3.500	H-3938CS3.500
3" (75mm)	-	-	H-3928CS3.000	H-3938CS3.000
2-1/2" (63mm)	-	-	H-3928CS2.500	H-3938CS2.500
2.12" (53mm)	-	-	H-3928CS2.120	H-3938CS2.120
2" (50mm)	-	-	H-3928CS2.000	H-3938CS2.000
1-3/4" (45mm)	-	-	H-3928CS1.750	H-3938CS1.750
1-1/2" (37.5mm)	-	-	H-3928CS1.500	H-3938CS1.500
1-1/4" (31.5mm)	-	-	H-3928CS1.250	H-3938CS1.250
1.06" (26.5mm)	-	-	H-3928CS1.060	H-3938CS1.060
1" (25.0mm)	H-3914CS1.000	H-3924CS1.000	H-3928CS1.000	H-3938CS1.000
7/8" (22.4mm)	H-3914CS.875	H-3924CS.875	H-3928CS.875	H-3938CS.875
3/4" (19.0mm)	H-3914CS.750	H-3924CS.750	H-3928CS.750	H-3910CSS.750
5/8" (16.0mm)	H-3914CS.625	H-3924CS.625	H-3928CS.625	H-3938CS.625
0.530" (13.2mm)	H-3914CS.530	H-3924CS.530	H-3928CS.530	H-3938CS.530
1/2" (12.5mm)	H-3914CS.500	H-3924CS.500	H-3928CS.500	H-3938CS.500
7/16" (11.2mm)	H-3914CS.438	H-3924CS.438	H-3928CS.438	H-3938CS.438
3/8" (9.5mm)	H-3914CS.375	H-3924CS.375	H-3928CS.375	H-3938CS.375
5/16" (8.0mm)	H-3914CS.312	H-3924CS.312	H-3928CS.312	H-3938CS.312
0.265" (6.7mm)	H-3914CS.265	H-3924CS.265	H-3928CS.265	H-3938CS.265
1/4" (6.3mm)	H-3914CS.250	H-3924CS.250	H-3928CS.250	H-3938CS.250
1/8" (3.17mm)	H-3914CS.125	H-3924CS.125	H-3928CS.125	H-3938CS.125

Fine Sieve Size	4" Diameter		12" Diameter	
	Brass Frame, Stainless Mesh		Brass Frame, Stainless Mesh	
	1-1/2" Deep	4" Deep	4" Deep	8" Deep
No. 3-1/2 (5.6mm)	H-3914FS3-1/2	H-3924FS3-1/2	H-3928FS3-1/2	H-3938FS3-1/2
No. 4 (4.75mm)	H-3914FS4	H-3924FS4	H-3928FS4	H-3938FS4
No. 5 (4.0mm)	H-3914FS5	H-3924FS5	H-3928FS5	H-3938FS5
No. 6 (3.35mm)	H-3914FS6	H-3924FS6	H-3928FS6	H-3938FS6
No. 7 (2.80mm)	H-3914FS7	H-3924FS7	H-3928FS7	H-3938FS7
No. 8 (2.36mm)	H-3914FS8	H-3924FS8	H-3928FS8	H-3938FS8
No. 10 (2.00mm)	H-3914FS10	H-3924FS10	H-3928FS10	H-3938FS10
No. 12 (1.70mm)	H-3914FS12	H-3924FS12	H-3928FS12	H-3938FS12
No. 14 (1.40mm)	H-3914FS14	H-3924FS14	H-3928FS14	H-3938FS14
No. 16 (1.18mm)	H-3914FS16	H-3924FS16	H-3928FS16	H-3938FS16
No. 18 (1.0mm)	H-3914FS18	H-3924FS18	H-3928FS18	H-3938FS18
No. 20 (850µ)	H-3914FS20	H-3924FS20	H-3928FS20	H-3938FS20
No. 25 (710µ)	H-3914FS25	H-3924FS25	H-3928FS25	H-3938FS25
No. 30 (600µ)	H-3914FS30	H-3924FS30	H-3928FS30	H-3938FS30
No. 35 (500µ)	H-3914FS35	H-3924FS35	H-3928FS35	H-3938FS35
No. 40 (425µ)	H-3914FS40	H-3924FS40	H-3928FS40	H-3938FS40
No. 45 (355µ)	H-3914FS45	H-3924FS45	H-3928FS45	H-3938FS45
No. 50 (300µ)	H-3914FS50	H-3924FS50	H-3928FS50	H-3938FS50
No. 60 (250µ)	H-3914FS60	H-3924FS60	H-3928FS60	H-3938FS60
No. 70 (212µ)	H-3914FS70	H-3924FS70	H-3928FS70	H-3938FS70
No. 80 (180µ)	H-3914FS80	H-3924FS80	H-3928FS80	H-3938FS80
No. 100 (150µ)	H-3914FS100	H-3924FS100	H-3928FS100	H-3938FS100
No. 120 (125µ)	H-3914FS120	H-3924FS120	H-3928FS120	H-3938FS120
No. 140 (106µ)	H-3914FS140	H-3924FS140	H-3928FS140	H-3938FS140
No. 170 (90µ)	H-3914FS170	H-3924FS170	H-3928FS170	H-3938FS170
No. 200 (75µ)	H-3914FS200	H-3924FS200	H-3928FS200	H-3938FS200
No. 230 (63µ)	H-3914FS230	H-3924FS230	H-3928FS230	H-3938FS230
No. 270 (53µ)	H-3914FS270	H-3924FS270	H-3928FS270	H-3938FS270
No. 325 (45µ)	H-3914FS325	H-3924FS325	H-3928FS325	H-3938FS325
No. 400 (38µ)	H-3914FS400	H-3924FS400	H-3928FS400	H-3938FS400
No. 450 (32µ)	H-3914FS450	H-3924FS450	H-3928FS450	H-3938FS450
No. 500 (25µ)	H-3914FS500	H-3924FS500	H-3928FS500	H-3938FS500
No. 635 (20µ)	H-3914FS635	H-3924FS635	H-3928FS635	H-3938FS635
No. 850 (10µ)	H-3914FS850	H-3924FS850	H-3928FS850	H-3938FS850
No. 1000 (2µ)	H-3914FS1000	H-3924FS1000	H-3928FS1000	H-3938FS1000

**USA Standard
ASTM Test Sieves**

Coarse Sieve Size	Brass Frame, Stainless Mesh			
	3" Diameter 1" Deep	5" Diameter 1-1/2" Deep	6" Diameter 1-1/2" Deep	10" Diameter 3" Deep
4" (100mm)	-	-	-	H-3919CS4.000
3-1/2" (90mm)	-	-	-	H-3919CS3.500
3" (75mm)	-	-	-	H-3919CS3.000
2-1/2" (63mm)	-	-	-	H-3919CS2.500
2.12" (53mm)	-	-	-	H-3919CS2.120
2" (50mm)	-	-	-	H-3919CS2.000
1-3/4" (45mm)	-	-	-	H-3919CS1.750
1-1/2" (37.5mm)	-	-	-	H-3919CS1.500
1-1/4" (31.5mm)	-	-	-	H-3919CS1.250
1.06" (26.5mm)	-	-	-	H-3919CS1.060
1" (25.0mm)	H-3913CS1.000	H-3915CS1.000	H-3916CS1.000	H-3919CS1.000
7/8" (22.4mm)	H-3913CS.875	H-3915CS.875	H-3916CS.875	H-3919CS.875
3/4" (19.0mm)	H-3913CS.750	H-3915CS.750	H-3916CS.750	H-3919CS.750
5/8" (16.0mm)	H-3913CS.625	H-3915CS.625	H-3916CS.625	H-3919CS.625
0.530" (13.2mm)	H-3913CS.530	H-3915CS.530	H-3916CS.530	H-3919CS.530
1/2" (12.5mm)	H-3913CS.500	H-3915CS.500	H-3916CS.500	H-3919CS.500
7/16" (11.2mm)	H-3913CS.438	H-3915CS.438	H-3916CS.438	H-3919CS.438
3/8" (9.5mm)	H-3913CS.375	H-3915CS.375	H-3916CS.375	H-3919CS.375
5/16" (8.0mm)	H-3913CS.312	H-3915CS.312	H-3916CS.312	H-3919CS.312
0.265" (6.7mm)	H-3913CS.265	H-3915CS.265	H-3916CS.265	H-3919CS.265
1/4" (6.3mm)	H-3913CS.250	H-3915CS.250	H-3916CS.250	H-3919CS.250
1/8" (3.17mm)	H-3913CS.125	H-3915CS.125	H-3916CS.125	H-3919CS.125



Sieves
203
Aggregate

3" 5" 6" 10"
76mm 127mm 152mm 254mm

Fine Sieve Size	Brass Frame, Stainless Mesh			
	3" Diameter 1" Deep	5" Diameter 1-1/2" Deep	6" Diameter 1-1/2" Deep	10" Diameter 3" Deep
No. 3-1/2 (5.6mm)	H-3913FS3-1/2	H-3915FS3-1/2	H-3916FS3-1/2	H-3919FS3-1/2
No. 4 (4.75mm)	H-3913FS4	H-3915FS4	H-3916FS4	H-3919FS4
No. 5 (4.0mm)	H-3913FS5	H-3915FS5	H-3916FS5	H-3919FS5
No. 6 (3.35mm)	H-3913FS6	H-3915FS6	H-3916FS6	H-3919FS6
No. 7 (2.80mm)	H-3913FS7	H-3915FS7	H-3916FS7	H-3919FS7
No. 8 (2.36mm)	H-3913FS8	H-3915FS8	H-3916FS8	H-3919FS8
No. 10 (2.00mm)	H-3913FS10	H-3915FS10	H-3916FS10	H-3919FS10
No. 12 (1.70mm)	H-3913FS12	H-3915FS12	H-3916FS12	H-3919FS12
No. 14 (1.40mm)	H-3913FS14	H-3915FS14	H-3916FS14	H-3919FS14
No. 16 (1.18mm)	H-3913FS16	H-3915FS16	H-3916FS16	H-3919FS16
No. 18 (1.0mm)	H-3913FS18	H-3915FS18	H-3916FS18	H-3919FS18
No. 20 (850μ)	H-3913FS20	H-3915FS20	H-3916FS20	H-3919FS20
No. 25 (710μ)	H-3913FS25	H-3915FS25	H-3916FS25	H-3919FS25
No. 30 (600μ)	H-3913FS20	H-3915FS20	H-3916FS20	H-3919FS20
No. 35 (500μ)	H-3913FS35	H-3915FS35	H-3916FS35	H-3919FS35
No. 40 (425μ)	H-3913FS40	H-3915FS40	H-3916FS40	H-3919FS40
No. 45 (355μ)	H-3913FS45	H-3915FS45	H-3916FS45	H-3919FS45
No. 50 (300μ)	H-3913FS50	H-3915FS50	H-3916FS50	H-3919FS50
No. 60 (250μ)	H-3913FS60	H-3915FS60	H-3916FS60	H-3919FS60
No. 70 (212μ)	H-3913FS70	H-3915FS70	H-3916FS70	H-3919FS70
No. 80 (180μ)	H-3913FS80	H-3915FS80	H-3916FS80	H-3919FS80
No. 100 (150μ)	H-3913FS100	H-3915FS100	H-3916FS100	H-3919FS100
No. 120 (125μ)	H-3913FS120	H-3915FS120	H-3916FS120	H-3919FS120
No. 140 (106μ)	H-3913FS140	H-3915FS140	H-3916FS140	H-3919FS140
No. 170 (90μ)	H-3913FS170	H-3915FS170	H-3916FS170	H-3919FS170
No. 200 (75μ)	H-3913FS200	H-3915FS200	H-3916FS200	H-3919FS200
No. 230 (63μ)	H-3913FS230	H-3915FS230	H-3916FS230	H-3919FS230
No. 270 (53μ)	H-3913FS270	H-3915FS270	H-3916FS270	H-3919FS270
No. 325 (45μ)	H-3913FS325	H-3915FS325	H-3916FS325	H-3919FS325
No. 400 (38μ)	H-3913FS400	H-3915FS400	H-3916FS400	H-3919FS400
No. 450 (32μ)	H-3913FS450	H-3915FS450	H-3916FS450	H-3919FS450
No. 500 (25μ)	H-3913FS500	H-3915FS500	H-3916FS500	H-3919FS500
No. 635 (20μ)	H-3913FS635	H-3915FS635	H-3916FS635	H-3919FS635
No. 850 (10μ)	H-3913FS850	H-3915FS850	H-3916FS850	H-3919FS850
No. 1000 (2μ)	H-3913FS1000	H-3915FS1000	H-3916FS1000	H-3919FS1000



Metric Test Sieves

Sieves, Metric



200mm

Aggregate



Coarse Sieve Size	Brass Frame Stainless Mesh	
	Full Height 50mm	Half Height 25mm
100mm	H-3934CS.100	H-3936CS.100
90mm	H-3934CS.090	H-3936CS.090
75mm	H-3934CS.075	H-3936CS.075
63mm	H-3934CS.063	H-3936CS.063
53mm	H-3934CS.053	H-3936CS.053
50mm	H-3934CS.050	H-3936CS.050
45mm	H-3934CS.045	H-3936CS.045
37.5mm	H-3934CS.0375	H-3936CS.0375
31.5mm	H-3934CS.0315	H-3936CS.0315
26.5mm	H-3934CS.0265	H-3936CS.0265
25.0mm	H-3934CS.025	H-3936CS.025
22.4mm	H-3934CS.0224	H-3936CS.0224
19.0mm	H-3934CS.019	H-3936CS.019
16.0mm	H-3934CS.016	H-3936CS.016
13.2mm	H-3934CS.0132	H-3936CS.0132
12.5mm	H-3934CS.0125	H-3936CS.0125
11.2mm	H-3934CS.0112	H-3936CS.0112
9.5mm	H-3934CS.0095	H-3936CS.0095
8.0mm	H-3934CS.008	H-3936CS.008
6.7mm	H-3934CS.0067	H-3936CS.0067
6.3mm	H-3934CS.0063	H-3936CS.0063
5.6mm	H-3934CS0056	H-3936CS0056

Fine Sieve Size	Brass Frame Stainless Mesh	
	Full Height 3" (75mm)	Half Height 1 5/8" (41mm)
5.0mm	H-3934FS.05	H-3936FS.05
4.75mm	H-3934FS.0475	H-3936FS.0475
4.0mm	H-3934FS.04	H-3936FS.04
3.35mm	H-3934FS.0335	H-3936FS.0335
2.80mm	H-3934FS.028	H-3936FS.028
2.36mm	H-3934FS.0236	H-3936FS.0236
2.00mm	H-3934FS.02	H-3936FS.02
1.70mm	H-3934FS.017	H-3936FS.017
1.40mm	H-3934FS.014	H-3936FS.014
1.18mm	H-3934FS0118	H-3936FS.0118
1.0mm	H-3934FS.01	H-3936FS.01
850μ	H-3934FS.850	H-3936FS.850
710μ	H-3934FS.710	H-3936FS.710
600μ	H-3934FS.600	H-3936FS.600
500μ	H-3934FS.500	H-3936FS.500
425μ	H-3934FS.425	H-3936FS.425
355μ	H-3934FS.355	H-3936FS.355
300μ	H-3934FS.300	H-3936FS.300
250μ	H-3934FS.250	H-3936FS.250
212μ	H-3934FS.212	H-3936FS.212
180μ	H-3934FS.180	H-3936FS.180
150μ	H-3934FS.150	H-3936FS.150
125μ	H-3934FS.125	H-3936FS.125
106μ	H-3934FS.106	H-3936FS.106
80μ	H-3934FS.180	H-3936FS.180
75μ	H-3934FS.75	H-3936FS.75
63μ	H-3934FS.63	H-3936FS.63
53μ	H-3934FS.53	H-3936FS.53
45μ	H-3934FS.45	H-3936FS.45
38μ	H-3934FS.38	H-3936FS.38



H-3772

H-3774

H-2813

H-3773

H-3770

H-3799

Larger Brushes on Page 261

Sieve Covers with Ring Handle

Description	Brass	Stainless
3" Dia. Sieve Cover	H-3913BC	H-3913SC
4" Dia. Sieve Cover	H-3914BC	—
5" Dia. Sieve Cover	H-3915BC	—
6" Dia. Sieve Cover	H-3916BC	—
8" Dia. Sieve Cover	H-3930BC	H-3930SC
10" Dia. Sieve Cover	H-3919BC	—
12" Dia. Sieve Cover	H-3912BC	H-3912SC
200mm Sieve Cover	H-3950BC	H-3934BC

Bottom Sieve Pans

Description	Brass	Stainless
3" Dia., 5/8" (17mm) deep	H-3913HP	H-3913SS
3" Dia., 1" (25mm) deep	H-3913P	—
4" Dia., 1-1/2" (38mm) deep	H-3914P	—
5" Dia., 1" (25mm) deep	H-3915P	—
6" Dia., 1-5/8" (43mm) deep	H-3916P	—
8" Dia., 1" (25mm) deep	H-3960P	H-3960SS
8" Dia., 2" (51mm) deep	H-3950P	H-3950SS
10" Dia., 2" (51mm) deep	H-3950P	—
12" Dia., 1" (25mm) deep	H-3950P	H-3932PSS
12" Dia., 2" (51mm) deep	H-3950P	—
12" Dia., 3" (75mm) deep	H-3950P	H-3912SS
200mm Dia., 25mm deep	H-3950P	H-3936P
200mm Dia., 51mm deep	H-3951P	H-3934P

Magnifying Comparator— H-2813

The magnifying Comparator is ideal for use in examining sieve mesh for size verification, as well as general inspection for damage. The instrument is supplied complete with four interchangeable scales:

- #121— .5 x .005" Ruler line scale
- #122— 15 x .1mm Ruler line scale
- #172— .5 x 0.1" Parallel line scale
- #173— 1/2 x 1/64" Parallel line scale

Sieve Brush, coarse mesh— H-3772

Wire, wire loop handle; 1-1/2" x 3/4" x 1/8" (38 x 19 x 3mm), 5-1/2" (140mm) overall length.

Separator Pans

Description	Brass	Stainless
3" Dia., 1" (25mm) deep	H-3913SP	—
3" Dia., 3" (75mm) deep	H-3913DSP	—
4" Dia., 1-1/2" (38mm) deep	H-3914SP	—
4" Dia., 4" (102mm) deep	H-3924SP	—
5" Dia., 1" (25mm) deep	H-3915SP	—
6" Dia., 1-5/8" (43mm) deep	H-3916SP	—
8" Dia., 1" (25mm) deep	H-3955SP	H-3955SS
8" Dia., 2" (51mm) deep	H-3956SP	H-3956SS
8" Dia., 4" (102mm) deep	H-3945SP	—
8" Dia., 6" (152mm) deep	H-3946SP	—
8" Dia., 8" (203mm) deep	H-3947SP	—
10" Dia., 8" (203mm) deep	H-3919SP	—
12" Dia., 1" (25mm) deep	H-3932SP	H-3932SSP
12" Dia., 2" (51mm) deep	H-3922SP	H-3922PSS
12" Dia., 3.25" (83mm) deep	H-3912SP	H-3912SSP
12" Dia., 4" (102mm) deep	H-3928SP	—
12" Dia., 6" (152mm) deep	H-3929SP	—
12" Dia., 8" (203mm) deep	H-3938SP	—
200mm Dia., 25mm deep	H-3950SP	H-3936SP
200mm Dia., 51mm deep	H-3951SP	H-3934SP
200mm Dia., 102mm deep	H-3952SP	H-3938SP
200mm Dia., 152mm deep	H-3953SP	H-3939SP

Sieve Brush, fine mesh— H-3774

Horsehair, wood handle; 1-1/2" x 1-1/4" dia. (38 x 32mm), 5-1/4" (133mm) overall length.

Sieve Brush, fine mesh— H-3773

Wire, plastic handle; 1-1/2" x 1-1/4" dia. (38 x 32mm), 5-1/4" (133mm) overall length.

Sieve Brush, fine mesh— H-3770

Horsehair, wood handle; 2-1/2" x 1" x 3/8" (64 x 25 x 10mm), 10-1/2" (267mm) overall length.

Sieve Brush, oval shape— H-3799

Horsehair, wood handle; 2-3/4" x 1-1/8" x 3/4" (70 x 29 x 19mm), 10-1/2" (267mm) overall length.



H-4326



H-4325



H-4330



H-4310



H-4315A

Sieve Shaker for 3" Sieves, 120V 60Hz— H-4326**Sieve Shaker for 3" Sieves, 220V 50Hz— H-4326.5F**

Small, simple shaker for use with 3" sieves. Unit vibrates at 2000 vpm and creates a cyclonic effect, which produces a sieving action. Will accommodate up to 6 sieves and uses a 1/20 Hp motor. Includes 3-wire plug for 115V 50/60 operation. Ship wt. 6 lb (2.7kg)

Humboldt Motorized Sieve Shaker, 120V 60Hz—H-4325**Humboldt Motorized Sieve Shaker, 220V 60Hz—H-4325.2F****Humboldt Motorized Sieve Shaker, 220V 50Hz—H-4325.5F**

Economy Sieve Shaker, which complies with ASTM C136 Standards, the Humboldt Motorized Sieve Shaker can be used with 3", 5" and 8" sieves. 1/4 HP motor handles up to (10) 8" sieves, (12) 5" sieves and (16) 3" full-height sieves; and, (18) half-height 8" sieves. 1/4 HP motor, 115V, 60Hz with 30 minute timer. Mounting is required. Dimensions 15w x 15d x 45h" (380 x 380 x 1143mm). Ship wt. 65lb (29.5kg).

Humboldt Motorized Sieve Shaker, 120V 60Hz— H-4330**Humboldt Motorized Sieve Shaker, 220V 60Hz— H-4330.2F****Humboldt Motorized Sieve Shaker, 220V 50Hz— H-4330.5F**

Economy Sieve Shaker, which complies with ASTM C136 Standards, the Humboldt Motorized Sieve Shaker can be used with 8", 10" and 12" sieves. 1/4 HP motor handles up to (11) 8" sieves, (7) 10" sieves and (7) 12" full-height sieves; and, (19) half-height 8" sieves, (13) half-height 12" sieves. 1/4 HP motor, 115V, 60Hz with 30 minute timer. Mounting is required. ASTM C136. Dimensions 21w x 18d x 47h" (533 x 4570 x 1194mm) Ship wt. 85 lbs (38.5kg).

Hand-Operated Sieve Shaker— H-4310

Identical to Model H-4325 except that it uses a hand crank instead of a motor for operation. Shipping wt. 49 lbs (22 Kg).

Mary Ann® Sieve Sifter, 120V 60Hz— H-4315A**Mary Ann® Sieve Sifter, 230V 50Hz— H-4315A.5F**

The "Original Mary Ann" Sieve sifter has been a standard of the industry for years. This totally enclosed unit can be used with 8" or 12" sieves. Sieve stacks up to 26" in height can be set into place quickly. The Mary Ann design angles the sieves at 45° while rotation from 1/3hp motor and tapping from hardwood-faced aluminum hammers promote action to accomplish the sieving process. Dimensions: 18 x 26 x 58" (457 x 660 x 1473mm). Ship wt. 140 lbs. (64kg).

Rotary Lab Sieve Sifter, 120V 60Hz— H-4312**Rotary Lab Sieve Sifter, 220V 50/60Hz— H-4312.4F**

The Rotary Lab Sieve Sifter borrows its design from the Mary Ann Sieve Sifter. Like the Mary Ann it is a totally enclosed unit, which can be used with 8" or 12" sieves. Sieve stack capacity is six full-height (3") 12" sieves with a bottom pan. Unit timing is controlled by a digital count-down controller with a large red LED display. Operation can be set from 1 to 99 minutes. Settings can be saved between tests to speed operation and provide repeatability of tests. Dimensions: 19 x 24 x 58" (483 x 610 x 1473mm). Ship wt. 215 lbs. (98kg).

Meinzer II Sieve Shaker, 120V 60Hz— H-4323

This maintenance free, lightweight and portable vibrating shaker provides precise repeatable results time after time. By utilizing an electromagnetic drive, a fixed amplitude and rubber spring mounts, this unit produces the simultaneous vertical and horizontal movement needed for basic dry particle sizing analysis. This sieve shaker can handle 8" (8-full height/15 half-height) sieves, as well as 3" (12-full height/23 half-height) sieves. Comes with a 60 minute mechanical timer. This unit is ideal for use with sands, cements, chemicals, powder metals, cosmetics, grains, seeds, coal, soils, coffee, pharmaceuticals, tobacco, and many other dry components in ground, granular or powder form.

Ro-Tap® Sieve Shaker, 120V 60Hz— H-4320**Ro-Tap® Sieve Shaker, 220V 60Hz— H-4320.2F****Ro-Tap® Sieve Shaker, 230V 50Hz— H-4320.5F**

The Ro-Tap Sieve Shaker provides a compact design and aggressive sieving action. This shaker provides 278 oscillations and 150 taps per minute to produce an effective sieving action. It is powered by a 1/4 hp motor and provides a built-in 99 minute step-down timer. Unit holds up to six, 8" full-height (2") sieves, plus a full-height pan. Dimensions: 28 x 21 x 25" (711 x 533 x 635mm). Ship wt. 190 lbs. (86kg).

Ro-Tap® Sieve Shaker, 120V 60Hz— H-4322**Ro-Tap® Sieve Shaker, 220V 60Hz— H-4322.2F****Ro-Tap® Sieve Shaker, 230V 50Hz— H-4322.5F**

The Ro-Tap Sieve Shaker provides a compact design and aggressive sieving action. This shaker provides 278 oscillations and 150 taps per minute to produce an effective sieving action. It is powered by a 1/4 hp motor and provides a built-in 99 minute step-down timer. Unit holds up to six, 12" intermediate-height (2") sieves, plus a pan. Dimensions: 28 x 21 x 25" (711 x 533 x 635mm). Ship wt. 190 lbs. (86kg).

8" Sieve Adapter for 12" Ro-Tap® Sieve Shaker— H-4322.8

Adapter to accommodate 8" sieves on the H-4322 Sieve Shaker.



H-4312



H-4323



H-4320



H-4321, H-4327

Dura Tap™, Motorized Sieve Shaker, 120V 60Hz— H-4321

Dura Tap™, Motorized Sieve Shaker, 220V 60Hz—H-4321.2F

Dura Tap™, Motorized Sieve Shaker, 220V 50Hz—H-4321.5F

Designed for use with 8" sieves, this industrial-strength Sieve Shaker is engineered with rugged steel and alloy materials ready to withstand everyday, harsh duty cycles. Grease fittings are provided to ensure longer life for your bearings, and each unit is "burned in" by continuously running it for over 4 hours, guaranteeing performance right out of the box. Unit holds 6 full-height 8" sieves, plus one pan and cover or 14 half-height sieves, plus one pan and cover. Uses a vertically-mounted, enclosed 1/4 hp electric motor and a built-in digital timer (+/- 2 seconds over 24 hours). Dimensions: 28 x 21 x 25" (711 x 533 x 635 mm). Ship wt. 225 lb (102kg).

Dura Tap™, Motorized Sieve Shaker, 120V 60Hz— H-4327

Dura Tap™, Motorized Sieve Shaker, 220V 60Hz—H-4327.2F

Dura Tap™, Motorized Sieve Shaker, 220V 50Hz—H-4327.5F

Designed for use with 12" sieves, this industrial-strength Sieve Shaker is engineered with rugged steel and alloy materials ready to withstand everyday, harsh duty cycles. Grease fittings are provided to ensure longer life for your bearings, and each unit is "burned in" by continuously running it for over 4 hours, guaranteeing performance right out of the box. Unit holds 4 full-height 12" sieves, plus one pan and cover or 8 half-height sieves, plus one pan and cover. Uses a vertically-mounted, enclosed 1/4 hp electric motor and a built-in digital timer (+/- 2 seconds over 24 hours). Dimensions: 28 x 21 x 25" (711 x 533 x 635 mm). Ship wt. 225 lb (102kg).

Motorized Sieve Shakers Use the chart below to check and compare specifications between the various Sieve Shakers.

Description	Model	Sieve Dia.		Sieve Capacity*			ASTM	Timer minutes	Mounting	Motor HP	Dimensions W D H	Ship Wt. lbs. (kg)
		in.	mm	full	inter.	half						
8" Motorized Sieve Shaker	H-4325	3	76	16			C136	30	Yes	1/4	15 x 15 x 45" (381 x 381 x 1143mm)	65 (29.5)
		5	127	12								
		8	203	10		18						
12" Motorized Sieve Shaker	H-4330	8	203	11		19	C136	30	Yes	1/4	21 x 18 x 47" (533 x 457 x 1194mm)	85 (38.5)
		10	254	7								
		12	305	7	11	13						
8" Hand Sieve Shaker	H-4310	3	76	16			C136	30	Yes	1/4	15 x 15 x 45" (381 x 381 x 1143mm)	49 (22)
		5	127	12								
		8	203	10		18						
Mary Ann Sieve Sifter	H-4315A	8	203	10			C136	99 Digital	No	1/3	13 x 35 x 45" (330 x 889 x 1143mm)	140 (63.5)
		12	305	6								
Rotary Lab Sieve Sifter	H-4312	8	203	10		20	C136	99 Digital	No	1/3	19 x 24 x 58" (483 x 610 x 1473mm)	215 (98)
		12	305	6								
Meinzer II	H-4323	8	203	8		15	C136	60	No	†	10 x 10 x 7 (254 x 254 x 178mm)	36 (16.3)
Dura-Tap™ Sieve Shaker	H-4321	8	203	7		14	C136	24 hr. Digital	No	1/4	28 x 21 x 25" (711 x 533 x 635mm)	225 (102)
Dura-Tap™ Sieve Shaker	H-4327	12	203	4	7	8	C136	24 hr. Digital	No	1/4	28 x 21 x 25" (711 x 533 x 635mm)	225 (102)
Ro-Tap® Sieve Shaker	H-4320	8	203	6		13	C136	99 Digital	No	1/4	28 x 21 x 25" (711 x 533 x 635mm)	109 (86)
Ro-Tap® Sieve Shaker	H-4322	12	305	4		6	C136	99 Digital	No	1/4	28 x 21 x 25" (711 x 533 x 635mm)	190 (86)

* includes top cover and pan
† electromagnetic drive



H-3903



H-4391



H-3902



H-4100 Series

Rocker-Type Field-Testing Sieves— H-4391

For sieve analysis of coarse aggregates and other materials. Consists of a 12" (305mm) square frame with handles mounted on a collector box with rockers. Includes 3" (76.1mm), 2" (50.8mm), 1-1/2" (38.1mm), 1" (25.4mm), 3/4" (190mm), 1/2" (12.7mm), 3/8" (9.51mm) and No. 4 ASTM wire screen plates with square openings.

Screen plates of any standard openings are available; separations finer than No. 20 mesh are not recommended for this unit. Screens are held in place with two locking devices on opposite sides. All screens can be clamped into frame for carrying or storage. OD15-1/4 x 12-1/4 x 10" (387 x 311 x 354mm). Replacement screens available, call 1-800-544-7220.

Ship wt. 42 lbs. (19kg)

5" Dia. Soil Analysis Sieves Set— H-3903

Used by agricultural engineers because of their accuracy and ease of handling. Frames are seamless brass with rolled edges and extended skirts for nesting. Set includes: (1) ea of: No. 10, 20, 40, 60, 80, 100 Pan and Cover.

5" Dia. Perforated Plate, Soil Analysis Sieve Set— H-3902

Set includes pan, cover and five metric perforated plate sieves. Screening surfaces are perforated brass plate with 0.5mm, 1mm, 2mm, 3mm and 5mm size openings. Frames are 5" (127mm) dia. by 1-1/2" (38mm) deep.

Ship wt. 10 lbs. (4.5kg)

18" Dia. Brass Frame, Riddles (Sieves)— H-4100 Series

Brass frame riddles (sieves) are made with stainless steel wire cloth and are used to wash, sift, strain for draining-off liquids and separate aggregates and dry materials in the sieve analysis of concrete and other materials. Comply with ASTM specifications.

Screen No.	Mesh Size	Model
4"	100mm	H-4109.4
3.5"	90mm	H-4109A
3"	75mm	H-4109
2.5"	63mm	H-4108
2"	50mm	H-4107
1.5"	37.5mm	H-4106
1.25"	31.5mm	H-4105A
1"	25.0mm	H-4105
.875"	22.4mm	H-4104A
.75"	19.0mm	H-4104
.625"	16.0mm	H-4103A
.5"	12.5mm	H-4103
.375"	9.5mm	H-4102
.25"	6.3mm	H-4101
No. 3.5	5.60mm	H-4100.3
No. 4	4.75mm	H-4100.4
No. 5	4.00mm	H-4100.5
No. 6	3.35mm	H-4100.6
No. 7	2.80mm	H-4100.7
No. 8	2.36mm	H-4100.8
No. 10	2.00mm	H-4100.10
No. 12	1.70mm	H-4100.12
No. 14	1.40mm	H-4100.14
No. 16	1.18mm	H-4100.16
No. 18	1.00mm	H-4100.18
No. 20	85	H-4100.20
Cover		H-4100C
Bottom Pan		H-4100P



H-3945



H-3942, H-3943



H-3948

Deep Frame Wet Washing Sieves

Extra-deep frame sieves for wet testing of various materials make it possible to wash the fines through the sieve without losing any of the sample. Sieves are constructed of brass frames and permanently installed stainless steel cloth. These sieves can also use almost any size mesh material 20 mesh and finer, call for availability.

Model	Description dia. x depth	Size lbs. (kg)	Ship wt.
H-3945	Wet washing sieve with No. 200 stainless steel cloth	8" x 4"	7
H-3945RC	Wet washing sieve with No. 200 stainless steel cloth and back-up cloth	(203 x 102mm)	(3.2)
H-3946	Wet washing sieve with No. 200 stainless steel cloth	8" x 6"	8
H-3946RC	Wet washing sieve with No. 200 stainless steel cloth and back-up cloth	(203 x 152mm)	(3.6)
H-3947	Wet washing sieve with No. 200 stainless steel cloth	8" x 8"	9
H-3947RC	Wet washing sieve with No. 200 stainless steel cloth and back-up cloth	(203 x 203mm)	(4.0)
H-3928FS200	Wet washing sieve with No. 200 stainless steel cloth	12" x 4"	11
H-3928FS200RC	Wet washing sieve with No. 200 stainless steel cloth and back-up cloth	(305 x 102mm)	(5.0)
H-3929FS200	Wet washing sieve with No. 200 stainless steel cloth	12" x 6"	13
H-3929FS200RC	Wet washing sieve with No. 200 stainless steel cloth and back-up cloth	(305 x 152mm)	(5.9)
H-3938FS200	Wet washing sieve with No. 200 stainless steel cloth	12" x 8"	14
H-3938FS200RC	Wet washing sieve with No. 200 stainless steel cloth and back-up cloth	(305 x 203mm)	(6.3)

Replaceable Mesh, Wet Washing Sieves

Cost-effective replaceable mesh inserts allow you to interchange mesh sizes in these sieves, as well as make quick replacements of damaged screens. Inserts include back-up cloth and are available in either No. 200 or 325 mesh sizes. These sieves can also use almost any size mesh material 20 mesh and finer, call for availability.

Model	Description dia. x depth
H-3942	8" x 4" high (203 x 101mm) with No. 200 replaceable mesh disk
H-3943	8" x 6" high (203 x 152mm) with No. 200 replaceable mesh disk
H-3942FS325	8" x 4" high (203 x 101mm) with No. 325 replaceable mesh disk
H-3943FS325	8" x 6" high (203 x 152mm) with No. 325 replaceable mesh disk
H-3942.200	No. 200 replacement mesh disk
H-3942.325	No. 325 replacement mesh disk

Corps of Engineers Wash Screen Assembly— H-3948

Unit is used to wash out fines from samples of base coarse materials. Assembly has 10 to 12 lb. (4.5 to 5.4kg) capacity. Includes 12" (305mm) dia. brass frame with No. 200 mesh detachable screen with a coarser mesh backing at the bottom. Sieve is 10" deep (254mm) with an overload screen at midpoint. Sieves easily disassembles to clean and replace mesh. Ship wt. 112 lbs. (51kg)

No. 10 Overload Screen for H-3948— H-3948M10

Replacement No. 200 Mesh for H-3948— H-3948M200



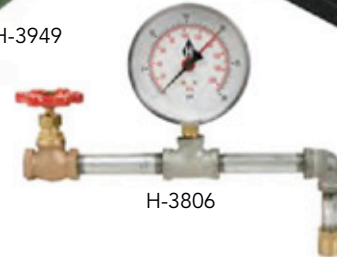
H-3807

H-4328
H-4328.2 Bucket and
Sieves (not included)

H-3949



H-3880



H-3806

Cement Wet Washing Sieves

Stainless steel mesh sieves with nickel-plated brass frame and legs for support when drying on hot plates. Legs are quick and easy to remove to facilitate mesh replacement.

Model	Description
H-3807	2" x 3" high (52 x 76mm) with No. 325 replaceable mesh
H-3804	3" x 3-1/2" H (76 x 89mm) w/ No. 200 replaceable mesh
H-3809	4" x 4-1/2" H (102 x 114mm) w/ No. 325 replaceable mesh
H-3807.325	2" dia. No. 325 replacement mesh disk
H-3804.200	3" dia. No. 200 replacement mesh disk
H-3809.200	4" dia. No. 200 replacement mesh disk
H-3807.4	Replacement Leg
H-3807.5	Replacement Screw

All Wet Washing Sieves are available from 50-400 mesh.
Call 1-800-544-7220 to order mesh not listed.

Wet/Dry Sieve Shaker, 120V 60Hz— H-4328**Wet/Dry Sieve Shaker, 220V 50Hz (see note)— H-4328.5F**

Lightweight cast aluminum, electrically operated portable sieve shaker is designed for use with one or two 8" diameter full-height or four half-height testing sieves. Used for wet or dry screening of solid particles. When placed over a bucket or sink, the unit provides the necessary shaking motion and frees the operator from a fatiguing task.

The sieve shaker has the advantage of being portable for making dry, gross separations and is convenient in making reproducible wet separations. The sieves are held firmly in place by a friction fit of the sieve's nesting ring, so a pan having a nesting ring can be used in lieu of one sieve. All PVC coated, 115v/60hz for intermittent duty, 3-wire cord and plug, on-off switch, and a neoprene wet- protective motor cap. Shipping Wt. 12 lbs. (5kg).

H-4328.5F includes a H-4328.1 220V 50Hz Transformer.

5 Gallon Bucket for H-4328— H-4328.2

Bucket is notched to securely hold the H-4328 Sieve Shaker in place.

Wet Washing Sieve Apparatus— H-3806

Controls spray and water pressure. Includes valve, pressure gauge, piping and H-3808 spray nozzle. Complies with ASTM C430, D1514; AASHTO T192; Test Standard No. 158 (Method 211)

Replacement Spray Nozzle— H-3808**Replacement Gauge— H-3806.1****Aggregate Washer, 115V 60Hz 1ph— H-3949****Aggregate Washer, 230V 50Hz 1ph— H-3949.5F**

Aggregate washer with 15lb. capacity (6.8kg) removes clay, aggregate particles and water-soluble materials by the decanted wash water. Specimen is agitated sufficiently to completely separate all particles. Revolving drum is 10-3/4" dia. x 13"D (27 x 33cm) and locks in four angle positions. Includes valve and 3/8" goose-neck water tube. O.D. 30" x 20" x 32" H (76 x 51 x 81cm). Complies with ASTM C117. **Order USA Standard Sieve, 200 mesh separately.**

Ship wt. 115 lbs. (52.2kg)

Table-Top Aggregate Washer, 120V 60Hz— H-3880**Table-Top Aggregate Washer, 230V 50/60Hz— H-3880.4F**

This lightweight, table-top Aggregate Washer has a capacity of 8lb (3.6kg) is designed to be located near the sink drain on a laboratory countertop. The easily removable drum that measures 9" diameter by 10-3/4" deep (229 x 273mm) is manufactured from stainless steel for rust and corrosion resistance. With the drum mounted in its fixed tilted position, the complete unit weighs only 25 lbs. (11.3kg). In operation, the washer applies a gentle agitation to the sample in the revolving drum until all particles are washed, separated and the overflow water runs clear. The unit is supplied complete with a permanent water connect with regulator valve, tubing, saddle valve, stainless steel goose-neck water tube with swivel connection and a 6-ft. power cord with GFCI plug for operator safety. Complies with ASTM C117.

Ship wt. 40 lbs. (18.1kg)

Sieves for use with Aggregate Washers (ASTM C117)

Model	Description
H-3920FS200	Standard, Full Height, No. 200 Mesh, 8" dia. Sieve
H-3912FS200	Standard, Full Height, No. 200 Mesh, 12" dia. Sieve
H-3920FS16	Standard, Full Height, No.16 Mesh, 8" dia. Sieve
H-3912FS16	Standard, Full Height, No. 16 Mesh, 12" dia. Sieve



Micron Air-Jet Sieve Shaker, 120V 60Hz — H-4334

Micron Air-Jet Sieve Shaker, 230V. 50/60Hz — H-4334.4F

Effective single sieve for dry powders, fragile samples or material that can't be wet sieved, Micron air-jet sieve shaker uses 200mm dia. sieve drums, with 2mm to 20µ particle size range. Unit adapts to 75mm diameter electro-formed sieves in 90mm drums for 45µ to 5µ. Timer and vacuum controls allow reproducibility of the results. Filter attachment, micromesh sieve or cyclone collector accessories may be used to recover fines. Includes 200mm cast aluminum sieve drum housing unit, Plexiglas lid, 15W slotted brass air nozzle, 0-15 minute rotary timer switch, 1HP vacuum power system, gauge and 9.5 gal. recoverable capacity, steel filter canister. Sieves are not included. Accessories and air-jet sieve drums are available; call for details and pricing.

Shipping Wt. 110 lbs. (50kg). 115V. 60Hz

Micron Air-Jet Sieves

For use with Air-Jet sieving systems. Stainless steel frame and cloth mesh. 7-7/8" dia. (200mm) frame with rubber seal. Overall height: 1-3/4" (44.5mm). Depth to cloth: 1-1/8" (28.6mm). Each sieve supplied with serial number and matching "Test Sieve Certificate" for traceability. Complies with ASTM E11.

U.S. Std. Mesh	Micron	Model	U.S. Std. Mesh	Micron	Model
No. 8	2360	H-4335F8	No. 80	180	H-4335F80
No. 10	200	H-4335F10	No. 100	150	H-4335F100
No. 12	1700	H-4335F12	No. 120	125	H-4335F120
No. 14	1400	H-4335F14	No. 140	106	H-4335F140
No. 16	1180	H-4335F16	No. 170	90	H-4335F170
No. 20	850	H-4335F20	No. 200	75	H-4335F200
No. 25	710	H-4335F25	No. 230	63	H-4335F230
No. 30	600	H-4335F30	No. 270	53	H-4335F270
No. 35	500	H-4335F35	No. 325	45	H-4335F325
No. 40	425	H-4335F40	No. 400	38	H-4335F400
No. 45	355	H-4335F45	No. 450	32	H-4335F450
No. 50	300	H-4335F50	No. 500	25	H-4335F500
No. 60	250	H-4335F60	No. 635	20	H-4335F635
No. 70	212	H-4335F70			

Specific Gravity and Fine Aggregate Kit, 120V 60Hz— H-3373A

Same Kit as above, 230V 50/60Hz— H-3373A.4F

Kit designed to provide you with the major equipment to do specific gravity and absorption of fine aggregate testing. The kit includes a H-3360 Conical mold and tamper; H-3381 Pycnometer Top and 1 Qt. (.95L) glass jar, HB-4533A .1g readability, 2600 gram scale; H-30120 Lab Oven, and H-3966 3/4" (19mm) sample splitter. Complies with ASTM C128, AASHTO T84. Shipping wt. 95 lb (43kg)

Conical Mold and Tamper— H-3360

Used for determination of bulk and apparent specific gravity and absorption of fine aggregate, brass mold is 40mm ID at top, 90mm ID at bottom, 75mm high. Steel tamper weighs 12 oz (340g) and has 1" dia. (25mm) flat circular tamping face. Complies with ASTM C128; AASHTO T84.

Conical Mold Only— H-3361

Tamper Only— H-3362

Pycnometer Top and Glass Jar— H-3381

Pycnometer top and 1qt. (.95L) glass jar set for determining specific gravity of fine aggregate. Top is spun brass with 3/8" (10mm) hole in one end; threaded end fits 1- or 2-qt. (1 or 2L) glass jar. Includes rubber gasket that fits on jar mouth to prevent fine particles from becoming deposited in the threads. Complies with ASTM C128. Order jars separately.

Glass Jar— H-3380.2

1qt. (.95L) glass jar. Complies with ASTM C128.

Pycnometer Top Only— H-3380

**Specific Gravity Bench Set, 120V 60Hz— H-2713A****Specific Gravity Bench Set, 220V 50/60Hz— H-2713A.4F**

Our specific gravity weighing kit includes our deluxe bench, our H-2712 Specific gravity tank kit with heater and circulating pump and our HB-4537AWB scale— a 20,000g x .1g readability scale with weigh-below feature.

The bench is 46" (1168mm) tall with a 31" x 25" (787 x 635mm) platform top, which includes a hole to accommodate the weigh-below scale feature; and, a crank-operated shelf that lets you bring the water tank up to the sample, making for easier sample immersion.

The H-2712 tank kit is comprised of a 30 gal. (113.5L) polyethylene tank, which measures 18" x 24" x 18" (457 x 610 x 457mm) and comes with a drain valve and overflow port. It also comes with a 200-watt, durable tank heater and a circulating pump, both of which are attached to a stainless steel mounting bracket that holds both securely to the tank. Kit is shown with optional H-3371 wire basket.

Specific Gravity Bench with Tank— H-2710A

Specific gravity bench with hole to accommodate hook for weigh-below scales; and, a crank-operated shelf that lets you bring the water tank up to the sample, making for easier sample immersion. Includes 30 gal. Polyethylene tank, which measures 18" x 24" x 18" (457 x 610 x 457mm) with drain valve and overflow port.

Shipping Wt. 130 lbs. (59kg).

**Specific Gravity Tank w/
Heater/Circulator, 120V 60Hz— H-2712A****Tank w/ Heater/Circulator, 220V 50/60Hz— H-2712A.4F**

30 gal. (113.5L) polyethylene tank, which measures 18" x 24" x 18" (457 x 610 x 457mm) and comes with a drain valve and overflow port. It also comes with a H-2712A.6, 200-watt, durable tank heater and circulating pump, both of which are attached to a stainless steel mounting bracket that holds both securely to the tank.

Complies with ASTM C127.

Heater/Circulator Assembly, 120V 60Hz— H-2712A.6**Heater/Circulator Assembly, 220V 50/60Hz— H-2712A.6.4F**

Comprised of a 200-watt, durable tank heater and circulating pump attached to stainless steel bracket that hangs on specific gravity tank to maintain constant temperature bath.

Sample Container— H-3351

For use in testing aggregate soundness, container is used to immerse samples of coarse aggregate in solution and then transfer samples to oven for uniform drying in minimum time. No. 4 wire mesh, bottom soldered to frame after fabricating. Overall dimension: 10" x 4" dia. (254 x 102mm) with 1/8" (3mm) round wire handle. Complies with ASTM C88; AASHTO T104.

Sample Container— H-3353

Used to immerse samples of coarse aggregates in solution and transfer samples to oven. #8 stainless steel wire mesh, bottom soldered to frame after fabricating. Overall dimension: 5-1/2" x 4" dia. (140 x 102mm). Complies with ASTM C88; AASHTO T104. Shipping wt. 6 lbs. (2.7kg)

Specific Gravity Basket— H-3371

Stainless steel No. 8 wire mesh basket features reinforced construction and bail-type handle. Dimensions: 8" x 8" dia. (203 x 203mm). Complies with ASTM C127. Shipping wt. 9 lbs. (4kg)

8" Specific Gravity Sieve #4— H-3355**12" Specific Gravity Sieve #4— H-3356**

Designed for use in specific gravity test applications. Heavy-gauge brass construction.

Hollow Tube Specific Gravity Cradle— H-2715

Through this unique, yet simple stainless steel hollow tube designed, water displacement is virtually eliminated for improved accuracy in specific gravity test applications.

Utility Bucket— H-3372

Heavily galvanized utility bucket has wire-reinforced top edge, bail-type handle and 14-qt. (13L) capacity. Complies with ASTM C127.



Specific Gravity Flask for Fine Aggregate— H-3383F
Specific Gravity Flask for Larger Aggregate— H-3383L

The Phunque Flask is the key element in a newly developed method for conducting specific gravity/absorption determinations for aggregate. This method has been designed to eliminate the inherent guess work built into ASTM C128 and AASHTO T84— the current cone and tampo methods in use today. The new test is easy to perform, easy to understand and easily reproducible between technicians and labs. The test is very easy to run and can be reliably run in the field. This can be especially helpful in asphalt operations where specific gravities can make a big impact on pay factors. This test lets the contractor check specific gravities on the material he is currently using, not lab tests, which may not be current. The H-3388F is for fine aggregate and has a neck approximately 1" in diameter. The H-3388L is used for coarse aggregate and has a neck approximately 2" in diameter. The scale on both items is readable to 0.1 grams; Both include an excel calculation sheet and a swabbing utensil to keep the neck of the flask dry during loading.

H-3383F: Shipping Wt. 12 lbs. (5kg).
 H-3383L: Shipping Wt. 15 lbs. (7kg).

Specific Gravity Flask (Le Chatelier)— H-3400

For determining density of powdered materials—limes, slag and hydraulic cement. Capacity: 250ml. Neck is graduated from 0 to 1ml and from 18 to 24ml. Flask is accurate to .05ml. Complies with ASTM C188; AASHTO T133. Shipping Wt. 2 lbs. (1kg).

Specific Gravity Flask (Chapman)— H-3460

Flask has two bulbs for determining approximate percentage of voids and surface moisture in fine aggregates. Graduated to 200ml between bulbs and from 375ml up to 450ml (in 1ml divisions) above second bulb. Complies with ASTM C70; AASHTO T142. Shipping Wt. 2 lbs. (1kg).

Specific Gravity Bottles (Pycnometers)

Adjusted bottle for routine commercial testing, fitted with ground-in perforated stopper. Capillary vent stopper design allows stopper to be inserted to fixed depth in the bottle's neck. Small hole in center of stopper allows emission of air and surplus water. Volume of the bottle has been adjusted at 20°C. Complies with ASTM D854; AASHTO T100.

- Specific Gravity Bottle, 25ml— H-3385**
- Specific Gravity Bottle, 50ml— H-3386**
- Specific Gravity Bottle, 100ml— H-3387**

Hubbard 24ml Specific Gravity Bottle— H-2640

Hubbard-form 24ml bottle for determination of specific gravity of semi-solid bituminous materials, asphalt cements, soft tar pitches and emulsions. Features ground-in stopper with 1.6mm hole. Complies with ASTM D70, D115, D1963; AASHTO T228.

Hubbard-Carmick Specific Gravity Bottle— H-2660

Modified 24ml, wide-mouth Hubbard-Carmick, Erlenmeyer-style bottle allows easy filling and cleaning and is very stable. Meets ASTM D70, D115, D2343; AASHTO T228, T43

Volumetric Flasks

Glass flasks used in specific gravity determinations are calibrated to contain rated capacity at 20°C within permissible tolerance. Available stoppered or unstoppered. Complies with ASTM D854; AASHTO T100.

Volumetric Flasks	Model
100ml, unstoppered volumetric flask	H-3391
250ml, unstoppered volumetric flask	H-3392
500ml, unstoppered volumetric flask	H-3393
250ml, stoppered volumetric flask	H-3394
500ml, stoppered volumetric flask	H-3395



H-4967
(includes pelican case)



H-4965A



H-4966



H-4972

Speedy® 2000 Moisture Tester (20g)—H-4967

Speedy® 2000 Moisture Tester (6g)—H-4968

The Series 2000 Speedy moisture tester is a portable system for measuring the moisture content of a wide range of materials including soils, aggregates, dust and powders (and liquids). The system consists of a low pressure vessel fitted with a pressure gauge and an electronic scale and test accessories. Moisture measurements are made by mixing a weighed sample of the material with a calcium carbide reagent in the sealed pressure vessel. The reagent reacts chemically with water in the sample, producing acetylene gas that in turn increases the pressure within the vessel. The pressure increase in the vessel is proportional to the amount of water in the sample, the moisture content can be read directly from the calibrated pressure gauge. The tester is supplied complete with heavy-duty plastic carrying case, electronic balance, beaker, cleaning cloth, cap, washer, scoop, steel pulverizing balls and cleaning brushes. Complies with ASTM D4944 and AASHTO T217. Ship wt. 13 lbs. (5.9kg). **See Warning Below.**

Accuracy: Within 0.5% on most materials

Test Speed: 45 sec. to 3 min., depending on material

Gauge: Calibrated from 0-20% moisture based on wet weight

Balance: Electronic; 0-7 oz (0-200g) range; battery operated

Calibration Kit, Speedy Tester—H-4965A

A self-contained unit designed to enable an operator to check the accuracy of the Speedy Moisture Tester. The unit is comprised of a master dial, integral air pump, control connections and tools for checking gauge accuracy and pressure leaks, with instructions for simple re-calibrations. Includes case. Shipping wt. 20 lbs. (9kg)

Moisture Tester Reagent—H-4966

Calcium carbide reagent for Speedy® Moisture Testers. Carton of 24-1 lb. (0.5kg) containers. Shipped via motor freight only.

See Warning Below. Ship wt. 26 lbs. (11.7kg)

Trident Moisture Probe—H-4972

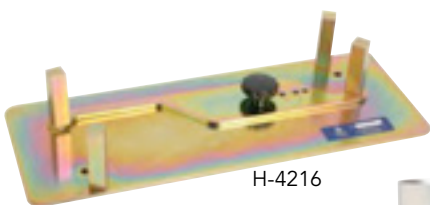
The H-4972 Trident Moisture Meter utilizes the latest microwave and microprocessor technology to measure moisture content in various fine and coarse-grained materials. The prongs of the probe are inserted into the material to be tested and the percentage of moisture content is instantaneously shown on the easy to read display. The Trident comes calibrated for both sand and aggregate, and can be programmed by the user for up to ten different materials. The Trident can store more than 150 readings – complete with time and date for future reference.

HAZARDOUS WARNING:

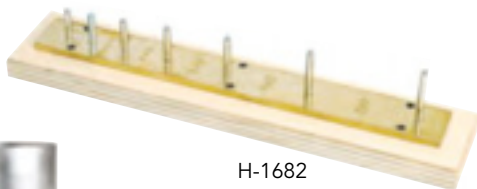
Danger of explosion/fire may result if Moisture Testing Reagent is allowed contact with moisture. Calcium carbide forms flammable acetylene gas when wet so it must be kept sealed and dry. Provide adequate ventilation and use away from sparks and flame.

U.S. shipping regulations require ground shipment for Speedy Moisture Testers. H-4966 reagent carton must go truck shipment and incur extra charge for hazardous goods handling

International shipping regulations require separate purchase of reagent, which requires "dangerous goods" papers and packing. For this reason, Speedy Moisture Testers for International orders do not contain reagent, order separately.



H-4216



H-1682



H-1684



H-1680A



H-1686



H-3420



Flakiness Sieves

Proportional Caliper Device— H-4216

Use to determine the percentage of flat particles, elongated particles, or both flat & elongated particles in coarse aggregates. Steel construction for strength & durability, plated for corrosion resistance. 6" x 16" (152.4 x 406.4mm) base plate with four rubber feet for stability, and for convenience in tabletop testing. Ratio desired is obtained by selecting one of four adjustable positions: 2 = 1:2; 3 = 1:3; 4 = 1:4; or 5 = 1:5. Meets ASTM D4791. It is recommended that the desired procedure be reviewed carefully prior to conducting the test. Complies with ASTM D4791. Ship wt. 8 lbs. (4kg)

Elongation Index for Classification of Aggregate Particles— H-1682

For determining elongation index. Particle is elongated when its length (longest dimension) is more than 1.8 of the midsize of the sieve fraction. Aggregate to be classified is separated into seven sieve fractions from 63 to 6.3mm, and each fraction is examined separately. Six labeled openings between pairs of metal pins measure particle from each of the six sieve cuts below 50mm. The mass of all elongated particles (failing to pass between pins) as percent of the sample is the elongation index. Complies with BS 812. Ship wt. 3 lbs. (1kg)

Void Content Apparatus, Fine Aggregates— H-1680A

Use to determine the uncompacted void content of a fine aggregate sample. Indicates the angularity, sphericity, and workability of fine aggregate in a mixture. Includes 100 ml brass cylindrical measure, funnel assembly, funnel stand, and glass plate for calibration. Complies with ASTM C1252, AASHTO TP33. Ship wt. 10 lbs. (4.5kg)

Scratch Hardness Tester— H-3420

Determines quantity of soft particles in coarse aggregates on basis of scratch hardness. Apparatus consists of 1/16" (1.6mm) dia. brass rod with rounded point inserted into plunger. Overall weight of brass point and plunger is 2 ±0.1 lbs (8.9 ±0.4N). Plunger is mounted on support stand, permitting plunger to lower and raise freely. Furnished with one extra brass scratch rod. Complies with ASTM C851. Ship wt. 9 lbs. (4kg)

Brass Rod— H-3421

For use with H-3420. Package of 10.

Void Content Apparatus, Coarse Aggregates— H-1686

Used to determine the void content of uncompacted coarse aggregates used in HMA applications. When used on aggregates of a known size, the void content provides the user with an indication of the angularity, sphericity and surface texture as compared to other coarse aggregates of the same grading. In operation, the aggregate is allowed to free-fall 115mm from the funnel bottom into a 154mm diameter by 160mm high cylindrical measure. The excess heaped aggregate is struck using the included bar, the mass is measured, and the void content is computed. The apparatus consists of a stainless steel hopper, stand, measure and strike-off bar and a 170mm square glass plate for calibration of the measure. Complies with AASHTO TP56. Order overflow pan and material handling scoop separately.

Flakiness Gauge for Classification of Aggregate Particles— H-1684

For determining flakiness index. Particle is flaky when its thickness (smallest dimension) is less than 0.6 of the mid-size of the sieve fraction. Gauge has seven labeled slots for rapid hand trying of particles from each of the seven sieve cuts. The mass of all flaky particles (passing appropriate slots) as percent of the sample is the flakiness index. Complies with BS 812.

Flakiness Sieves

Model	Width	Length	Passing	Retained
H-4392.4.9	4.9mm	30mm	10mm	6.3mm
H-4392.7.2	7.2mm	40mm	14mm	10mm
H-4392.10.2	10.2mm	50mm	20mm	14mm
H-4392.14.4	14.4mm	60mm	28mm	20mm
H-4392.19.7	19.7mm	80mm	37.5mm	28mm
H-4392.26.3	26.3mm	90mm	50mm	37.5mm
H-4392.33.9	33.9mm	100mm	63mm	50mm



H-3860



H-3860.100



HM-4100



HM-4100.2

Los Angeles Abrasion Machine, 120V 60Hz— H-3860**Los Angeles Abrasion Machine, 220V 50Hz— H-3860.5F**

Tests for resistance to abrasion in crushed rock, slag, crushed and uncrushed gravel, using Los Angeles testing method. Features welded structural steel frame, fabricated 1/2"-thick (913mm) abrasion-resistant steel drum, removable shelf bolted to drum and balanced drum assembly for easy rotation by hand. Enclosed chain drive rotates drum without conventional slip clutch. Positive drive delivers greater accuracy. Self-contained worm-drive motorized speed reducer has anti-friction bearings and sealed lubrication. Motor is 1HP (746W), equipped with magnetic push-button control and automatic overload cutout. Includes revolution counter, material catch pan and 1 abrasion charge consisting of 12 hardened-steel balls. Dimen.: 39" x 29" x 37" (991 x 737 x 940mm). Complies with ASTM C131, C535; AASHTO T96.

Shipping wt. 1060 lbs. (485kg) 

Abrasion Charge—H-3865


Replacement abrasive charge for H-3860 Los Angeles Abrasion Machine. Consists of 12 hardened-steel balls.

Ottawa Silica Sand— H-3820

Specially graded, natural Ottawa silica sand will pass a No. 20 (850 μ) sieve and be retained on a No. 30 (600 μ) sieve. Specific gravity is 2.65. Packed in 50 lb. (22.7kg) bags. Complies with ASTM C778.

Shipping wt. 50 lbs. (22.7kg)

Sound Enclosure For LA Abrasion Machine— H-3862

Full enclosure designed to cut down on noise generated will using the LA Abrasion Machine. Unit is Steel Construction with Foam Lining for noise reduction. Shipping wt. 305 lbs. (138kg) 

Slake Durability Apparatus, 120V 60Hz— HM-4100**Slake Durability Apparatus, 220V 50Hz— HM-4100.5F**

The Slake Durability Apparatus is used to determine the durability of rocks and the probable amount of deterioration of weak rocks, over a period of time, after simulated exposure to nature's continual wetting and drying cycles. The apparatus consists of a base-mounted motor drive unit with two mesh drums and two water tanks with quick-release drive assemblies. The drums rotate at a speed of 20 revolutions per minute. Options include two extra drums and tanks for running up to four tests simultaneously. Complies with ASTM D4644 standard.

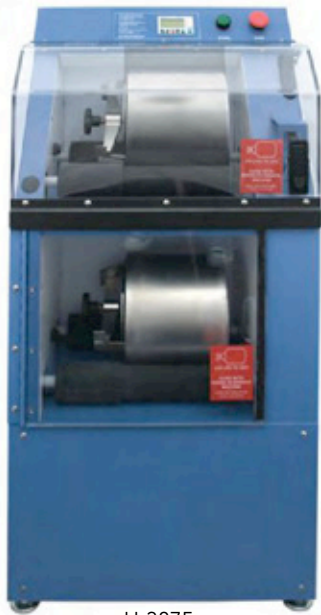
Shipping wt. 70 lbs. (32kg)

Wire Mesh Drums— HM-4100.1

Set of 2 wire mesh drums for use with Slake Durability Apparatus.

Drum and Tank Assembly— HM-4100.2

Set of two wire mesh drum and water tank assemblies.



H-3875



H-3875.1

H-3875.2



HP-1160

Micro-Deval Apparatus, 120V 60Hz— H-3875

The Micro-Deval test measures abrasion resistance and durability of mineral aggregates. An aggregate sample is placed in a sealed stainless steel jar with an abrasive charge of up to 5,000g of 9.5mm diameter stainless steel balls and water, then rotated at 100rpm for two hours. Aggregate quality is determined by percentage loss in gradation results at completion. Smaller equipment size, lower sample quantities and a simpler procedure make the method easier and less costly to perform than traditional methods.

The H-3875 Complies with current ASTM, AASHTO and Canadian standards, as well as the more stringent Texas DOT requirements. The H-3875 Micro-Deval Apparatus is a second generation, state-of-the-art machine. A sophisticated electronic controller with optical sensing system accurately tracks test time, total revolutions and rpm of jars. Test duration may be controlled by either elapsed time or total revolutions. Jars stop within a fraction of one revolution at test termination. Jar revolution and speed data may also be used as a verification of machine performance.

The jars revolve behind closed Lexan™ doors with safety interlocks. Other manufacturers use separate timers to control test duration, which does not permit tracking of jar revolutions or speed and allows variations up to ±6% of the optimum number of revolutions. In addition, other machines spin the jars on unguarded open rollers, creating a potentially hazardous situation.

The Micro-Deval machine is a two-tier unit with sturdy steel frame. Each tier carries one stainless steel 5L jar, 194mm ID, 170mm internal height with locking cover. Power to the rubber-covered rollers is supplied by a 3/4hp, 115V/60Hz electric motor through a gear transmission and chain drive. The unit is supplied with two jars and two 5,500g abrasive charges. A magnet is included to assist in removing the abrasive charge after the test is complete. Overall Dimensions: 20.5 x 13.5 x 38" (521 x 343 x 965mm). Shipping wt. 110 lbs. (107kg)

220V version is not available

Slightly different equipment meeting European Standard EN 1097-1 is also available and will be quoted upon request.

Micro-Deval 5L Jar— H-3875.1

For additional sample preparation capacity and greatly reduced testing times, order additional Jars.

Micro-Deval Abrasive Charge— H-3875.2

For additional sample preparation capacity and greatly reduced testing times, order additional Abrasive Charges.

Order required sieves separately in 8in (page 200), 12in (page 201) or 200mm (page 204) diameters as desired. Required Mesh sizes to comply with ASTM and AASHTO Specifications:

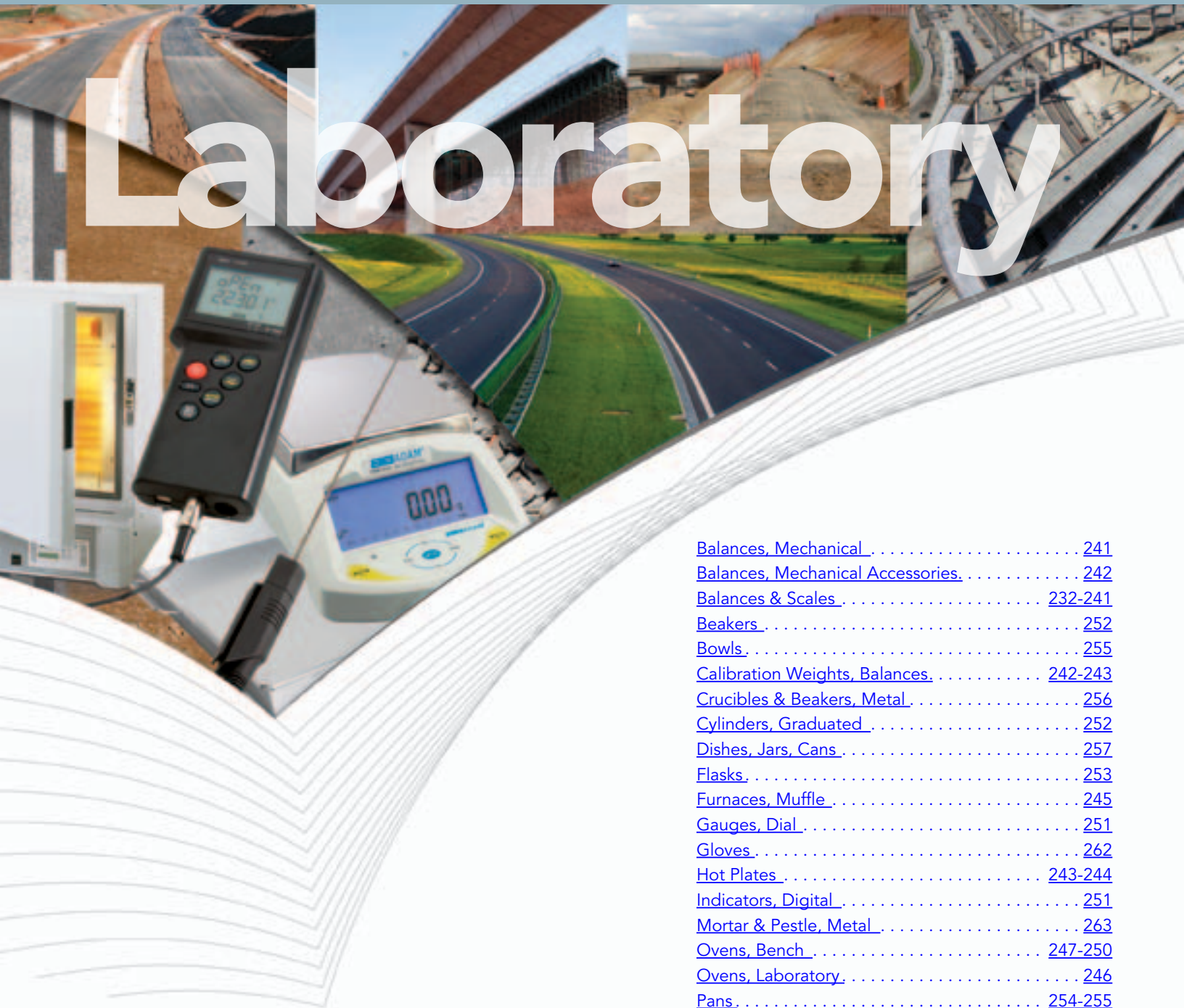
Coarse Aggregate	Fine Aggregate
3/4"	No. 4
5/8"	No. 8
.530"	No. 16
3/8"	No. 30
.265"	No. 100
No. 4	No. 200
No. 16	

See separate listing for wet sieving accessories, useful for washing sample over sieves at completion of abrasion cycle, page 209.

Falling Sand Abrasion Tester— HP1160

The Falling sand test determines the abrasion resistance of coatings, such as paint, varnish, lacquer and related products. The test panel is enclosed in a receptacle with a window. Ottawa natural silica sand is considered the standard use in this test because of its known characteristics. Order H-3820 Ottawa silica test sand separately. Complies with ASTM D333, D968, D1395, D2205. Shipping wt. 110 lbs. (49.9kg)

Laboratory



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Testing Equipment for



Construction Materials

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H-3580

Shown with optional protective, rubber armor and built in stand

H-3582

HT-3513

HT-3523

HT-4795
Shown with Probe,
not included

Data logging, Digital Thermometer w/2 K Thermocouples— H-3580

Data logging, Digital Thermometer for up to 2000 points. Allows time-and-date stamp for advanced data analysis. Dual thermocouples provide simultaneous readings. Push-button, menu-driven operation provides easy setup and use.

Digital Thermometer w/ K-Type Thermocouple— H-3582

Universal temperature monitoring thermometer with countdown timer and audible alarms. Can switch update rate between 1 and 10 seconds. Comes with splash-proof pouch.

Wrap & Stow Thermocouple Thermometer— HT-3513

This instrument/probe system delivers $\pm 0.9^\circ\text{F}$ accuracy and probes can be replaced in the field without the need for recalibration. The heavy-duty patented probe cable is reinforced with Kevlar[®] and a metal braid that neatly wraps and stows around the instrument.

Wrap & Stow Thermocouple Thermometer— HT-3523

This instrument/probe system delivers $\pm 0.9^\circ\text{F}$ accuracy and probes can be replaced in the field without the need for recalibration. The heavy-duty patented probe cable is reinforced with Kevlar[®] and a metal braid that neatly wraps and stows around the instrument. Also, backlight LCD screen and Hold button.

Precision, Hand-held Calibration Thermometer— HT-4795

The HT-4795 precision hand-held thermometer is a 2-channel instrument that has a resolution of 0.001°C with a system accuracy of $\pm 0.015\text{K}$. It provides an excellent calibration reference for your other thermometers. Simultaneous display of two measured values or differential. Records minimum, maximum, hold and average values. Integrated calibration function (according to EN60751 up to 14 points) Password protected calibration function. For 3-point calibration certification, order HT-4795C.

For 6" Probe, order HT-4795.1
For 12" Probe, order HT-4795.2

Model	H-3580	H-3582	HT-3513	HT-3523	HT-4795
Type	Dual Inputs, Data logging (2000 points), Digital Thermometer	One K-type Input Digital Thermometer	Wrap & Stow Thermocouple Thermometer	Wrap & Stow Thermocouple Thermometer	Precision, Hand-held Calibration Thermometer
Features	(2) Standard K-Probes, Data logging of up to 2000 Points, Menu-Driven Operation, USB Output, Min/Max Temperature Display	(1) Standard K-Probe, Push Button Operation, $^\circ\text{F}/^\circ\text{C}$ Selectable, Min/Max Temperature Display, Hold Function	$^\circ\text{F}$ and $^\circ\text{C}$ switchable, Wrap & Stow, replaceable Thermocouple. Large, Easy-to-read LCD screen, IPX7 waterproof	$^\circ\text{F}$ and $^\circ\text{C}$ switchable, Wrap & Stow, replaceable Thermocouple. Large, Back-light LCD screen, Hold Button, IPX7 waterproof	High Precision Accuracy, 2-channel measurement, Max./Min., USB Interface, DataLogger to 4000 measurements, ISO cert.
Probe	Type-K, J, T, E, R, S, B	One Type-K	DuraNeedle Probe included	DuraNeedle Probe included	Order Probes Separately
Range	-418 to 2501 $^\circ\text{F}$ -250 to 1373 $^\circ\text{C}$	-418 to 2501 $^\circ\text{F}$ -250 to 1373 $^\circ\text{C}$	-100 $^\circ$ to 500 $^\circ\text{F}$ -73 $^\circ$ to 260 $^\circ\text{C}$	-100 $^\circ$ to 500 $^\circ\text{F}$ -73 $^\circ$ to 260 $^\circ\text{C}$	-328 $^\circ$ to 1562 $^\circ\text{F}$ -200 $^\circ$ to +850 $^\circ\text{C}$
Resolution	0.01 $^\circ$ or 0.1 $^\circ\text{F}/^\circ\text{C}$ auto ranging to 0.1 $^\circ$ above 99.99	0.1 $^\circ\text{F}/^\circ\text{C}$ between -1999.9 $^\circ$ and 999.9 $^\circ$, 1 $^\circ$ below -199.9 $^\circ$ and above 999.9 $^\circ$	0.1 $^\circ$	0.1 $^\circ/1^\circ$	0.001 $^\circ\text{C}$ from -200 $^\circ\text{C}$ to +200 $^\circ\text{C}$ remaining range 0.01 $^\circ\text{C}$
Accuracy (Type K)	$\pm 0.25\%$ of reading $\pm 2^\circ\text{F}$ ($\pm 1^\circ\text{C}$) below -148 $^\circ\text{F}$ (-99.9 $^\circ\text{C}$), 0.1% of reading $\pm 0.7^\circ\text{F}$ ($\pm 0.4^\circ\text{C}$) above -238 $^\circ\text{F}$ (-150 $^\circ\text{C}$)	Below -238 $^\circ\text{F}$ (-150 $^\circ\text{C}$): $\pm 0.25\%$ of reading $\pm 2^\circ\text{F}$ ($\pm 1^\circ\text{C}$) Above -238 $^\circ\text{F}$ (-150 $^\circ\text{C}$): $\pm 0.1\%$ of reading $\pm 0.7^\circ\text{F}$ ($\pm 0.4^\circ\text{C}$)	$\pm 0.9^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$) total system at ambient temperatures between 68 $^\circ$ to 86 $^\circ\text{F}$ (20 $^\circ$ to 30 $^\circ\text{C}$)	$\pm 0.9^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$) total system at ambient temperatures between 68 $^\circ$ to 86 $^\circ\text{F}$ (20 $^\circ$ to 30 $^\circ\text{C}$)	$\pm 0.015^\circ\text{C}$ from -50 $^\circ\text{C}$ to +199.99 $^\circ\text{C}$ $\pm 0.025\%$ of reading for the remaining range
Stem Length	Various	Various	6 inches	6 inches	Various
Power	(3) AA batteries or optional AC adapter	(3) AA batteries	AAA Batteries	AAA Batteries	9v Battery
Traceable Certificate	order H-3580C	order H-3582C	Available	Available	3-point calibration certification available

See Probes and Accessories on Page 212



Traceable, Wide-range, Memory Thermometer—HT-4007

Wide-range, Memory thermometer, which is °F /°C switchable and accepts all type K, J and T probes. Its backlit large display is easy-to-read in any light and information can be output to a computer. See page 210 for data acquisition software and cable.

Traceable Universal, Alarm Thermometer—HT-4110

Universal temperature monitoring thermometer with countdown timer and audible alarms. Can switch update rate between 1 and 10 seconds. Comes with splash-proof pouch.

Traceable, RTD Platinum Thermometer—HT-4132

One button operation, great for QC and processes. Platinum (100-ohm) 4-wire probe. Has low battery/bad probe indicator and can be output to a computer. See page 210 for data acquisition software and cable.

Traceable, User-Adjustable, 2-Channel Thermometer—HT-4135

Two-channel thermometer with user-adjustable offsets, allows adjustment to specific temperatures, in-house calibration, or different sensors for increased accuracy. Shockproof, rubber case with built-in stand.

case, great for rugged applications. Max and Hold buttons help in operation.

Traceable, Total Range Thermometer—HT-4015

One of the fastest reading and technically advanced thermometers available. Unit is constructed for rugged applications and provides the use of all Type-K probes. It also provides Min/Max capabilities, a 24-hour timer, alarms and a memory function.

Model	HT-4007	HT-4110	HT-4132	HT-4135	HT-4015
Type	Wide-range with Memory Thermometer with Traceable certificate	Universal Thermometer with alarm capability	RTD Platinum Thermometer with Traceable certificate	User-Adjustable, Two-Channel, Offset Thermometer with Traceable certificate	Total-Range, Rough-Use Thermometer with Traceable certificate
Features	°F and °C switchable, Accepts Type K, J or T probes, Min/Max readings, backlit display, count-up timer, Computer output capability	°F and °C switchable, 3/4-inch LCD display, Can monitor temperature continuously for 3 years in 1 or 10 second intervals, Audible alarms with countdown timer 5/8-inch high digits	°F and °C switchable, One-button operation, Low-battery, bad probe indicator, 1/2-inch high digits, Computer output capability	Rubberized instrument case with stand, Velcro wrist strap, user adjustable for in-house calibration, Max temp button, Hold button, uses all Type K thermocouples	Memories, alarms, Timer and Min/Max capabilities, Backlit Display, Protective casing with flip-out stand, °F and °C switchable, 5/8-inch high digits, Hold Button
Probe	Stainless, triple-purpose Type K thermocouple probe for use with soils, liquids, Air/Gas	Stainless, triple-purpose probe for use with soils, liquids, Air/Gas	Platinum, (100-ohm) 4-wire probe for use with soils, liquids, Air/Gas	Supplied with 4', Fast-Response Beaded Probe, Uses all Type K probes	Supplied with 4', Fast-Response Beaded Probe, Uses all Type K probes
Range	-328 to 2498°F -200 to 1370°C	-58 to 500°F -50 to 260°C	-58 to 752°F -50 to 400°C	-58 to 1999°F -50 to 1300°C	-328 to 2498°F -200 to 1370°C
Resolution	0.1° from -200° to 640°C (-328 to 990°F) otherwise 1°	0.1°	0.01° below 200°C and 0.1° above 200°C	0.1°/1°	0.1°/1°
Accuracy (Type K)	±1°C	±1.0°C or 1% of reading	0.1% + 0.2°C below 200°C and ± 0.15% + 0.5°C above 200°C	±0.3% plus 1°C meter	±1°C from -50° to 740°C (-328 to 1364°F) otherwise ±2°C
Stem Length	6 inches	4.25 inches	6 inches	cable length 10'	cable length 4'
Power	9-volt battery	(2) AAA Batteries	9-volt battery (AC adapter available)	9-volt battery	(3) AAA Batteries
Traceable Certificate	Yes, included	Yes, included	Yes, included	Yes, included	Yes, included

See Probes and Accessories on Page 212



Computer Data Acquisition System For HT-4132 Thermometer— HT-4136

Computer Data Acquisition System For HT-4007 Thermometer— HT-4237

Powerful and easy to use computer data capture program for HT-4007 and HT-4132 Digital Thermometers. The software allows connecting up to eight instruments all running simultaneously on one computer. The software captures data in the background, tech for other tasks. Records interval readings from 1 to 10,000 seconds; displays minimum/maximum readings; and utilizes an alarm mode that permits the user to be notified visually, audibly, and by email when an alarm is triggered. Unlimited readings are saved to a file that can be viewed and printed as is, or printed in any report or spreadsheet format. Networking server/client capability allows the captured data to be monitored on a remote workstation. Readings may be streamed to cell phones or anywhere via email every minute or in any time interval. 24/7 notification of audible/visual alarms are sent to user's computer, remote computer, via email anywhere, and by email to cell phones. Program automatically installs in less than two minutes. Absolutely no user programming, no user keystrokes, no user entries are required. Simply connect the cable to the instrument and to a USB port (or serial port) and data is captured. Operation is straight forward plug and play. It is that easy. It is designed to work with Windows® 98/Me/NT/2000/XP/Vista/Windows 7. Includes a CD, a 6-foot cable (supplied USB, serial, and instrument connections) cable plugs into the instrument and computer. Multiple accessory extension cables expand cable length to 300 feet.

Data Logger For HT-4132 Thermometer— HT-4325

Complete DAS-4™ System captures and stores up to 8000 bytes (over 1000 readings). Great for those who want to capture field readings and upload to computer. Readings may be taken at intervals from 1 second to 99 hours. Stored readings may be downloaded to any PC and viewed. Includes Windows CD, a 3-foot cable (supplied USB, serial, and instrument connections). Cable plugs into instrument and computer. Four AA alkaline batteries supplied.



Hand-Held, Digital Thermometer Kit— H-3558D

Heavy-duty design with 3-1/2"-digit LCD display. Range from -58 to 2000°F (-50 to 1093°C). Resolution is 1° F/C. Accuracy is ±0.3% +2°F (1°C) from 32 to 2000°F (1093°C) and ±4°F (2°C) from -58 to 32°F (-50 to 0°C). Dual input thermocouples allow operator to monitor two locations. Other features include hold button, max temperature display and max memory. Supplied complete with removable rubber boot and one type-K 3-1/2" (89mm) stainless steel probe w/handle and 2 K wire probes.

Hand-Held, Digital Thermometer Kit— H-3564

Laboratory accuracy and fast response in a rugged dual-input contact thermometer. Operating Range: -58 to 2000°F (-50 to 1093°C). Kit includes the Fluke 52II thermometer, (4) general purpose bead probes and (2) Sure-Grip™ piercing probes and a case. Can use K, J, T and E probes.

Model	H-3558D	H-3564
Type	Dual Input, Digital Thermometer Kit	Dual Input, Digital Thermometer Kit
Features	(1) Standard K-Probe, Push Button Operation, °F/°C Selectable, Min/Max Temperature Display, Hold Function	(2) SureGrip Piercing Probes, (4) bead probes and Case
Probe	Type-K	Type-K, J, T, E
Range	-58 to 2000°F -50 to 1093°C	-58 to 2000°F -50 to 1093°C
Resolution	1°F/C	0.1 °C/°F/K <1000 and 1 °C/°F/K >1000
Accuracy (Type K)	±0.3% +2°F (1°C) from 32 to 2000°F (1093°C) ±4°F (2°C) from -58 to 32°F (-50 to 0°C)	Above -100°C: J, K, T, E-type: 0.05% Below -100°C: ± 0.3°C
Stem Length	Various	Various
Power	(3) AA batteries or optional AC adapter	(3) AA batteries
Traceable Certificate	order: H-3558D-C	order: H-3564C

See Probes and Accessories on Page 212



IR Gun, Infrared Thermometer, H-3593

Point and shoot simplicity. IR Gun with high-quality 9:1 optics and laser pointer. Reads °C or °F. Backlit display and batteries are included.

Infrared and Type K Thermocouple Combo Gun, H-3599

Infrared and Type K Thermocouple Combo Gun. High-quality 11:1 optics with laser pointer. Fast Response Type-K Probe is included. You also get Max, Min, Hold, Diff, Avg, Hi Alarm, Lo Alarm, backlit display and a °C/°F button.

Mini, Laser Infrared Thermometer, H-3595A

Pocket size, high-quality infrared gun with high-quality 10:1 optics and laser pointer. Operation is simple— aim, press trigger and read the backlit display. Reads °C or °F and has ergonomic grip handle. Uses 9V alkaline or NiCd battery, included.

Heavy-duty, Infrared Thermometer—H-3590

Handheld, and portable, the H-3590 Infrared Thermometer stands up to the day-to-day usage professionals require of their equipment. Features backlit LCD and extra bright laser pointer, making it more

visible in all conditions, especially outdoors. Includes tripod mount, display hold (7 seconds) and is switchable between °F and °C. Uses 9V alkaline or NiCd battery, included.

Wide-Range, Traceable, Infrared Thermometer, H-3591

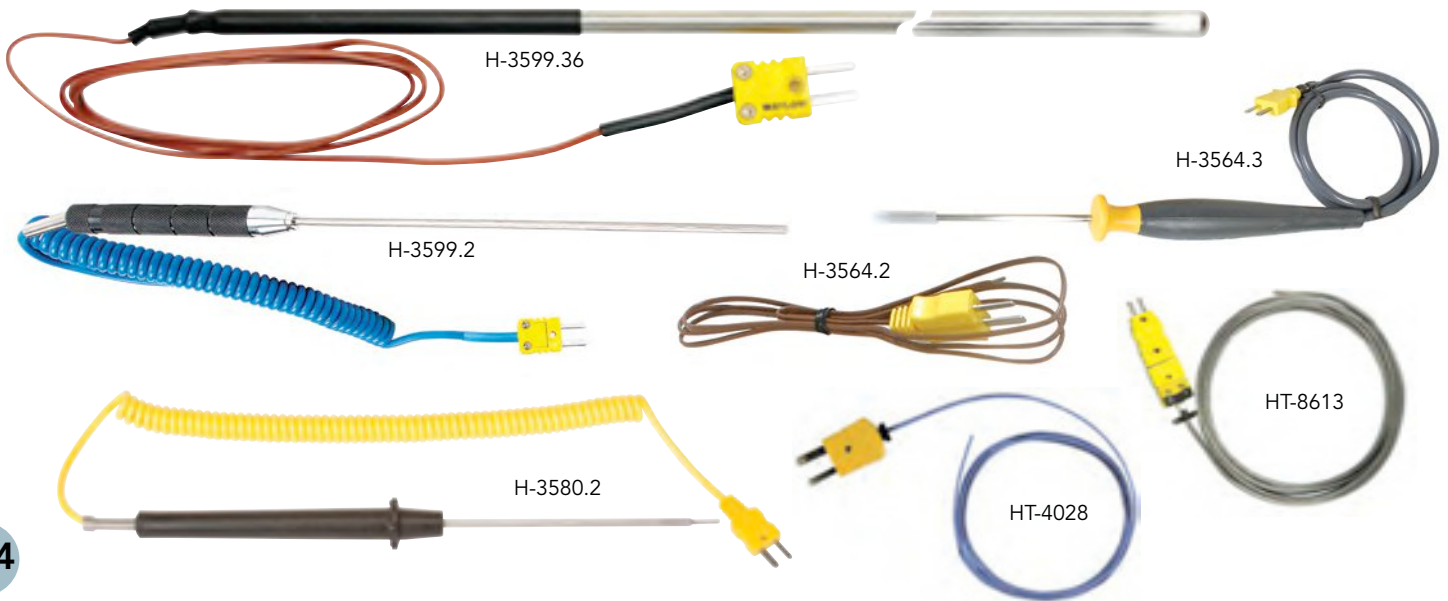
Hand-held and portable, the H-3591 features 50:1 optics and a range of -58 to 1832°F (-50 to 1000°C). This thermometer features a traceable calibration certificate, backlighting at the touch of a button, data hold, low battery indicator and °C/°F button.

Professional Infrared Thermometer—H-3597A

The Professional IR Thermometer is packed full of the features you need to make accurate infrared measurements. The H-3597A shows you exactly the size of your target every time. Its unique dual laser design highlights the outer edges of your target eliminating any guesswork or calculations. With a 50:1 target ratio you can be confident from long distance. It includes data functions like Min, Max, Lock, and Hi/Low alarms. Includes ABS carrying case and two AAA batteries.

Model	H-3590	H-3591	H-3597A	H-3599	H-3593	H-3595A
Type	Infrared	Infrared	Infrared	Infrared	Infrared	Infrared
Probe	none	none	none	One Type-K	none	none
Range	-25 to 999°F (-320 to 535°C)	-58 to 1832°F (-50 to 1000°C)	-76°F to 1832°F, -60°C to 1000°C	IR Gun: -76 to 932°F (-60 to 500°C) Probe: -76 to 1999°F (-60 to 1400°C)	-58 to 750°F (-50 to 400°C)	-20 to 932°F -30 to 500°C
Accuracy	The greater of: ±1% of reading or ±2°F (±1°C), at 73°F (23°C) ambient temp.	0.1° to 200°C	The greater of: ±1.5% of reading or ±2.7°F (±1.5°C), at 73°F (23°C) ambient temp.	IR: 15-35°C: ±1°C, Full Range: ±2%, 2°C Probe: ±0.8%, 1°C	15-35°C: ±1°C, Full Range: ±2%, 2°C	±1°C (2°F) from 50°F to 86°F (10°C to 30°C), ± 1.5% or ± 1.5°C (3°F)
Repeatability	±0.5% of reading or ±2°F (±1°C), whichever is greater	±1.5% +2°C between -20 to 200°C	±1.5% of reading -76°F to 1832°F (-60°C to 1000°C)	0.15°C at 25°C, 0.75°C at 80°C	0.15°C at 25°C, 0.75°C at 80°C	±0.5% of reading or < ±1°C (±2°F) whichever is greater
Optics Target Size	12:1 1" target dia. at 12"	50:1 1" target dia. at 50"	50:1 1" target dia. at 50" Dual-Laser shows target	11:1 1" target dia. at 11"	9:1 1" target dia. at 9"	10:1 1" target dia. at 10"
Traceable Certificate	order: H-3590C	included	order: H-3597C	order: H-3599C	order: H-3593C	order: H-3595AC
Power	9 Volt	9 Volt	(2) AAA	AAA	AAA	9 Volt

See Probes and Accessories on Page 212



K-Probe, 8"— H-3599.2

Eight inch long, K Thermocouple with 4-1/2" metal handle and 40" long coiled cable. Item is standard probe sold with H-3599 IR Gun. Temperature range is: -76°F to 1999°F (-60°C to 1400°C), Accuracy is: ±0.8%, 1°C. Compatible with K-type measurement instruments.

K-Probe, 3 ft.— H-3599.36

Three foot long, K Thermocouple is great for use in asphalt operations where you desire to know material temperatures in hoppers, trucks, piles, etc. Temperature range is: -30 to 1600°F. Heavy duty .250 dia. probe, 36" long with spring transition and 40" of lead wire with mini, type-K plug.

Bead Probe— H-3564.2

40" (1m) wire length with maximum continuous temperature measurement: 500°F (260°C). Accuracy is: ±1.1°C (0-260°C). Fast response time. Not suitable for liquid immersion. Compatible with K-type measurement instruments.

K-Probe, 5"— H-3580.2

5" stainless steel probe with 5 ft. PVC coiled cable and Nylon handle. Measurement range: -418 to 1650°F (-250 to 899°C). ASTM-E230-1993. Compatible with K-type measurement instruments.

K-Probe, 4"— H-3564.3

4" stainless steel probe with 40" (1m) cable. Measurement range: -40 to 662°F (-40 to 350°C). Accuracy is ±3.96°F (2.2°C). ASTM-E230-1993. Compatible with K-type measurement instruments.

Bead Probe— HT-4028

Fast-Response, Type-K thermocouple, beaded probe. Teflon cable can withstand temperatures of -40 to 250°C continuous or 300°C short-term use. Dimensions: 0.06-inch diameter probe with cable length of 4 feet for use with all Type-K thermometers in liquids, air/gas, and semisolids.

High-Temperature Probe— HT-8613

Ten-foot-long 0.19-inch diameter braided metal wire cable with smooth tip measures -73 to 982°C continuous or 1093°C short-term use. For use with all Type-K thermometers in liquids, air/gas, and semisolids

AC-Adapter for HT-4132— HT-4132.2

AC Adapter for use with HT-4132 Datalogging Thermometer on page 221.

Calibration Tester for Thermocouple Instruments— HT-9319

Test and validate the calibration accuracy of Type K thermocouple instruments. The HT-9319 simulates three preset temperatures of 32°F, 100°F and 160°F when plugged into unit. Accuracy is ±0.25°F in ambient conditions 50° to 90°F and 90% RH. Unit is calibrated to NIST Standards. Powered by a 3V Lithium battery, included.



Accessories for H-3580 and H-3582 Thermometers



Optional, Rubber, Protective Armor— H-3580.3 and integral stand allow you to prop the meter up on a bench for easy reading and use.



Optional, Hands-Free Mounting Kit— H-3580.4 allows you to hang a meter from your belt or other object, such as a pipe or stand for ease of use.

Digital Thermometer Accessories:	Model
Rubber Armor w/Built-in Stand For Thermometers Above	H-3580.3
Hands-Free Mounting Kit for Thermometers Above	H-3580.4
Thermocouple, K-Type for Thermometers Above	H-3580.2
AC adapter for H-3580 Datalogging Thermometer	H-3580.6

Other thermocouples are available, please enquire.



H-2727D



H-3543



H-3560D



H-3557D



HT-4142



HT-4105



HT-4107

Temperature/Humidity Instrument- Min/Max—H-2727D

The H-2727D measures both temperature and % Relative Humidity. It features Min/Max memory and switchable °F/°C. Temperature range is: 14° to 140°F / -10° to 60°C at $\pm 2^\circ\text{F}$ / $\pm 1^\circ\text{C}$ accuracy and 0.1°F/°C resolution. Measures 10 to 99% relative humidity at a resolution of 1.0% RH. Includes Min/Max memory capability. Uses (1) AAA battery.

Minimum/Maximum Thermometer— H-3543

Wall or desk-mount minimum/maximum thermometer with remote sensor. Sensor range is -58° to 158°F (-50° to 70°C). Switchable between °F and °C. Indoor/outdoor capabilities: Outdoor Temperature Range: -58 to 158°F (-50 to 70°C) Indoor Temperature Range: 32 to 122°F (0 to 50°C), Temperature Accuracy: $\pm 2^\circ\text{F}/\pm 1^\circ\text{C}$, Sensor cord length: 120" (304cm). Battery: 1 Alkaline 1.5v, AAA

Maximum and Minimum Thermometer— H-3560D

Dual-scale thermometer has U-shaped capillary mounted in plastic 8" x 2-5/8" x 1" (203 x 67 x 25mm) with guard and mounting tab. Ranges: -40°F to 120°F in 2°F div. and -40°C to 50°C in 1°C div. Thermometer indicates present, highest and lowest temperature since last indices setting. Indices are easily reset after each reading.

Digital Thermo-Timer—H-3557D

Versatile, 24-hour lab timer for use with ovens, incubators and other environmental chambers. Includes probe with 48" (1.2mm) long cable. Probe may be placed inside oven door for internal chamber temperature monitoring. Monitors and displays temperatures over a 0 to 200°C range at an accuracy of $\pm 2^\circ\text{C}$. Time and temperature functions may be used separately or simultaneously. Alarm sounds when programmed time or temperature high limits are reached. Display shows remaining time/temperature/high limit set points. Magnet permits mounting on side of oven. Uses "AAA" battery, not included.

Thermo-Timer Probe—H-3557D-P

Replacement probe for H-3557D Thermo-Timer.

Traceable Big Digit, Alarm Thermometer °F—HT-4142

Traceable Big Digit, Alarm Thermometer °C—HT-4143

Large, 1.125" high digits display probe temperatures and ambient temperatures, which can be seen from across a lab. This unique Four-alert Thermometer provides precise monitoring of even the slightest changes in temperature. Range is: -58 to 158°F or -50 to 70°C with a resolution of 0.1° and an accuracy of $\pm 1^\circ\text{C}$. Front panel controls are easy-to-set. Alarms can be set to activate at a temperature above, or below a setting or, between or outside two settings. Comes with traceable certificate of calibration.

Digital Indoor/Outdoor Thermometer °F—HT-4105

Thermometer displays current, minimum, and maximum temperatures. Most importantly, it captures and shows the exact time and date when the minimum and maximum temperature occurred. Ideal for monitoring solutions, refrigerators, and room temperature. Range is -40.0 to 176.0°F and -40.0 to 80.0°C with a resolution of 0.5° and accuracy of $\pm 1.5^\circ\text{C}$. Display's 3/8-inch-high digits show Min/Max of probe temperature or ambient temperature, time-of-day, and month/day. Wire mounting bracket permits easy probe placement. Sensor and 6-foot cable perform accurately even when both are under water. Comes with traceable certificate of calibration.

Digital Indoor/Outdoor Thermometer °F—HT-4107

Large LCD for easy reading of temperatures. Includes Min/Max Memory. External Range is: -58 to 158°F or -50 to 70°C and Inside Range is: 32 to 122°F or 0 to 50°C. Accuracy is: $\pm 2^\circ\text{F}$ or 2% or reading. Probe cable length is 120"/304cm. Uses "AAA" battery, included.



Model No.	Description	Range	Accuracy	Stem Length	Overall	Features
HT-4052	Long-Stem, Digital Thermometer	-58 to 302°F -50 to 150°C	±2.0°F ±1.0°C	8"	11"	Traceable Calibration Certificate
HT-4052U	Long-Stem, Digital Thermometer	-58 to 302°F -50 to 150°C	± 0.2°C	8"	11"	Traceable Calibration Certificate
HT-4353	Longer-Stem, Digital Thermometer	-58 to 572°F -50 to 300°C	±2.0°F ±1.0°C	11.375"	14.375"	Traceable Calibration Certificate
HT-4353U	Longer-Stem, Digital Thermometer	-58 to 572°F -50 to 300°C	± 0.5°C	11.375"	14.375"	Traceable Calibration Certificate
HT-4149	Long-Stem, Multi-Angle Digital Thermometer	-58 to 536°F -50 to 280°C	±2.0°F ±1.0°C	8"	10"	Traceable Calibration Certificate
HT-4149U	Long-Stem, Multi-Angle Digital Thermometer	-58 to 536°F -50 to 280°C	± 0.4°C	8"	10"	Traceable Calibration Certificate
HT-4050	Digital, Pocket Thermometer w/Sheath	-58 to 572°F	± 1.5°C	3.5"	7"	Traceable Calibration Certificate, Hold Button
HT-4050U	Digital, Pocket Thermometer w/Sheath	-50 to 300°C	± 0.4°C	3.5"	7"	Traceable Calibration Certificate, Hold Button
HT-4049	Digital, Jumbo Display Thermometer	-58 to 302°F -50 to 150°C	±2.0°F ±1.0°C	5.25"	6.5"	Traceable Calibration Certificate
HT-4049U	Digital, Jumbo Display Thermometer	-58 to 302°F -50 to 150°C	± 0.3°C	5.25"	6.5"	Traceable Calibration Certificate
HT-4039	Digital, Waterproof Min/Max Thermometer	-58 to 572°F -50 to 300°C	±2.0°F ±1.0°C	4.75"	10ft. cable	Traceable Calibration Certificate, Min/Max, Waterproof
HT-4039U	Digital, Waterproof Min/Max Thermometer	-58 to 572°F -50 to 300°C	± 0.5°C	4.75"	10ft. cable	Traceable Calibration Certificate, Min/Max, Waterproof
H-3538D	Digital, Waterproof Calibratable Thermometer	-40° to 450°F -40° to 232°C	±2.0°F ±1.0°C	5"		Field Calibratable Waterproof. Max Temp.
H-3541D	Digital, Waterproof Calibratable Thermometer	-40 to 450°F -40 to 232°C	±2.0°F ±1.0°C	5"		Field Calibratable Waterproof. Max Temp.



H-2639



H-3550



H-2634D



H-3540



H-3542



H-2630
H-3547



General Purpose Thermometers, Fahrenheit

Range	Div.	Length	Model
-30 to 120°F	1°F	12" (305mm)	H-2611
0 to 230°F	2°F	12" (305mm)	H-2613
0 to 300°F	2°F	12" (305mm)	H-2615
20 to 500°F	2°F	16" (405mm)	H-2617
20 to 750°F	5°F	16" (405mm)	H-2619

General Purpose Thermometers, Celsius

Range	Div.	Length	Model
-35 to 50°C	1°C	305mm (12")	H-2612
-20 to 110°C	1°C	305mm (12")	H-2614
-20 to 150°C	1°C	305mm (12")	H-2616
-10 to 260°C	1°C	405mm (16")	H-2618
-10 to 400°C	2°C	405mm (16")	H-2620

General Purpose Mercury Thermometers

Single-scale, mercury-filled, engraved stem thermometers, calibrated for total immersion tolerances. Meet NBS accuracy requirements.

Pocket-Type, Dial Thermometers

Model	Description	Range	Divisions
H-2633	1" Dial, 5" long stem, includes plastic pocket case and clip.	25 to 125°F	1°F
H-2639	1" Dial, 5" long stem, includes plastic pocket case and clip.	50 to 550°F	5°F
H-3550	1" Dial, 5" long stem, includes plastic pocket case w/ calibration tool.	-40 to 180°F	2°F
H-3552	1" Dial, 5" long stem, includes plastic pocket case w/ calibration tool.	0 to 220°F	2°F
H-3553	1" Dial, 5" long stem, includes plastic pocket case and clip.	0 to 150°C	2°C
H-3554	1" Dial, 5" long stem, includes plastic pocket case and clip.	0 to 250°C	5°C

Dual-Scale General Testing Thermometers

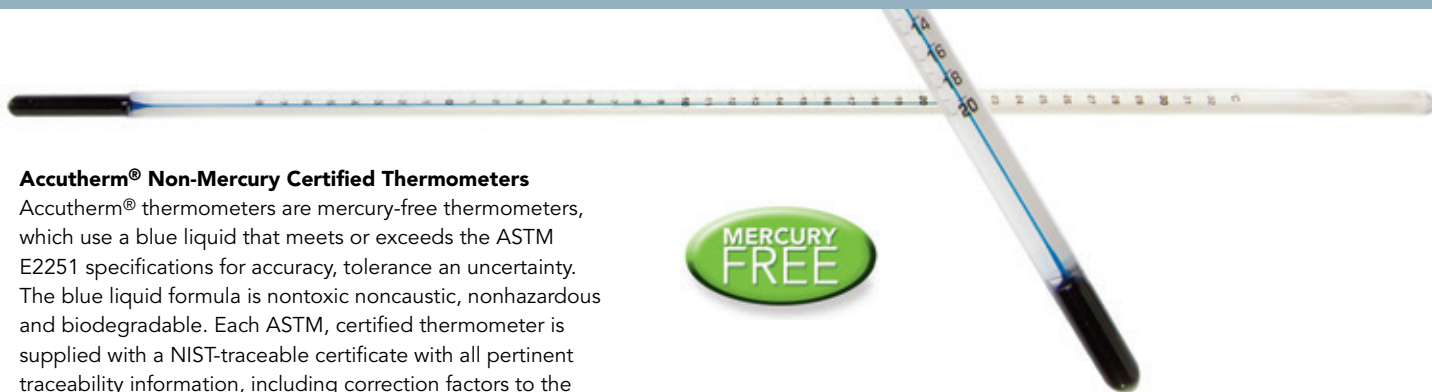
Model	Description	Range	Divisions
H-2631D	Direct-reading, all-metal dial thermometers for general use include °F and °C scales. Units have bi-metal element that actuates pointer over graduated dial. Stainless steel stem is 8" long x 0.15" (203 x 4mm). Dial face is 1-3/4" (45mm) dia. External adjustment allows recalibration.	025 to 125°F 0 to 50°C	1°F .5°C
H-2632D		0 to 220°F -10 to 100°C	2°F 1°C
H-2634D		50 to 500°F 0 to 260°C	5°F 2°C

Pocket-Type, Stick Thermometers

Model	Description	Range	Divisions
H-2630	5" long stem. Features copper-plated bulb to resist cutting, includes metal pocket case and clip.	100 to 450°F	5°F
H-3540	5" long stem. Large-bore, tempered glass with non-toxic liquid, includes plastic pocket case and clip.	0 to 220°F	2°F
H-3542	5" long stem. Mercury thermometer, includes metal pocket case and clip.	-20 to 110°C	1°C
H-3547	5" long stem. Mercury thermometer, includes metal pocket case and clip.	0 to 120°F	1°F

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.



Accutherm® Non-Mercury Certified Thermometers

Accutherm® thermometers are mercury-free thermometers, which use a blue liquid that meets or exceeds the ASTM E2251 specifications for accuracy, tolerance an uncertainty. The blue liquid formula is nontoxic noncaustic, nonhazardous and biodegradable. Each ASTM, certified thermometer is supplied with a NIST-traceable certificate with all pertinent traceability information, including correction factors to the nearest 1/10th of a scale division. These thermometers are supplied with one point certification in accordance with ASTM E411 standards.



Accutherm® Non-Mercury Thermometers

Accutherm® mercury-free thermometers with the same scales as ASTM mercury thermometers, but not ASTM approved.

Accutherm® Non-Mercury, Certified Thermometers

Range	Div.	ASTM	Model
-36 to 35°F	0.2°F	S62F	H-2605.62FC
-38 to 2°C	0.1°C	S62C	H-2605.62CC
18 to 89°F	0.2°F	S63F	H-2605.63FC
-8 to 32°C	0.1°C	S63C	H-2605.63CC
77 to 131°F**	0.2°F	S64F	H-2605.64FC
25 to 55°C**	0.1°C	S64C	H-2605.64CC
122 to 176°F**	0.2°F	S65F	H-2605.65FC
-50 to 80°C**	0.1°C	S65C	H-2605.65CC
167 to 221°F**	0.2°F	S66F	H-2605.66FC
75 to 105°C**	0.1°C	S66C	H-2605.66CC
206 to 311°F**	0.5°F	S67F	H-2605.67FC
95 to 155°C**	0.2°C	S67C	H-2605.67CC

**Has auxiliary ice point scale

Range	Div.	Model	Range	Div.	Model
-20 to 150°C	1.0°C	H-2604.C1	0 to 302°F	2.0°F	H-2604.F1
-38 to 50°C	1.0°C	H-2604.C2	-36 to 120°F	2.0°F	H-2604.F2
-5 to 110°C	0.5°C	H-2604.C3	+20 to 230°F	1.0°F	H-2604.F3
+38 to 82°C	0.1°C	H-2604.C4	+100 to 180°F	0.2°F	H-2604.F4
-2 to 80°C	0.2°C	H-2604.C5	+30 to 180°F	0.5°F	H-2604.F5
+30 to 200°C	1.0°C	H-2604.C6	+85 to 392°F	1.0°F	H-2604.F6
+19 to 27°C	0.1°C	H-2604.C7	+66 to 80°F	0.2°F	H-2604.F7
+49 to 57°C	0.1°C	H-2604.C8	+120 to 134°F	0.2°F	H-2604.F8
+57 to 65°C	0.1°C	H-2604.C9	+134 to 148°F	0.2°F	H-2604.F9
+79 to 87°C	0.1°C	H-2604.C10	+174 to 188°F	0.2°F	H-2604.F10
-38 to 42°C	0.2°C	H-2604.C11	-36.5 to 107.5°F	0.5°F	H-2604.F11
+25 to 105°C	0.2°C	H-2604.C12	+77 to 221°F	0.5°F	H-2604.F12
-2 to 68°C	0.2°C	H-2604.C13	+68 to 213°F	0.5°F	H-2604.F13
-2 to 52°C	0.2°C	H-2604.C14	-4 to 122°F	1.0°F	H-2604.F14
+24 to 78°C	0.2°C	H-2604.C15	+90 to 260°F	0.5°F	H-2604.F15
+48 to 102°C	0.2°C	H-2604.C16	0 to 220°F	2.0°F	H-2604.F16
+72 to 126°C	0.2°C	H-2604.C17	+60 to 160°F	1.0°F	H-2604.F17
+95 to 255°C	0.5°C	H-2604.C18	+75 to 175°F	1.0°F	H-2604.F18
+20 to 70°C	0.2°C	H-2604.C19	+100 to 300°F	2.0°F	H-2604.F19
-10 to 5°C	0.1°C	H-2604.C20	+200 to 350°F	2.0°F	H-2604.F20
+20 to 100.6°C	0.2°C	H-2604.C21	+50 to 392°F	2.0°F	H-2604.F21
-20 to 50°C	0.5°C	H-2604.C22	0/120°F x 0.5°F	0.5°F	H-2604.F22
+32 to 127°C	0.2°C	H-2604.C23	+60/180°F x 1.0°F	1.0°F	H-2604.F23
-15 to 105°C	1.0°C	H-2604.C24	-58/41°F x 0.5°F	0.5°F	H-2604.F24
+15 to 70°C	1.0°C	H-2604.C25	30 to 350°F	1.0°F	H-2604.F25
+25 to 80°C	1.0°C	H-2604.C26			
+40 to 150°C	1.0°C	H-2604.C27			
+95 to 175°C	1.0°C	H-2604.C28			
+10 to 200°C	1.0°C	H-2604.C29			
-20 to 10°C	0.1°C	H-2604.C30			
0 to 30°C	0.1°C	H-2604.C31			
-18 to 49°C	0.5°C	H-2604.C32			
+16 to 82°C	0.5°C	H-2604.C33			
-50 to 5°C	0.2°C	H-2604.C34			
-1 to 175°C	0.5°C	H-2604.C35			

Accutherm® Custom Calibration Thermometers

Accutherm® thermometers are available calibrated to any three (3) points up to 300°F. Please contact us at 1.800.544.7220 or 1.708.468.6300

Cases for Accutherm® Thermometers

Leatherette protective cases are available for all Accutherm thermometers. To order, please add a "C" suffix after the main model number, i.e.: H-2605C.5C.

Accutherm® Non-Mercury, ASTM-Approved Thermometers

Range	Div.	ASTM	Model
-38 to 50°C	1.0°C	5C	H-2605.5C
-36 to 120°F	2.0°F	5F	H-2605.5F
-20 to 102°C	0.2°C	12C	H-2605.2C
-5 to 215°F	0.5°F	12F	H-2605.2F
-2 to +80°C	0.1°C	15C	H-2605.15C
30 to 180°F	0.5°F	15F	H-2605.15F
34 to 42°C	0.1°C	18C	H-2605.18C
94 to 108°F	0.2°F	18F	H-2605.18F
204 to 103°C	0.1°C	22C	H-2605.22C
204 to 218°F	0.2°F	22F	H-2605.22F
19 to 35°C	0.02°C	56C	H-2605.56C
66 to 95°F	0.05°F	56F	H-2605.56F
-34 to 49°C	0.5°C	58C	H-2605.58C
-30 to 120°F	1.0°F	58F	H-2605.58F
-18 to 82°C	0.5°C	59C	H-2605.59C
0 to 180°F	1.0°F	59F	H-2605.59F
20 to 50°C	0.1°C	91C	H-2605.91C
18.9 to 25.1°C	0.01°C	116C	H-2605.116C
23.9 to 30.1°C	0.01°C	117C	H-2605.117C
38.6 to 41.4°C	0.05°C	120C	H-2605.120C
-7 to 105°C	0.5°C	130C	H-2605.130C
20 to 220°F	1.0°F	130F	H-2605.130F



ASTM E1 Thermometers—Fahrenheit and Celsius

Application	ASTM	Range	Model	Subdiv.	Length	Immersion
General Use	1F	0-302°F	H-2600.1F	2.0°F 1.0°C	12.5" 322mm	3" 76mm
	1C	-20-150°C	H-2610.1C			
	2F	20-580°F	H-2600.2F			
	2C	-5-300°C	H-2610.2C			
	3F	20-760°F	H-2600.3F			
Cloud and Pour	5F	-36-120°F	H-2600.5F	2.0°F 1.0°C	9.125" 231mm	4.25" 108mm)
	5C	-38-50°C	H-2610.5C			
Low Cloud and Pour	6F	-112-70°F	H-2600.6F	2.0°F 1.0°C	9.125" 231mm	3" 76mm
	6C	-80-20°C	H-2610.6C			
Low Distillation	7F	30-580°F	H-2600.7F	2.0°F 1.0°C	15.25" 386mm	Total
	7C	-2-300°C	H-2610.7C			
High Distillation	8F	30-360°F	H-2600.8F	2.0°F 1.0°C	15.25" 386mm	Total
	8C	-2-400°C	H-2610.8C			
Pensky-Martens Low	9F	20-230°C	H-2600.9F	1.0°F .5°C	11.25" 287mm	2.25" 57mm
	9C	-5-110°C	H-2610.9C			
Pensky-Martens High	10F	200-700°F	H-2600.10F	5.0°F 2.0°C	11.25" 287mm	2.25" 57mm
	10C	90-370°C	H-2610.10C			
Cleveland Open Flash	11F	20-760°F	H-2600.11F	5.0°F 2.0°C	12-1/8" 308mm	1" 25mm
	11C	-6-400°C	H-2610.11C			
Gravity	12F	-5-215°F	H-2600.12F	0.5°F 0.2°C	16-1/2" 420mm	total
	12C	-20-102°C	H-2610.12C			
Low Softening Point	15F	30-180°F	H-2600.15F	0.5°F 0.2°C	15-5/8" 397mm	total
	15C	-2-80°C	H-2610.15C			
High Softening Point	16F	85-392°F	H-2600.16F	1.0°F .5°C	15-5/8" 397mm	total
	16C	30-200°C	H-2610.16C			
Saybolt Viscosity	17F	66-80°F	H-2600.17F	0.2°F 0.1°C	10.875" 275mm	total
	17C	19-27°C	H-2610.17C			
	18F	94-108°F	H-2600.18F			
	18C	34-42°C	H-2610.18C			
	19F	120-134°F	H-2600.19F			
	19C	49-57°C	H-2610.19C			
	20F	134-148°F	H-2600.20F			
	20C	57-65°C	H-2610.20C			
	21C	79-87°C	H-2610.21C			
	22C	204-218°F	H-2600.22F			
Kinematic Viscosity	28F	97.5-102.5°F	H-2600.28F	0.1°F 0.2°C	12" 305mm	total
	28C	36.6-39.4°C	H-2610.28C			
Aniline Point	33F	-36.5-107.5°F	H-2600.33F	0.5°F 0.2°C	16.5" 419mm	2' 50mm
	33C	-38-42°C	H-2610.33C			
	35F	194-338°F	H-2600.35F			
	35C	90-170°C	H-2610.35C			
Kinematic Viscosity	45F	74.5-79.5°F	H-2600.45F	0.1°F 0.2°C	12" 305mm	total
	45C	23.6-26.4°C	H-2610.45C			
	46C	48.6-51.4°C	H-2610.46C			
	47F	137.5-142.5°F	H-2600.47F			
	47C	58.6-61.4°C	H-2610.47C			
Tag Closed Tester, Low Range	57F	-4-122°F	H-2600.57F	1.0°F .5°C	11.25" 287mm	2.25" 57mm
	57C	-20-50°C	H-2610.57C			
Precision	63F	18-89°F	H-2600.63F	.2°F .4°C	15" 379mm	total
	63C	-8-32°C	H-2610.63C			
	64F	77-131°F	H-2600.64F			
	64C	25-55°C	H-2610.64C			
Kinematic Viscosity	110F	272.5-277.5°C	H-2600.110F	.1°F .2°C	12" 305mm	total
	110C	133.6-136.4°C	H-2610.110C			
Bituminous Softening Point	113F	30-350°F	H-2600.113F	1.0°F .5°C	16" 406mm	
	113C	-1-175°C	H-2610.113C			

Specifications: All of these thermometers meet ASTM E1. All of the thermometers listed here can be calibrated and certified per ASTM specification. Call Humboldt for a price quote.

CAUTION
Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.



Teflon coated thermometers, for breakage and safety protection, are available. Add T to the end of the desired part number, i.e. H-2600.9FT

Mercury Thermometers

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Lab Equipment

Mercury Spill Clean-up Kit—H-3632SK
For recovery and disposal of spills up to 500g. Includes gloves, two plastic spatulas for cleaning, mercury collector to swab spill, absorbent and activator to absorb mercury, plastic bag for disposal, instructions.





H-4381A



H-4370
pH Only



H-4371
pH &
Temp.



H-4373



H-4383



H-4389

EcoTestr™ pH2— H-4381A
Simple, single line display with ±0.1% pH, full-scale accuracy. Push button calibration with hold function and auto shut-off make this unit easy to use. Automatic temperature compensation provides accurate readings even in fluctuating temperatures. Waterproof, dustproof housing. Includes Tester, integral sensor and batteries.

pHTestrs®— H-4370 or H-4371
Provides 3-point calibration and ±0.01% accuracy. Double-junction electrode provides longer electrode life. Replaceable electrodes. Push-button calibration with auto-buffer recognition. Compact, hand-held design. Waterproof, dust-proof housing. Includes Tester, detachable sensor and batteries.

pHTestr® 10 BNC— H-4373
Use any pH electrode with BNC connector. Provides 3-point, push-button calibration and ±0.01% accuracy. Microprocessor-based functions for fast, stable readings. Hold function, auto-off and Error messages. Waterproof, dustproof housing. Includes Tester without electrode and batteries.

pH/mV Temp Meter— H-4383
Measurements in both pH and mV, as well as temperature. Use U.S. or NIST buffer sets with auto buffer recognition. Store up to 50 readings. Ready indicator and hold function. Power with batteries or optional AC adapter. Use with most electrodes with BNC connector. Includes Meter, "All-in-one pH/Temp probe, electrode holders and batteries.

Order BNC electrode below.

Model	H-4381A	H-4370	H-4371	H-4373	H-4383
Range	-1.0 to 15.0 pH	-1.00 to 15.00 pH	-1.00 to 15.00 pH	-1.00 to 15.00 pH	-2.00 to 16.00 pH
Resolution	0.1 pH	0.01 pH	0.01 pH	0.01 pH	0.01 pH
Accuracy	±0.1 pH	±0.01 pH	±0.01 pH	±0.01 pH (meter only)	±0.01 pH
Calibration	Three-point, automatic (4.0, 7.0 or 10.0)	Three-point at either (USA 4.01, 7.0 or 10.0) (NIST 4.01, 6.86 or 9.18)	Three-point at either (USA 4.01, 7.0 or 10.0) (NIST 4.01, 6.86 or 9.18)	Three-point at either (USA 4.01, 7.0 or 10.0) (NIST 4.01, 6.86 or 9.18)	Up to 5 buffer values pH 1.68, 4.01, 6.86/7.00 9.18/10.01, 12.45
Temperature Range			32 to 122°F (0 to 50°C)		-10.0 to 110.0°C
Shpg. Wt.	6 oz. (170g)	4.5 oz. (125g)	4.5 oz. (125g)	6 oz. (170g)	1.4 lb (0.7kg)

Buffer Solutions	Model
pH 10.0 ±pH Accuracy, 1-pint	H-4360A.10
pH 12.45 ±pH Accuracy, 1-pint	H-4360A.12
pH 1.68 ±pH Accuracy, 1-pint	H-4360A.2
pH 4.01 ±pH Accuracy, 1-pint	H-4360A.4
pH 7.00 ±pH Accuracy, 1-pint	H-4360A.7
Buffer Solutions, Singles	Model
pH 10.0 ±pH Accuracy, 20 pack	H-4361A.10
pH 4.01 ±pH Accuracy, 20 pack	H-4361A.4
pH 7.00 ±pH Accuracy, 20 pack	H-4361A.7
Deionized Water Singles, 20 pack	H-4361A.00



H-4360A.7



H-4361A.4



H-4370.1



H-4373.1

pH Meter Accessories:	Model
Replacement Electrode Sensor for H-4370/H-4371	H-4370.1
pH Electrode (BNC), 0-14pH, Double-Junction, 12mm Dia	H-4373.1
pH Electrode (BNC), 0-12pH, Double-Junction, 12mm Dia.	H-4373.2
Replacement "All-in-One" Electrode for H-4383	H-4383.1
AC Adapter, 110 VAC for H-4383	H-4383.2
AC Adapter, 220 VAC for H-4383	H-4383.3

ECTestrs® Conductivity Tester — H-4389

Conductivity Tester with ±1% full-scale accuracy. User-replaceable cup-type sensor. Measures conductivity/TDS/salt and temperature. Range: 0-200 µS, 0-2000 µS; 0 to 20.00 mS. 3-point manual or auto calibration. Replacement electrode: H-4389.1



H-3568



H-4296



H-4296A



HT-5011



H-2629



H-3575



H-4294



H-4292



H-2260

Bi-metal Oven Thermometer

Description	Range	Div.	Model
All-metal unit is 2.3" x 3.3" with baked-enamel finish on bezel. Features bi-metal coil movement and glass lens. Hangs or stands.	100 to 600°F 50 to 315°C	25°F	H-3568

Surface Thermometer

Description	Range	Div.	Model
Sensing element comes into direct contact with surface to be measured. Dial read-out results from expansion or contraction of bi-metal. Unit is dual-magnet type, 2" (51mm) dia. x 1/2" (13mm) high.	0 to 250°F	2°F	H-2628
	0 to 500°F	5°F	H-2628H
	-20 to 120°C	1°C	H-2629

Humboldt Universal Timer—H-4296

Humboldt Universal Timer—H-4296.4F

Timer automatically shuts off electrical apparatus at set time of up to 60 minutes. Features two receptacles and a 3-wire cord and plug.

Humboldt Universal Digital Timer—H-4296A

Humboldt Universal Digital Timer—H-4296A.4F

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features easy-to-use digital interface and two-plug AC receptacle.

24-Hour Digital Timer Clock—H-3575

Electronic digital timer/clock is programmed to alarm for one minute when time is up. Unit counts down or up in seconds. LCD displays hours, minutes and seconds. Memory timer allows preset time to be stored. Unit has magnetic back and can also clip on or stand. Includes one 1.5 volt battery.

Giant Digit Countdown Timer—HT-5011

Great for viewing from across a room, easily viewable from 50 ft. with 1-1/3 inch high numbers. Three-button intuitive operation eliminates reading instructions. Traceable timer has automatic bounce-back Memory for repetitive timing. Timing range is 99 minutes, 59 seconds. Resolution is 1 second, accuracy is 0.01%. Individually, traceable calibration certificate is provided, and comes with easel bench stand and magnetic back for place-anywhere mounting.

Universal Lab Timer—H-4292

Universal Lab Timer—H-4292.5F

Portable electric timer as elapsed-time indicator, interval timer and electrical apparatus on-off timer. Features time range of 60 minutes by minutes and seconds, 8" dial with two sets of numerals (use inner circle of small numerals as stop clock) and selective automatic buzzer alarm. Has two separate outlet receptacles for automatic switching of external appliances. Toggle switch controls one outlet, which can make or break circuit at "0." Circuit automatically breaks on second outlet after time interval. Shipping wt. 6 lbs. (2.7kg)

Bell-Type Timer—H-4294

Economical, manual mechanical timer has 60-minute time range. Signals with clear bell tone at end of set time for manual apparatus shut off.

Stopwatch, 1/5 sec. movement, 1 rev = 60 sec.—H-2260

Stopwatch, 1/10 sec. movement, 1 rev = 30 sec.—H-2261

Time-out type stopwatch, used for timing operations and tests Start, stop and restart are activated by depressing the crown. Hands are reset by depressing pin on side of case. Features nickel-chromium case and anti-magnetic shock-resistant 7-jewel movement.



Digital Scale and Balance Comparison Chart

Capacity	Readability	Model Number	Power	Platform	Mfg.	Page No.
200g	.01g	HB-4720	AC / AA batteries	4.7" dia. / 120mm dia.	Ohaus	237
200g	0.01g	HB-4528	AC / AA batteries	4.7" dia. / 120mm dia.	Adam	237
250g	0.001g	HB-4700	AC	5.7" x 4.9" / 145 x 125mm	Adam	235
250g	0.1g	HB-4529	AC / AA batteries	4.7" Dia. / 120mm	Adam	237
300g	.01g	HB-4710A	Battery / AC	4.7" Dia. / 120mm	Adam	235
310g	0.001g	HB-313	AC	4.7" Dia. / 120mm	Ohaus	234
400g	.01g	HB-4724	AC / AA batteries	4.7" dia. / 12mm dia.	Ohaus	237
400g	0.1g	HB-4723	AC / AA batteries	4.7" dia. / 12mm dia.	Ohaus	237
450g	0.001g	HB-4701	AC	5.7" x 4.9" / 145 x 125mm	Adam	235
600g	.0001g	HB-4716	Battery / AC	5.7" x 4.9" / 145 x 125mm	Adam	235
600g	.01g	HB-4712A	Battery / AC	4.7" Dia. / 120mm	Adam	235
600g	0.1g	HB-4726	AC / AA batteries	6.5" x 5.5" / 16.5 x 14.2mm	Ohaus	237
600g	0.02g	HB-4711A	Battery / AC	4.7" Dia. / 120mm	Adam	235
600g	0.1g	HB-4530	AC / AA batteries	4.7" Dia. / 120mm	Adam	237
750g	0.001g	HB-4702	AC	5.7" x 4.9" / 145 x 125mm	Adam	235
810g	0.01g	HB-812	AC / 4 AA batteries	5.8" x 6.3" / 14.9 x 16.2mm	Ohaus	234
1000g	.01g	HB-4713A	Battery / AC	4.7" Dia. / 120mm	Adam	235
1500g	0.01g	HB-4703	AC	7.6" x 7.6" / 192 x 192mm	Adam	235
1500g	0.05g	HB-4714A	Battery / AC	4.7" Dia. / 120mm	Adam	235
1500g	0.1g	HB-4532	AC / AA batteries	4.7" Dia. / 120mm	Adam	237
1600g	0.1g	HB-4950	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	Ohaus	237
2000g	0.1g	HB-4727	AC / AA batteries	6.5" x 5.5" / 16.5 x 14.2mm	Ohaus	237
2000g	0.1g	HB-4820	AC / C batteries	5.75" x 6.22" / 146 x 158mm	Ohaus	240
2000g	0.01g	HB-4536A	AC	7.6" x 7.6" / 192 x 192mm	Adam	236
2000g	1g	HB-4534	AC / AA batteries	5.1" Dia. / 130mm	Adam	237
2100g	0.01g	HB-2102	AC	6.6" x 7.1" / 16.8 x 18mm	Ohaus	234
2100g	0.1g	HB-2101	AC / 4 AA batteries	5.8" x 6.3" / 14.9 x 16.2mm	Ohaus	234
2200g	0.01g	HB-5220	AC	7.5" x 7.9" / 190 x 200mm	Ohaus	234
2500g	0.01g	HB-4704	AC	7.6" x 7.6" / 192 x 192mm	Adam	235
2600g	0.1g	HB-4533	AC / AA batteries	4.7" Dia. / 120mm	Adam	237
3000g	0.01g	HB-4542A	Battery / AC	7.6" x 7.6" / 192 x 192mm	Adam	236
3000g	0.1g	HB-4715A	Battery / AC	4.7" Dia. / 120mm	Adam	235
3000g	1g	HB-4821	AC / C batteries	5.75" x 6.22" / 146 x 158mm	Ohaus	240
3000g	1g	HB-4823	AC / C batteries	5.75" x 6.22" / 146 x 158mm	Ohaus	240
3100g	0.01g	HB-3102	AC	6.6" x 7.1" / 16.8 x 18mm	Ohaus	234
3200g	0.2g	HB-4951	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	Ohaus	237
3500g	0.01g	HB-4705	AC	7.6" x 7.6" / 192 x 192mm	Adam	235
4000g	0.1g	HB-4728	AC / AA batteries	6.5" x 5.5" / 16.5 x 14.2mm	Ohaus	237
4000g	0.1g	HB-4539A	AC	7.6" x 7.6" / 192 x 192mm	Adam	236
4100g	0.1g	HB-4101	AC / 4 AA batteries	5.8" x 6.3" / 14.9 x 16.2mm	Ohaus	234
4500g	0.01g	HB-4706	AC	7.6" x 7.6" / 192 x 192mm	Adam	235



Digital Scale and Balance Comparison Chart

Capacity	Readability	Model Number	Power	Platform	Mfg.	Page No.
5000g	1g	HB-4535	AC / AA batteries	5.7" Dia. / 145mm	Adam	237
6000g	0.01g	HB-4707	AC	7.6" x 7.6" / 192 x 192mm	Adam	235
6000g	0.1g	HB-4540A	AC	7.6" x 7.6" / 192 x 192mm	Adam	236
6000g	2g	HB-4822	AC / C batteries	5.75" x 6.22" / 146 x 158mm	Ohaus	240
6000g	2g	HB-4824	AC / C batteries	5.75" x 6.22" / 146 x 158mm	Ohaus	240
6200g	0.01g	HB-5622	AC	7.5" x 7.9" / 190 x 200mm	Ohaus	234
6200g	0.1g	HB-5620	AC	7.5" x 7.9" / 190 x 200mm	Ohaus	234
6400g	0.5g	HB-4952	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	Ohaus	237
8000g	0.1g	HB-4541A	AC	7.6" x 7.6" / 192 x 192mm	Adam	236
8100g	0.1g	HB-8101	AC / 4 AA batteries	5.8" x 6.3" / 14.9 x 16.2mm	Ohaus	234
10,000g	0.1g	HB-4538AWB	AC	15.7" x 11.8" / 400 x 300mm	Adam	236
10,000g	0.5g	HB-4953	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	Ohaus	237
10,200g	0.01g	HB-5102	AC	7.5" x 7.9" / 190 x 200mm	Ohaus	234
10,200g	0.1g	HB-5100	AC	7.5" x 7.9" / 190 x 200mm	Ohaus	234
12,000g	0.1g	HB-4506	AC	4.7" Dia. / 120mm	Ohaus	236
16,000g	1g	HB-4954	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	Ohaus	237
35lb./16kg	.001lb/.5g	HB-4636	AC / battery	8.9" x 10.8" / 225 x 275mm	Adam	239
20,000g	0.1g	HB-4537AWB	AC	15.7" x 11.8" / 400 x 300mm	Adam	236
22,000g	0.1g	HB-4508	AC	5.8" x 6.3" / 14.9 x 16.2mm	Ohaus	236
60lb. / 30kg	.01lb / .005kg	HB-4830	AC / C batteries	12" X 14" / 30.5mm X 35.5mm	Ohaus	238
60lb. / 30kg	.01lb / .005kg	HB-4930	AC / C batteries	12" X 14" / 30.5mm X 35.5mm	Ohaus	238
60lb. / 30kg	.01lb / .005kg	HB-4781	AC / rechargeable battery	11.8" x 9" / 300 x 230mm	Ohaus	239
70lb./32kg	.002lb/1g	HB-4635	AC / battery	8.9" x 10.8" / 225 x 275mm	Adam	239
32,000g	0.1g	HB-4510	AC	5.8" x 6.3" / 14.9 x 16.2mm	Ohaus	236
75lb./35kg	.02lb/.01kg	HB-4774	AC / AA batteries	12" sq / 300mm sq.	Adam	238
100lb./45kg	.005lb/2g	HB-4634	AC / battery	8.9" x 10.8" / 225 x 275mm	Adam	239
110lb./50kg	.05lb/.02kg	HB-4770	AC / AA batteries	12.2 x 10.8 in. / 310 x 270mm	Ohaus	239
110lb./50kg	.05lb/.02kg	HB-4769	AC / AA batteries	20.5 x 15.7 in. / 520 x 400mm	Ohaus	239
150lb / 60kg	.02lb / .01kg	HB-4831	AC / C batteries	16.5" X 21.7" / 420mm X 550mm	Ohaus	238
150lb / 60kg	.02lb / .01kg	HB-4931	AC / C batteries	12" X 14" / 30.5mm X 35.5mm	Ohaus	238
165lb./75kg	.05lb/.02kg	HB-4775A	AC / AA batteries	12" sq / 300mm sq.	Adam	238
220lb./100kg	.1lb/.05kg	HB-4771	AC / AA batteries	20.5 x 15.7 in. / 520 x 400mm	Ohaus	239
250lb / 100kg	.05lb / .02kg	HB-4932	AC / C batteries	15.7" X 19.7" / 400mm X 500mm	Ohaus	238
300lb / 150kg	.05lb / .02kg	HB-4832	AC / C batteries	19.7" X 25.6" / 500mm X 650mm	Ohaus	238
300lb / 150kg	.05lb / .02kg	HB-4933	AC / C batteries	16.5" X 21.7" / 420mm X 550mm	Ohaus	238
330lb./150kg	.1lb/.05kg	HB-4776	AC / AA batteries	12" sq / 300mm sq.	Adam	238
440lb./200Kg	.1lb/.05kg	HB-4777	AC / AA batteries	12" sq / 300mm sq.	Adam	238
440lb./200kg	.2lb/.1kg	HB-4772	AC / AA batteries	20.5 x 15.7 in. / 520 x 400mm	Ohaus	239
600lb / 300kg	.1lb / .05kg	HB-4833	AC / C batteries	19.7" X 25.6" / 500mm X 650mm	Ohaus	238
600lb / 300kg	.1lb / .05kg	HB-4934	AC / C batteries	17" X 22" / 42mm X 55mm	Ohaus	238



HB-3102

Adventurer Pro Precision Balances

The Adventurer Pro Series has established itself as the industry's most versatile balance. It counts, it sums, it holds and it delivers traceable results. No other balance in its class offers as many features in a compact design.

- Weighing units: Milligram, Gram, Kilogram, Ounce, Pound, Carat, Pennyweight, Ounce Troy, Grain, Newton, Hong Kong Tael, Singapore Tael, Taiwan Tael, Momme, Tical, Baht, Mesghal, Tola, Custom
- Digital Calibration with external weight or Digital with Internal Weight (Pro "C" models with InCal option)
- 2-line alphanumeric LCD with brilliant backlight. Portable models include a backlight auto-off feature to conserve batteries
- Use RS232 Interface to connect to a PC or a printer and record GLP/GMP data including date, time, balance ID, user ID, project ID and reference data to meet traceability and compliance requirements.



HB-5102

Explorer Precision Balances

The NEW Explorer balance provides ultimate quality by combining fast and highly accurate weighing results combined with intuitive weighing software, touchless user-programmable operation sensors, modular design and auto-cal internal calibration.

- Modular design allows user to configure the balance in almost any setup needed.
- 4 touchless sensors let you program functions like print, calibration, tare, etc., which are activated by the wave of your hand.
- Intuitive software provides easy-to-use graphical software featuring 14 applications.
- Fast stabilization time, up to 50% faster
- Auto-Cal Intelligent calibration ensures accurate performance by daily calibrating the balance automatically.
- Intuitive user-setup makes this balance a joy to use.

Ohaus Adventurer Pro Precision Balances

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
310g	0.001g	HB-313	0.001g	±0.002g	AC	4.7" Dia. / 120mm	13.7 lb/6.2kg
810g	0.01g	HB-812	0.01g	±0.02g	AC / 4 AA batt.	5.8" x 6.3" / 14.9 x 16.2mm	5.3 lb/2.4kg
2100g	0.1g	HB-2101	0.1g	±0.2g	AC / 4 AA batt.	5.8" x 6.3" / 14.9 x 16.2mm	5.5 lb/2.5kg
2100g	0.01g	HB-2102	0.01g	±0.02g	AC	6.6" x 7.1" / 16.8 x 18mm	12.6 lb/5.7kg
3100g	0.01g	HB-3102	0.01g	±0.02g	AC	6.6" x 7.1" / 16.8 x 18mm	12.6 lb/5.7kg
4100g	0.1g	HB-4101	0.1g	±0.2g	AC / 4 AA batt.	5.8" x 6.3" / 14.9 x 16.2mm	5.5 lb/2.5kg
8100g	0.1g	HB-8101	0.1g	±0.2g	AC / 4 AA batt.	5.8" x 6.3" / 14.9 x 16.2mm	5.5 lb/2.5kg

Calibrated Models Note: Models above are available with InCal Internal Calibration—Place a "C" at the end of the part number to order this option. InCal Balance shipping weights are roughly double std. models. (InCal models do not provide for AA battery operation)

Ohaus Explorer Pro Precision Balances

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
2200g	0.01g	HB-5220	±0.01g	±0.02g	AC	7.5" x 7.9" / 190 x 200mm	15 lb/6.8kg
4200g	0.01g	HB-5420	±0.01g	±0.02g	AC	7.5" x 7.9" / 190 x 200mm	15 lb/6.8kg
6200g	0.01g	HB-5622	±0.01g	±0.02g	AC	7.5" x 7.9" / 190 x 200mm	11 lb/7.4kg
6200g	0.1g	HB-5620	±0.1g	±0.1g	AC	7.5" x 7.9" / 190 x 200mm	11 lb/7.4kg
10200g	0.01g	HB-5102	±0.01g	±0.02g	AC	7.5" x 7.9" / 190 x 200mm	11 lb/7.4kg
10200g	0.1g	HB-5100	±0.1g	±0.1g	AC	7.5" x 7.9" / 190 x 200mm	11 lb/7.4kg

Display Cable Extension— HB-5100C

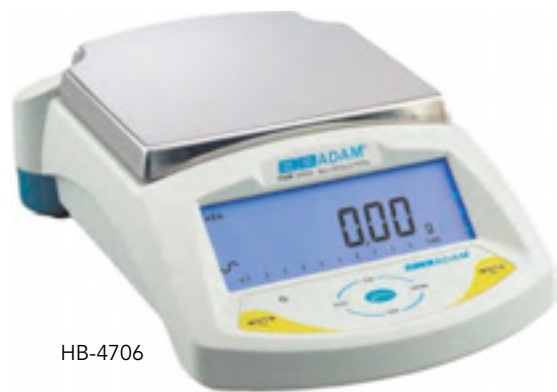
Cable to allow Display to detach from weighing base.



Tower Mount for Explorer Scales— HB-5100T

Tower Mount Kit for Explorer Series Scales for raising display above weighing base.





HB-4706

Adam PGW Precision Balances

PGW precision balances are designed to deliver the ultimate in speed and accuracy in an easy- to-use, reliable model. These balances incorporate a simple user interface for easy setup and control of a wide range of smart functions and security features, allowing simple and advanced weighing applications to be executed on the spot, without the need for complex calculations. PGW balances are designed for the lab but have the rugged features needed for materials testing. They include all metal chemical resistant die-cast housings, below balance weighing, and a huge backlit display.

- Weighing units: g, ct, mg*, Kg, GN, N, dr, oz, ozt, dwt, mm, tl T, tl H, tl S, T, ti, custom. (*0.001 models only)
- All models are available with or without motorized internal calibration. Digital filters compensate for vibration, drafts or temperature changes
- GLP-compliant software and print outs via RS232 connection; date and time stored in memory
- Lock down Kensington™ type mounting point
- Below balance weighing with optional hanger

Adam PGW Precision Balances

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
250g	0.001g	HB-4700	0.001g	0.002g	AC	5.7" x 4.9" / 145 x 125mm	28 lb/12.7kg
450g	0.001g	HB-4701	0.001g	0.002g	AC	5.7" x 4.9" / 145 x 125mm	28 lb/12.7kg
600g	0.001g	HB-4716	0.001g	0.002g	AC	5.7" x 4.9" / 145 x 125mm	28 lb/12.7kg
750g	0.001g	HB-4702	0.002g	0.002g	AC	5.7" x 4.9" / 145 x 125mm	28 lb/12.7kg
1500g	0.01g	HB-4703	0.01g	0.02g	AC	7.6" x 7.6" / 192 x 192mm	28 lb/12.7kg
2500g	0.01g	HB-4704	0.01g	0.02g	AC	7.6" x 7.6" / 192 x 192mm	28 lb/12.7kg
3500g	0.01g	HB-4705	0.01g	0.02g	AC	7.6" x 7.6" / 192 x 192mm	28 lb/12.7kg
4500g	0.01g	HB-4706	0.01g	0.02g	AC	7.6" x 7.6" / 192 x 192mm	28 lb/12.7kg
6000g	0.01g	HB-4707	0.01g	0.02g	AC	7.6" x 7.6" / 192 x 192mm	28 lb/12.7kg

NOTE: Internal Calibration—Place a "C" at the end of the part number to order this option.

Weigh Below Hook— HB-4700WB	In-use Cover— HB-4700CV
RS-232 Cable— HB-4700CB	RS-232 to USB Cable— HB-4700USB

Adam HCB Precision Balances

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
300g	.01g	HB-4710A	0.02g	±0.02g	Battery / AC	4.7" Dia. / 120mm	7 lb/3.2kg
600g	0.02g	HB-4711A	0.04g	±0.04g	Battery / AC	4.7" Dia. / 120mm	7 lb/3.2kg
600g	.01g	HB-4712A	0.02g	±0.02g	Battery / AC	4.7" Dia. / 120mm	7 lb/3.2kg
1000g	.01g	HB-4713A	0.02g	±0.02g	Battery / AC	4.7" Dia. / 120mm	7 lb/3.2kg
1500g	0.05g	HB-4714A	0.1g	±0.1g	Battery / AC	4.7" Dia. / 120mm	7 lb/3.2kg
3000g	0.1g	HB-4715A	0.2g	±0.2g	Battery / AC	4.7" Dia. / 120mm	7 lb/3.2kg

In-use Cover— HB-4710CV	Carrying Case— HB-4710CS
RS-232 Cable— HB-4700CB	USB Cable— HB-4700USB



HB-4712A

Adam HCB Highland™ Precision Balances

Adam Equipment's Highland balances have what it takes for lab work, field use, and various industrial applications. They feature multiple weighing units, RS-232 and USB interfaces, rechargeable battery pack and AC operation, capacity tracker, adjustable feet and level, lock down and more. Density and specific gravity determination are easy with the below balance weighing feature, and the removable draft shield eliminates wind disturbances outdoors or in drafty environments. ShockProtect™ overload protection keeps the performance of the Highland safe and secure, and the HandiCal™ internal calibration weight provides reliable readings time after time.

- Weighing units: g, ct, oz, pennyweight (dwt), Tels T (TL.T), Tels S (TL.S), Tels Hk. (TL.H) Newtons (N), kilogram (kg), pound (lb)
- USB and RS-232 interfaces
- Stainless steel pan
- Dual, color-coated tare keys
- Large backlit display is clear and quick to read
- Removable draft shield
- Auto power off saves battery life

NOTE: Internal Calibration is built in on all models above.



HB-4506



HB-4537AWB

Explorer Pro High Capacity Models

Built to meet the most rugged demands, Ohaus Explorer Pro high-capacity balances provide an industrial capacity balance with the resolution and features of a premium laboratory balance. Three models are available with loads up to 32,000g and a readability of 0.1g. The extra large 11" x 14" (28 x 35.6cm) platform is ideal for laboratory and industrial applications in concrete/asphalt production and quality control.

- Weighing units: gram, kilogram, pound, ounce, ounce troy, carat, pennyweight, Hong Kong Tael, Singapore Tael, Taiwan Tael, mommes, grain, tical, Newton, custom
- Unique high-resolution graphic display with pop-up windows and menus to guide you through balance functions
- RS232 port for easy communication with computer or printer
- Weigh below capability
- Application library to store/recall Procedures
- Models available with AutoCal™, temperature sensitive motor driven internal calibration, which automatically self-calibrates when needed—always ready and calibrated!

PGL Balances

PGL balances combine the solid construction and fundamental features of a high-precision top loader with the versatility of a portable balance. A full-metal die cast housing, sealed front panel, and readabilities of 1mg, 10mg, and 0.1g make the PGL ideal for applications that demand both high precision and ruggedness. A built-in rechargeable battery and AC adapter/charger allow you to take your PGL balance anywhere, even out to the field. And, the unique ShockProtect™ overload protection keeps the weighing mechanism safe from overloads.

- Weighing units: gram, kilogram, carat, grain, newton, pound, ounce, pound-ounce, custom unit
- RS232 port for easy communication with computer or printer
- Backlit LCD display with capacity tracker
- Stainless steel platform
- AC power or rechargeable battery operation
- All metal construction
- Below balance weighing

PGL In-use Cover— HB-4540CV
Weigh Below Hook for PGL Balance

Ohaus Explorer Pro Precision Balances

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
12,000g	0.1g	HB-4506	0.1g	±0.4g	AC	11 x 14 / 28 x 35.6mm	27 lb/12.3kg
22,000g	0.1g	HB-4508	0.1g	±0.4g	AC	11 x 14 / 28 x 35.6mm	27 lb/12.3kg
32,000g	0.1g	HB-4510	0.1g	±0.4g	AC	11 x 14 / 28 x 35.6mm	27 lb/12.3kg

Calibrated Models Note: Models above are available with InCal Internal Calibration—Place a "C" at the end of the part number to order this option.

Adam PGL Precision Balances

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
2000g	0.01g	HB-4536A	0.02g	0.04g	AC	7.6" x 7.6" / 192 x 192mm	20 lb/9.1kg
3000g	0.01g	HB-4542A	0.02g	0.04g	AC	7.6" x 7.6" / 192 x 192mm	20 lb/9.1kg
4000g	0.1g	HB-4539A	0.2g	0.04g	AC	7.6" x 7.6" / 192 x 192mm	20 lb/9.1kg
6000g	0.1g	HB-4540A	0.2g	0.04g	AC	7.6" x 7.6" / 192 x 192mm	20 lb/9.1kg
8000g	0.1g	HB-4541A	0.2g	0.04g	AC	7.6" x 7.6" / 192 x 192mm	20 lb/9.1kg

Adam PGL Precision Balances, Large Capacity with Weigh-Below Hook (Density Determination Measurements)

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
10000g	0.1g	HB-4538AWB	0.2g	0.4g	AC	15.7" x 11.8" / 400 x 300mm	20 lb/9.1kg
20000g	0.1g	HB-4537AWB	0.2g	0.4g	AC	15.7" x 11.8" / 400 x 300mm	20 lb/9.1kg



HB-4951



HB-4726



HB-4532

Ohaus NavigatorXT Portable Balance

The touch-free control of the zero, print, function, tare, and backlight operations help to avoid transferring sample residue to the keypad. In addition, the two sensors can be set up independently to control up to 36 combinations of operations. Accurately stabilizes in less than one second providing fast and accurate weighing results. Navigator XT is designed with a superior mechanical overload protection system that allows the scale to withstand loads up to 400% of its rated capacity.

- Internal, rechargeable battery provides up to 100 hours running time
- Touchless control feature

USB Interface Cable— HB-4950.1
Navigator Hard Case— HB-4950C

Ohaus Scout Pro Portable Balance

The Ohaus Scout Pro portable balances feature easy-to-use two-button operation, a high-contrast LCD display, multiple weighing units, four application modes, and the option of either RS232 or USB connectivity.

- Easy to Use – The high-contrast LCD display combined with two key operation makes the Scout Pro a snap to operate
- Battery or AC Power – Uses 4 “AA” batteries with auto shut-off feature for 40 hours of operation, or AC powerpack
- Integral Weigh-Below Hook – for density or specific gravity determination
- USB or RS232 Connectivity

USB Interface Cable— HB-4727.1
Scout Hard Case— HB-4727C

Adam Core Balance Compact Portable

The CQT provides a low-cost solution for field and lab usage. Complete with removable draft shield, AC adapter, adjustable feet and level and an integral security bracket. Ready for use out of the box, the CQT balances can operate with 6 AA batteries and an optional carrying case is available.

- A removable draft shield helps when working on site where wind makes accurate readings difficult
- Battery-powered with six AA batteries
- Optional carrying case available
- 2600g model is a great upgrade for triple-beam balances and comes with a hard case

Ohaus NavigatorXT Portable Balance

Capacity	Readability	Model	Units	Power	Pan Size	Ship Wgt.
1600g	0.1g	HB-4950	lb, oz, lb:oz, kg, g	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	6.1 lb/2.8kg
3200g	0.2g	HB-4951	lb, oz, lb:oz, kg, g	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	6.1 lb/2.8kg
6400g	0.5g	HB-4952	lb, oz, lb:oz, kg, g	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	6.1 lb/2.8kg
10000g	0.5g	HB-4953	lb, oz, lb:oz, kg, g	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	6.1 lb/2.8kg
16000g	1g	HB-4954	lb, oz, lb:oz, kg, g	AC / Rechargeable	9.00" x 6.90" / 250 x 240mm	6.1 lb/2.8kg

Ohaus Scout Pro Portable Balance

Capacity	Readability	Model	Repeatability	Units	Power	Pan Size	Ship Wgt.
200g	.01g	HB-4720	±.01	kg, lb, g, oz	AC / AA batteries	4.7" dia. / 12mm dia.	5.3 lb/2.4kg
400g	.01g	HB-4724	±.01	kg, lb, g, oz	AC / AA batteries	4.7" dia. / 12mm dia.	5.5 lb/2.5kg
400g	.1g	HB-4723	±.1	kg, lb, g, oz	AC / AA batteries	4.7" dia. / 12mm dia.	12.6 lb/5.7kg
600g	.1g	HB-4726	±.1	kg, lb, g, oz	AC / AA batteries	6.5" x 5.5" / 16.5 x 14.2mm	5.5 lb/2.5kg
2000g	.1g	HB-4727	±.1	kg, lb, g, oz	AC / AA batteries	6.5" x 5.5" / 16.5 x 14.2mm	5.5 lb/2.5kg
4000g	.1g	HB-4728	±.1	kg, lb, g, oz	AC / AA batteries	6.5" x 5.5" / 16.5 x 14.2mm	5.5 lb/2.5kg

Adam Core Balance CQT Compact Portable

Capacity	Readability	Model	Repeatability	Linearity	Power	Pan Size	Ship Wgt.
200g	0.01g	HB-4528A	0.01g	±0.02g	AC / AA batteries	5.1" Dia. / 130mm	5.3 lb/2.4kg
250g	0.1g	HB-4529A	0.1g	±0.1g	AC / AA batteries	5.1" Dia. / 130mm	5.5 lb/2.5kg
600g	0.1g	HB-4530A	0.1g	±0.1g	AC / AA batteries	5.1" Dia. / 130mm	12.6 lb/5.7kg
1500g	0.1g	HB-4532A	0.1g	±0.2g	AC / AA batteries	5.1" Dia. / 130mm	5.5 lb/2.5kg
2000g	1g	HB-4534A	1g	±1g	AC / AA batteries	5.1" Dia. / 130mm	5.5 lb/2.5kg
2600g*	0.1g	HB-4533A	0.1g	±0.2g	AC / AA batteries	5.1" Dia. / 130mm	5.5 lb/2.5kg
5000g	1g	HB-4535A	1g	±1g	AC / AA batteries	5.1" Dia. / 130mm	5.5 lb/2.5kg

*2600g, Model HB-4533 is sold with a hard case (see picture)— perfect for field use, great upgrade to triple beam balances.



HB-4775A

Adam CPWplus Portable Scales

The CPWplus line of industrial scales is one of our most popular scales for materials testing and general field use. With a steel base, stainless steel weighing pan, flexible remote indicator and splash-proof keypad, the CPWplus can handle harsh messy applications easily. The RS232 interface, AC adapter and wall-mount bracket make it a versatile solution for lab and field work. Uses 6 AA batteries. Optional carrying case (HB-4775C) available for ease of portability.

- Large backlit LCD display on flexible remote indicator
- RS232 bi-directional interface
- Hold function freezes reading
- Uses 9V adapter (included) or six AA batteries
- Steel base, stainless weighing pan and splash-proof keypad



HB-4831

Ohaus Defender Bench Scales

The Defender 3000 feature a simple, yet rugged, tubular-frame design. They include an indicator with tactile keys, backlit LCD display, built-in rechargeable battery operation and flexible mounting capabilities. These scales provide multiple weighing units: lb, oz, lb:oz, kg, g.

Standard Features Include:

- 304 stainless steel pan with painted carbon steel frame and aluminum IP67 load cell
- Indicator features a high-impact durable ABS housing with reversible face for either wall, column or table-top mounting
- Adjustable non-slip rubber leveling feet with externally visible level indicator
- 1-in/25mm high LCD weight display with high-contrast backlight
- Built-in RS232 for printing and data connection
- AC adapter and internal rechargeable lead acid battery



Defender Low-Profile Bench Scales

The OHAUS Defender 5000 Series Low-Profile scales are a feature-rich line of bench scales, combining an ABS plastic indicator with painted steel bases and mounting brackets. The Defender 5000 offers a multifunctional indicator with multiple weighing units (kg, g, lb, oz, lb:oz (decimal), metric tonnes and a user-definable unit) and software modes to meet your requirements.

Standard Features Include:

- Painted steel bases with ABS indicator
- Quick display of results using large LCD with high-contrast white backlight
- Easy to operate with 4-key membrane keypad with raised tactile keys
- Weighs in one or more units: kg, g, lb, oz, lb:oz (decimal), metric tonnes and user-definable custom unit
- Internal power supply with universal line cord or 6 "C" batteries (80 hr. battery life)
- Base and indicator connected using quick connect plug

Adam CPWplus Portable Scales

Capacity	Readability	Model	Repeatability	Power	Pan Size	Ship Wgt.
75lb./35kg	.02lb/.01kg	HB-4774	.02lb/.01kg	AC / AA batteries	12" sq / 300mm sq.	11 lb / 5 kg
165lb./75kg	.05lb/.02kg	HB-4775A	.05lb/.02kg	AC / AA batteries	12" sq / 300mm sq.	11 lb / 5 kg
330lb./150kg	.1lb/.05kg	HB-4776	.1lb/.05kg	AC / AA batteries	12" sq / 300mm sq.	11 lb / 5 kg
440lb./200kg	.1lb/.05kg	HB-4777	.1lb/.05kg	AC / AA batteries	12" sq / 300mm sq.	11 lb / 5 kg

Hard Carrying Case for CBWplus Scales—HB-4775C

Ohaus Defender 3000 Bench Scale

Capacity	Readability	Model	Power	Pan Size	Ship Wgt.
60lb. / 30kg	.01lb / .005kg	HB-4830	AC / C batteries	12" X 14" / 30.5mm X 35.5mm	33 lb / 15 kg
150lb / 60kg	.02lb / .01kg	HB-4831	AC / C batteries	16.5" X 21.7" / 420mm X 550mm	51 lb / 23 kg
300lb / 150kg	.05lb / .02kg	HB-4832	AC / C batteries	19.7" X 25.6" / 500mm X 650mm	82 lb / 37 kg
600lb / 300kg	.1lb / .05kg	HB-4833	AC / C batteries	19.7" X 25.6" / 500mm X 650mm	82 lb / 37 kg

Rechargeable Battery Kit— HB-4931RB

Ohaus Defender 5000 Low Profile Bench Scale

Capacity	Readability	Model	Power	Pan Size	Ship Wgt.
60lb. / 30kg	.01lb / .005kg	HB-4930	AC / C batteries	12" X 14" / 30.5mm X 35.5mm	35.9 lb / 12.7 kg
150lb / 60kg	.02lb / .01kg	HB-4931	AC / C batteries	12" X 14" / 30.5mm X 35.5mm	35.9 lb / 12.7 kg
250lb / 100kg	.05lb / .02kg	HB-4932	AC / C batteries	15.7" X 19.7" / 400mm X 500mm	53.6 lb / 24.3 kg
300lb / 150kg	.05lb / .02kg	HB-4933	AC / C batteries	16.5" X 21.7" / 420mm X 550mm	64.8 lb / 29.4 kg
600lb / 300kg	.1lb / .05kg	HB-4934	AC / C batteries	17" X 22" / 42mm X 55mm	64.8 lb / 29.4 kg

Rechargeable Battery Kit— HB-4931RB





HB-4781



HB-4770



HB-4772



HB-4635

Ohaus Multi-function Weighing Scale

This multi-function weighing scale is designed for light to medium industrial applications and provides fast displayed results, multiple functionality and internal battery operation. It offers versatility, portability and dependability in one affordable package.

- Stainless steel weighing pan
- Four weighing units: kg, g, lb and oz
- 80-hour internal rechargeable battery with power-saving auto-shut off feature
- Included in-use cover

Ohaus ES Bench Scale

The Ohaus ES Low profile Bench Scale brings utility and economy together. Easy, two-button operation and a large display guarantee accurate and unmistakable results. The unique 3-way mounting bracket allows you to mount the indicator to the scale base, above the scale platform, or on any vertical surface. For simple weighing at a favorable cost, this scale is the one to choose.

- Auto-zero tracking
- Large platform with leveling feet
- Battery saving auto-off timer, (after 5 minutes of inactivity)
- Large backlit LCD display on flexible remote indicator
- RS232 bi-directional interface
- Hold function freezes reading
- Steel base, stainless weighing pan and splash-proof keypad

Adam CBK Bench Scale

Repetitive weighing tasks are fast and simple with a large stainless steel platform, backlit display, and a graphic capacity tracker to show how much weighing range is used or available. Amber, green and red indicators make check weighing applications trouble free and quickly show operators if a sample is under or over the preset limits. The CBK includes features like RS232 interface, date & time, a built in rechargeable battery pack and AC adapter, to make it ideal for production, warehousing or even in the field.

- Large backlit LCD with capacity tracker
- Colored LED check limit indicators
- Stainless steel pan
- 5 weighing units (g, Kg, lb, oz, lb;oz)
- Rechargeable battery
- RS-232 interface with multi-language, date and time output

Ohaus Multi-function Weighing Scale

Capacity	Readability	Model	Power	Pan Size	Ship Wgt.
60lb. / 30kg	.01lb / .005kg	HB-4781	AC / rechargeable battery	11.8" x 9" / 300 x 230mm	11.7 lb / 5.3 kg

In-use Cover—HB-4636CV

Adam CBK Bench Scale

Capacity	Readability	Model	Repeatability	Power	Pan Size	Ship Wgt.
35lb./16kg	.001lb/.5g	HB-4636A	.001lb/.5g	AC / battery	8.9" x 10.8" / 225 x 275mm	11 lb / 22 kg
70lb./32kg	.002lb/1g	HB-4635A	.002lb/1g	AC / battery	8.9" x 10.8" / 225 x 275mm	11 lb / 22 kg
100lb./48kg	.005lb/2g	HB-4634A	.005lb/2g	AC / battery	8.9" x 10.8" / 225 x 275mm	11 lb / 22 kg

NOTE: To order factory-installed weigh-below hook, use WB suffix to part number.

Hard Carrying Case for CBK Scales—HB-4635C

In-use Cover—HB-4636CV

Ohaus ES Bench Scale

Capacity	Readability	Model	Power	Units	Pan Size	Ship Wgt.
110lb./50kg	.05lb/.02kg	HB-4770	AC / AA batteries	lb, oz, kg, lb:oz	12.2 x 10.8 in. / 310 x 270mm	8.8 lb / 4 kg
110lb./50kg	.05lb/.02kg	HB-4769	AC / AA batteries	lb, oz, kg, lb:oz	20.5 x 15.7 in. / 520 x 400mm	38 lb / 17 kg
220lb./100kg	.1lb/.05kg	HB-4771	AC / AA batteries	lb, oz, kg, lb:oz	20.5 x 15.7 in. / 520 x 400mm	38 lb / 17 kg
440lb./200kg	.2lb/.1kg	HB-4772	AC / AA batteries	lb, oz, kg	20.5 x 15.7 in. / 520 x 400mm	38 lb / 17 kg



HB-4821

Ohaus Valor Xtreme Precision Scale

The Valor Xtreme features a full stainless steel housing with added chemical resistance and a removable stainless weighing pan. It has advanced overload protection rated at 10x the scale capacity, making it ideal for tough environments. Long battery life of up to 100 hours is supplied from four C-type batteries. These scales also feature up-front level bubbles and a large backlit display. Models HB-4823 and HB-4824 provide full NEMA 4X/IP65 water resistance for use in wet applications.



H-4732



H-4621



H-4480



H-4490

Ohaus Valor Xtreme Precision Scale

Capacity	Readability	Model	Units	Power	Pan Size	Ship Wgt.
2000g	.1g	HB-4820	lb, oz, lb:oz, kg, g	AC / C batteries	5.75" x 6.22" / 146 x 158mm	5.3 lb/2.4kg
3000g	1g	HB-4821	lb, oz, lb:oz, kg, g	AC / C batteries	5.75" x 6.22" / 146 x 158mm	5.5 lb/2.5kg
6000g	2g	HB-4822	lb, oz, lb:oz, kg, g	AC / C batteries	5.75" x 6.22" / 146 x 158mm	12.6 lb/5.7kg
3000g	1g	HB-4823	lb, oz, lb:oz, kg, g	AC / C batteries	5.75" x 6.22" / 146 x 158mm	5.5 lb/2.5kg
6000g	2g	HB-4824	lb, oz, lb:oz, kg, g	AC / C batteries	5.75" x 6.22" / 146 x 158mm	5.5 lb/2.5kg

Portable Bench Platform Scale— H-4732

Compact, self-contained scale is designed for rugged use, ideal for location or lab applications where scale can take a pounding. Complete with carrying handle, which doubles as a beam guard and allows convenient hanging from wall brackets, freeing bench and counter space. Weighs in lbs. only. 131 lbs capacity, Top: 125 lbs by 5 lbs; Left: 5 lbs x 1 oz; Right: 1 lb x 0.01 lb; Tare Bar: 0-10 lbs. The H-4732 is constructed of steel and cast aluminum with adjustable hardened steel pivots and self-aligning steel bearings. The built-in platform and steel locking mechanism ensure safe, secure operation and portability. Also features a stainless steel poise rail, the beams are mounted below the platform, allowing unrestricted visibility when weighing. Beam balance indicator ensures correct reading. Main frame has rubber cushion mounting for protection. Platform: 12" x 17" (305 x 432mm).

Portable Bench Platform Scale (metric)— H-4732M

Metric version of H-4732 above. Weighs in kg only. 52 kg capacity, Top: 50 kg by 2 kg; Left: 0-2 kg blank tare; Right: 2 kg x 0.01 kg.

Heavy Capacity Portable Bench Platform Scale— H-4748A

Heavier capacity model of the H-4732 above. Weighs in lbs. only. 260 lbs capacity, Top: 250 lbs by 10 lbs; Left: 5 lbs x 1 oz; Right: 5 lbs x 0.1 lb; Tare Bar: 0-25 lbs. Complete with carrying handle, which doubles as a beam guard and allows convenient hanging from wall brackets, freeing bench and counter space.

Stainless Steel Cover for H-4732 and H-4732M— H-4732SC

Digital Readout, U.S./Metric Suspension Scale— H-4621

High accuracy, compact digital hanging scale uses a 12-bit A/D converter for accuracy $\pm 0.1\%$ of applied load. Weatherproof ABS plastic case assures maximum protection against moisture, dust and rough usage. High visibility, 1/2" high LCD digital readout provides easy reading of weights. Membrane push button switches allow simple trouble-free operation. Power is supplied by (1) 9-volt alkaline battery (not included). Peak hold, stainless steel hooks. Function keys for Zero, lb/kg, On/Off. Overall case size 3.75" W x 2" D x 6"H.

Capacity	Resolution	Model	Accuracy
250lb/113.4kg	.01lb/.01kg	H-4621	$\pm 0.1\%$

Spring Scale— H-4480

For field soil tests in mechanical analysis of aggregates, scale has 60 lb. capacity. Dial is 30 lbs. by 0.1 lb. For direct reading, loose pointer is set at any position on the 8" (203mm) dia. dial with thumbscrew. Overall dimensions: 8" x 1-5/8" x 16" (203 x 41 x 406mm). Shipping wt. 8 lbs. (3.6kg)

Straight Spring Balance— H-4490

Heavy-duty spring balance for batch weighings with reliable accuracy and 100 lb. capacity. Gauge 100 lbs. by 1 lb. Easy-to-read recessed gauge has deep-etched graduations. Adjustable indicator is set to zero for taring. Overall dimensions: 2" x 1-3/4" x 11" (51 x 45 x 279mm).



Ohaus Mechanical Balances

The Ohaus 700 Series accommodates a large range of laboratory applications. Standard features include: Faster stability—three times faster stability reading than any other three-beam balance on the market; and, greater accuracy—outstanding beam quality allows for smooth positioning of the poise. Include weight sets. The OHAUS Dial-O-Gram® Series combines the convenience of direct-reading dial calibration with the speed of magnetic damping for a balance that accurately and quickly weighs everything.

Ohaus Triple Pro Mechanical Balance

The Triple Pro features 2600g capacity and 0.1g readability. Balance has integral covered mass storage, including weight set and built in handle for ease of use. Balance also features a storage lock to protect balance when not in use and a spring-loaded zero adjust compensator. **Includes rod and clamp for fast set up of weigh-below applications like specific gravity.**



Ohaus Heavy-Duty Solution Balance

The Ohaus Heavy-Duty Solution Balance is a dual beam mechanical balance with a maximum capacity of 20 kilograms and a readability of 1 gram. A dual-faced Indicator Plate allows front and rear weighing. The base and beam are constructed of cast aluminum and finished with a durable epoxy powder coating. A large lockable tare and magnetic damping speeds up the weighing process. Readings up to 1100 grams may be taken directly off the two beams and the slotted mass set provided extends the weighing capacity to 20 kilograms.

Ohaus Heavy-Duty Field Test Scale

The Field Test Scale is a very compact design and provides accurate weighings of a wide variety of heavy materials, even under the most adverse conditions. The large stabilized pan will hold oversized samples without tipping, and the weighted base keeps the entire scale rock steady. Two models are available: 16kg with a readability of 5g and a 36lb model with a readability of 0.01lb. Includes a set of slotted weights, stored in the base.

Ohaus Cent-O-Gram and Dial-O-Gram Scales

Quality, high precision overhead mechanical balances Ohaus Cent-O-Gram and Dial-O-Gram Overhead Balances offer the accuracy and convenience of an integrated weigh-below balance while allowing students to visualize mass measurement principles. Designed with a hanging pan system, both balances offer 10 times the readability of the Ohaus Triple Beam and Dial-O-Gram top-loading balances. The Vernier dial on the Dial-O-Gram 310 replaces two of the beams and is a great time saver.

Ohaus Mechanical Balances

Capacity	Readability	Model	Description (Ohaus No.)	Tare	Platform	Shipping wt.
311g	0.01g	H-4825	Cent-O-Gram (311-00)	—	3.5" dia. x .5" deep stainless steel pan	5.5lb/2.49kg
310g	0.01g	H-4830	Dial-O-Gram (310-00)	—	3.5" dia. x .5" deep stainless steel pan	5.5lb/2.49kg
2610g	0.1g	H-4603	Series 700 Triple Beam w/ H-4609 weight set (750-SW/707)	—	6" dia. stainless steel plate	8.8lb/3.99kg
2610g	0.1g	H-4604	Series 700 Triple Beam w/ H-4609 weight set (750-SW/707)	225g	6" dia. stainless steel plate	8.8lb/3.99kg
2610g	0.1g	H-4605	Series 700 Triple Beam w/ H-4609 weight set (750-SW/707)	—	12" x 6" x 3" stainless steel scoop	8.3lb/3.76kg
2610g	0.1g	H-4835	Dial-O-Gram (1650-WO)	225g	6" dia. stainless steel plate	9.9lb/4.49kg
2610g	0.1g	H-4739	Triple Pro Mechanical Balance (TP2611)	—	147 x 147mm	8.8lb/3.99kg
16kg	5.0g	H-4665	Heavy-Duty Field Scale, metric (2400-11)	—	10" dia. epoxy-coated steel	23lb/10.45kg
36lb	0.01lb	H-4660	Heavy-Duty Field Scale, english (2400-12)	—	10" dia. epoxy-coated steel	23lb/10.45kg
20kg	1.0g	H-4785	Heavy-Duty Solution Balance (1119-DO)	2270g	11" dia. stainless steel	44lb/19.96kg

* includes H-4615S stainless steel scoop and counterweight



Mechanical Balance Accessories

(Models: H-4603, H-4604, H-4605, H-4835, H-4837)

Description (Ohaus No.)	Model
Polypropylene scoop & counterweight (703-00)	H-4615P
Stainless steel scoop & counterweight (703-S0)	H-4615S
Rod & clamp assembly for under-balance weighing (183-00)	H-21170

Description (Ohaus No.)	Model
Vinyl dust cover (706-00)	H-4603C
Steel carrying case	H-4603CC
Replacement attachment weight set (707-00)	H-4609



Stainless Steel Electronic Balance Calibration Weights—

Stainless Steel Electronic Balance Calibration Weights are available in ASTM Classes 1 and 4 in sizes ranging from 10g to 30kg. Class 1 weights are for analytical balances and applications requiring high accuracy while Class 4 weights are typically used for balances less sensitive than 0.01g. Weights are available in a cylindrical design up to 5kg and a stackable grip-handle design from 5kg to 30kg for all necessary testing, calibration and adjustment. All ANSI/ASTM E617 class weights meet or exceed specifications for tolerance, construction, surface finish, and magnetism as outlined in ANSI/ASTM E617. Weights 5kg and below are supplied in protective cases.

For weights with a Traceable Certificate, place a T at the end of the part number when ordering, i.e. H-4888.30KGT.

For weights with a NVLAP Certificate, place a W at the end of the part number when ordering, i.e. H-4888.30KGW.

Individual Weights— Stainless Steel

Weight	ASTM Class 1	ASTM Class 4
30 kg	H-4888.30KG	H-4889.30KG
25 kg	H-4888.25KG	H-4889.25KG
24 kg	H-4888.24KG	H-4889.24KG
20 kg	H-4888.20KG	H-4889.20KG
16 kg	H-4888.16KG	H-4889.16KG
10 kg	H-4888.10KG	H-4889.10KG
8 kg	H-4888.8KG	H-4889.8KG
5 kg	H-4888.5KG	H-4889.5KG
4 kg	H-4888.4KG	H-4889.4KG
3 kg	H-4888.3KG	H-4888.3KG
2 kg	H-4888.2KG	H-4888.2KG
1.5 kg	H-4888.15KG	H-4889.15KG
1 kg	H-4888.1KG	H-4889.1KG
600 g	H-4888.600G	H-4889.600G
500 g	H-4888.500G	H-4889.500G
400 g	H-4888.400G	H-4889.400G
300 g	H-4888.300G	H-4889.300G
200 g	H-4888.200G	H-4889.200G
160 g	H-4888.160G	H-4889.160G
150 g	H-4888.150G	H-4889.150G
100 g	H-4888.100G	H-4889.100G
80 g	H-4888.80G	H-4889.80G
70 g	H-4888.70G	H-4889.70G
60 g	H-4888.60G	H-4889.60G
50 g	H-4888.50G	H-4889.50G
40 g	H-4888.40G	H-4889.40G
30 g	H-4888.30G	H-4889.30G
20 g	H-4888.20G	H-4889.20G
10 g	H-4888.10G	H-4889.10G



H-4889.250KG



H-4886SS



H-4660.10

Stainless Steel Heavy Capacity Calibration Weights—

Stainless Steel Heavy Capacity Weights are an ideal solution for for the calibration of large capacity scales.

Weight	ASTM Class 4
250kg	H-4889.250KG
200kg	H-4889.200KG
180kg	H-4889.180KG
150kg	H-4889.150KG
100kg	H-4889.100KG
80kg	H-4889.80KG
75kg	H-4889.75KG
60kg	H-4889.60KG
50kg	H-4889.50KG
40kg	H-4889.40KG
20kg	H-4889.20KG

For weights with a Traceable Certificate, place a T at the end of the part number when ordering, i.e. H-4889.50KGT.

For weights with a NVLAP Certificate, place a W at the end of the part number when ordering, i.e. H-4889.50KGW.

Stainless Steel Calibration Weight Sets—

Stainless Steel Electronic Balance Calibration Weight Sets are available in ASTM Class 1 with a 2100g capacity. Class 1 weights are for analytical balances and applications requiring high accuracy. These sets are available three ways: with and Accuracy Certificate, with a Traceable Certificate or with a NVLAP Certificate. These sets include a convenient holder for the set. All ANSI/ASTM E617 class weights meet or exceed specifications for tolerance, construction, surface finish, and magnetism as outlined in ANSI/ASTM E617.

Weight Sets— Stainless Steel

Model	Description
H-4888WS	Stainless Steel Electronic Balance Calibration Weight Set: 2100g capacity: 1kg, 500g, 300g, 200g, 100g, ASTM Class 1 w/ accuracy certificate
H-4888WST	Stainless Steel Electronic Balance Calibration Weight Set: 2100g capacity: 1kg, 500g, 300g, 200g, 100g, ASTM Class 1 w/ Traceable Certificate
H-4888WSW	Stainless Steel Electronic Balance Calibration Weight Set: 2100g capacity: 1kg, 500g, 300g, 200g, 100g, ASTM Class 1 w/ NVLAP Certificate
H-4886SS	Metric Economical Stainless Steel Weight Set: 2010g capacity: 1kg, 500g, 200g, (2) 100g, 50g, 20g, (2) 10g, 5g, (2) 2g, 1g w/ accuracy certificate
H-4886SSC	Metric Economical Stainless Steel Weight Set: 2010g capacity: 1kg, 500g, 200g, (2) 100g, 50g, 20g, (2) 10g, 5g, (2) 2g, 1g w/Traceable Certificate
H-4887SS	Metric Economical Stainless Steel Weight Set: 4110g capacity: 2000g, 1000g, 500g, (2) 200g, 100g, 50g, (2) 20g, 10g, 5g, (2) 2g, 1g. w/ accuracy certificate
H-4887SST	Metric Economical Stainless Steel Weight Set: 4110g capacity: 2000g, 1000g, 500g, (2) 200g, 100g, 50g, (2) 20g, 10g, 5g, (2) 2g, 1g. w/Traceable Certificate

Field Scale Replacement Weights

Model H-4660 (avoirdupois)

Model H-4665 (metric)

Weight	Model
1 lb.	H-4660.1
2 lb.	H-4660.2
5 lb.	H-4660.5
10 lb.	H-4660.10

Weight	Model
500g	H-4665.1
1kg	H-4665.2
2kg	H-4665.3
5kg	H-4665.4

Original set includes: (1) 1lb; (2) 2 lb, and (2) 5 lb, and (2) 10lb

Original set includes: (1) 500g; (1) 1 kg; (2) 2 kg, and (2) 5 kg

Gas Hotplate, Cylinder Gas— H-4947AC

Two-burner, heavy-duty cast iron stove runs on cylinder gas. Designed for portability, this stove is perfect for any lab or location application. Burners are rated at 35,000 BTU and provide fast heating. Shpg. wt. 53lbs. (24kg)



H-4947AC

Gas Hotplate, Natural Gas— H-4947NC

Two-burner, heavy-duty cast iron stove runs on natural gas. Designed for portability, this stove is perfect for any lab or location application. Burners are rated at 35,000 BTU and provide fast heating. Shpg. wt. 53lbs. (24kg)

Gas Hotplate— H-4955

Stainless and aluminized steel construction provides durability and long life. Two, individual-controlled 26,000 BTU burners with individual grates. Heavy-duty legs with leveling legs. Comes with regulator kit for field conversion to propane gas. Dimensions: 12"W x 27"D x 13"H (30.5 x 68.6 x 34 cm).



H-4955



H-4943



H-4943S



H-4954



H-4944



H-4953



H-4952



H-4949



H-4956



H-4958

Basic and Stirring Hotplates—

Reflective white ceramic surface is acid- and alkali-resistant and easy to clean. Nonheating frame surrounds the heated ceramic plate for added protection. Fit virtually anywhere in the lab. Easy-to-set analog temperature control knob with graduated scale. LED display. Top plate and base design diverts liquids away from internal electronics. Safety warning system with visual alert protects user from accidental burns. Redundant temperature control systems for over-temperature protection. Incorporated base mount holds support rods up to 13mm diameter—ideal when using thermometers or pH probes.

Stirring Function Models— Variable analog stirring control to 1200 rpm. Instant-On feature begins stirring at low 60 rpm to prevent splashing. Direct-drive motor/magnet system runs silently.

Heavy-Duty Hotplates—

Electric hotplate with cast-aluminum heating surface and integral structural ribs that will not warp or buckle. Perforated stainless steel base supports heavy loads.

Basic and Stirring Hotplates—

Temperature Range	Heating Surface	Electrical	Standard Model	Stirring Model	Stirring Range
Ambient to 540°C (Ambient to 1004°F)	7" x 7"	120V 60Hz	H-4942	H-4942S	60 to 1200rpm
		230V 50/60Hz	H-4942.4F	H-4942S.4F	
		120V 60Hz	H-4954	H-4944S	
		230V 50/60Hz	H-4954.4F	H-4944S.4F	
Ambient to 400°C (Ambient to 752°F)	10" x 10"	120V 60Hz	H-4943	H-4943S	60 to 1200rpm
		230V 50/60Hz	H-4943.4F	H-4943S.4F	
		120V 60Hz	H-4955	H-4945S	
		230V 50/60Hz	H-4955.4F	H-4945S.4F	

Heavy-Duty Hotplates—

Model	Electrical	Heating Surface	Temperature Range
H-4952	120V 60Hz	12" x 12" (30 x 61cm)	Ambient to 371°C (Ambient to 700°F) Temp. stability: ±3.5°C (6.3°C)
H-4952.4F	230V 50/60Hz		
H-4953	120V 60Hz	12" x 24" (30 x 30cm)	
H-4953.4F	230V 50/60Hz		

Electric Hotplate— H-4949

Dual-burner electric hot plate. Two 825-watt rapid heating burners. Infinite heat controls, heavy-gauge steel construction; chrome finish; phenolic feet. Includes 3-wire cord and plug. 6-1/2" (16.5cm) dia. heating elements: Overall: 20-1/2" x 8-3/4" x 4" (52 x 22 x 10cm). Warm-simmer rolling boil with adjustable controls. Shpg. wt. 9lbs. (4.1kg)

Electric Hotplate— H-4956

Stainless steel construction provides durability and long life. 9-inch solid plate burners for faster, more even heating and easier clean-up. Dimensions: 15"W x 27"D x 12"H (38.1 x 69.5 x 29.3 cm).

Industrial-grade Heat Gun—H-4958

Powerful blower provides a high volumes of air needed for almost any application and convenient base allows for stationary use. Unit is 14.3 Amps and produces temperatures of 750-1000°F. Air intake regulator provides temperature adjustment and cool air setting is great for no-heat applications, adding versatility. Insulated nozzle Protects operator, provides a cool exterior temperature.



H-30200



H-30204.4F



H-30216.4F



H-30210.4F

Small Benchtop Muffle Furnace, 120V 50/60Hz—H-30200

240V 50/60Hz—H-30200.4F

Small (0.07 cu.ft.), 1500W benchtop muffle furnace has ceramic fiber insulation, which provides faster heat-up and reduced energy consumption. Embedded heating element on top and both sides provides temperature uniformity. Digital single setpoint temperature control to 1100°C with single display showing actual temperature or setpoint. Drop-down door doubles as a convenient shelf for loading and unloading. Rear chamber port for monitoring temperatures with independent measuring devices. Shipped with power cord. Refer to table for specifications.

Shpg. wt. 28lb (12.7kg)

Small Benchtop Muffle Furnace, 120V 50/60Hz—H-30201

240V 50/60Hz—H-30201.4F

Small (0.2 cu.ft.), 1800W benchtop muffle furnace has ceramic fiber insulation, which provides faster heat-up and reduced energy consumption. Embedded heating element on top and both sides provides temperature uniformity. Digital single setpoint temperature control to 1200°C with single display showing actual temperature or setpoint. Drop-down door doubles as a convenient shelf for loading and unloading. Rear chamber port for monitoring temperatures with independent measuring devices. Shipped with power cord. Refer to table for specifications.

Shpg. wt. 60 lb (27.2kg)

Large Premium Benchtop Muffle Furnace, 240V 50/60Hz—H-30204.4F

Small (0.5 cu.ft.), 3095W benchtop muffle furnace has ceramic fiber insulation, which provides faster heat-up and reduced energy consumption. Embedded heating element on top and both sides provides temperature uniformity. Digital single setpoint temperature control to 1200°C with single display showing actual temperature or setpoint. Drop-down door doubles as a convenient shelf for loading and unloading. Rear chamber port for monitoring temperatures with independent measuring devices. Shipped with power cord. Refer to table for specifications.

Shpg. wt. 134 (61kg)

Low-Cost 1200°C Box Furnaces, 208/220V 50/60Hz 1 phase

Small to medium-sized, low-cost box furnaces with a maximum working temperature of 1200°C. Furnaces exhibit excellent temperature uniformity and use a ceramic fiber board lining to ensure energy efficiency. Heating elements are designed in a unique configuration, which lays directly on a fiber-groove surface to ensure the longest heating element life, best heat radiation properties and minimum distortion of heating elements at high temperature. All models use long-life platinum/rhodium S-type thermocouple. 30-segment, easy-to-use PID programmable temperature controller, allows control of heating rates, dwells (time holds) and cooling rates. Safety feature includes a safety interlock system to shut off power when furnace door open.

High-Temperature, 1500°C Box Furnaces, 208/220V 50/60Hz 1 phase

Small to medium-sized, low-cost box furnaces with a maximum working temperature of 1500°C. Furnaces exhibit excellent temperature uniformity and use a ceramic fiber board lining to ensure energy efficiency. Long lasting high-temperature silicon carbide heating elements are designed in a unique U-shaped configuration to ensure the longest heating element life, best heat radiation properties at high temperatures, and easy exchange. All models use long-life platinum/rhodium S-type thermocouple. 30-segment, easy-to-use PID Programmable Temperature Controller, allows control of heating rates, dwells (time holds) and cooling rates. Safety feature includes a safety interlock system to shut off power when furnace door open.

Model	Max. Temp	Dimensions Chamber (HxWxD)	Electrical
H-30200	2012°F (1100°C)	4.25" x 5" x 6" (108 x 127 x 152mm)	120V, 12amps, 50/60Hz
H-30200.4F			240V, 6.3amps, 50/60Hz
H-30201	2192°F (1200°C)	5" x 7" x 10" (130 x 180 x 250mm)	120V, 15amps, 150/60Hz
H-30201.4F			240V, 7.5amps, 50/60Hz
H-30204.4F	2192°F (1200°C)	6.8" x 12.8" x 10" (180 x 330 x 250mm)	240V, 12.9amps, 50/60Hz
H-30214.4F	2192°F (1200°C)	4" x 5" x 8" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.
H-30215.4F	2192°F (1200°C)	6" x 7" x 8" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.
H-30216.4F	2192°F (1200°C)	7" x 8" x 12" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.
H-30210.4F	2732°F (1500°C)	4" x 5" x 8" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.
H-30211.4F	2732°F (1500°C)	6" x 7" x 8" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.
H-30212.4F	2732°F (1500°C)	7" x 8" x 12" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.
H-30213.4F	2732°F (1500°C)	10" x 10" x 16" (180 x 330 x 250mm)	208/220V 50/60Hz 1 ph.

Gloves: see page 262; Evaporating Dishes: see page 256-257;
Crucible Tongs: see page 262; Safety Tongs: see page 262;



Laboratory Ovens

Quality fan-forced circulation or gravity-convection ovens feature double-wall construction and heavy, welded-steel exterior. Work space is insulated from the outer cabinet with one inch of high-density mineral wool, and interiors are made of corrosive-resistant aluminized steel. Low-watt density incoloy-sheathed elements are used. Include automatic thermocontrol, pilot light heat indicator and either a top-mounted, mercury thermometer (0°-300°C) on the gravity convection models or a door-mounted, dial thermometer on the forced air models. All ovens come with two, adjustable shelves and a 6 ft., 3-wire power cord and grounded plug. Units also have scratch-proof rubber feet, full-length piano-hinged door and extruded thermoplastic door handle.

Laboratory Ovens – Forced Air

Model	Max. Temp.	Description	Dimensions (W x H x D)
H-30105	437°F (225°C)	.6 cu. ft. (17L) capacity. Features bi-metal temperature controller, ±2° sensitivity. 115V, 60 Hz, 800 watts minimum. Shipping wt. 50 lbs. (22.6kg)	Inside: 12" x 8.6" x 10" (305 x 218 x 254mm) Overall: 14" x 20.5" x 12" (356 x 521 x 305mm)
H-30105.4F		230V, 50/60 Hz. version of above	
H-30115	437°F (225°C)	1.14 cu. ft. (32L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz, 1000 watts minimum. Shipping wt. 66 lbs. (30kg)	Inside: 13" x 11.6" x 13" (330 x 295 x 330mm) Overall: 15" x 24.5" x 15" (381 x 622 x 381mm)
H-30115.4F		230V, 50/60 Hz. version of above	
H-30125	437°F (225°C)	2 cu. ft. (56L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz, 1600 watts min. Shipping wt. 82 lbs. (31.7kg)	Inside: 18" x 14.6" x 12" (457 x 371 x 305mm) Overall: 20" x 28.5" x 14" (508 x 724 x 356mm)
H-30125.4F		230V, 50/60 Hz. version of above	
H-30131	437°F (225°C)	2.86 cu. ft. (81L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz, 1600 watts min. Shipping wt. 112 lbs. (51kg)	Inside: 18" x 19.6" x 14" (457 x 498 x 356mm) Overall: 20" x 33.5" x 16" (508 x 851 x 406mm)
H-30131.4F		230V, 50/60 Hz. version of above	

Laboratory Ovens – Gravity Convection

Model	Max. Temp.	Description	Dimensions (W x H x D)
H-30100	437°F (225°C)	.7 cu. ft. (20L) capacity. Features bi-metal temperature controller, ±2° sensitivity. 115V, 60 Hz, 600 watts minimum. Shipping wt. 44 lbs. (20kg)	Inside: 12" x 10" x 10" (305 x 254 x 254mm) Overall: 4" x 17" x 12" (355 x 431 x 304mm)
H-30100.4F		230V, 50/60 Hz. version of above	
H-30110	437°F (225°C)	1.27 cu. ft. (35L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz, 800 watts minimum. Shipping wt. 60 lbs. (27.2kg)	Inside: 13" x 13" x 13" (330 x 330 x 330mm) Overall: 15" x 21" x 15" (381 x 534 x 381mm)
H-30110.4F		230V, 50/60 Hz. version of above	
H-30120	437°F (225°C)	2 cu. ft. (56L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz. 1200 watts min. Shipping wt. 78 lbs. (35kg)	Inside: 18" x 16" x 12" (457 x 406 x 305mm) Overall: 20" x 25" x 14" (508 x 635 x 356mm)
H-30120.4F		230V, 50/60 Hz. version of above	
H-30128	437°F (225°C)	3.0 cu. ft. (85L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz, 1600 watts min. Shipping wt. 94 lbs. (43kg)	Inside: 18" x 21" x 14" (457 x 534 x 356mm) Overall: 20" x 30" x 16" (508 x 762 x 406mm)
H-30128.4F		230V, 50/60 Hz. version of above	



H-30145



H-30145E with E-Series Digital Control

Laboratory Bench Ovens

These ovens feature fan-forced-air circulation, which provides even work space temperature for testing applications. Ovens incorporate large, 7/16" diameter, Low-watt density incoloy-sheathed elements and 2" (51mm) thick mineral wool, high density insulation, steel-lined interior, piano-hinged and gasketed doors, adjustable damper control and an ambient temperature range to 300°F (149°C). Ovens include two adjustable shelves. Additional shelves can be ordered, shelf support holes are on 1-1/2" (38mm) centers to accommodate up to 11 shelves. Features on-off switch, panel board, thermostat, heat switch, 3-wire cord and plug.

Digital Control Bench Ovens (E-Series)

These units utilize a precise digital PID microprocessor temperature controller, which with a J-type thermocouple will hold set temperatures accurately within 1 degree with improved chamber uniformity. Control features include large easy-to-read dual LED display, showing both set and process temperatures, °C or °F units. A versatile on/off control mode allows for even faster temperature recovery times and processing of batch-style work loads not requiring accurate temperature stability.

Model	Max. Temp.	Description	Dimensions (W x H x D)
H-30140	300°F (149°C)	7 cu. ft. (198L) capacity. Features calibrated dial-type temperature controller, 115V, 60 Hz, 1110 watts Shipping wt. 180 lbs. (68kg)	Inside: 25.5" x 20" x 24" (648 x 508 x 610mm) Overall: 33" x 24" x 35.5" (838 x 610 x 902mm)
H-30140.4F		230V, 50/60Hz version of H-30140	
H-30140E		E-Series digital control version of H-30140	
H-30140E.4F		230V, 50/60Hz version of H-30140E	
H-30145	437°F (225°C)	7 cu. ft. (198L) capacity. Features calibrated dial-type temperature controller, 115V, 60 Hz, 2110 watts. Uses 20 amp grounded plug. Shipping wt. 180 lbs. (68kg)	Inside: 26" x 20" x 26" (660 x 508 x 660mm) Overall: 33" x 24" x 32" (838 x 610 x 813mm)
H-30145.4F		230V, 50/60Hz version of H-30145	
H-30145E		E-Series digital control version of H-30145	
H-30145E.4F		230V, 50/60Hz version of H-30145E	
H-30135	437°F (225°C)	10.6 cu. ft. (300L) capacity. Features calibrated dial-type temperature controller,, 115V, 60 Hz. 2110 watts. Uses 20 amp grounded plug. Shipping wt. 180 lbs (68kg).	Inside: 25.5" x 30" x 24" (648 x 782 x 610mm) Overall: 33" x 34" x 35.5" (838 x 804 x 902mm)
H-30135.4F		230V, 50/60Hz version of H-30135	
H-30135E		E-Series digital control version of H-30135	
H-30135E.4F		230V, 50/60Hz version of H-30135E	
H-30160.4F	550°F (287°C)	6.6 cu. ft. (187L) capacity. Features calibrated dial-type temperature controller, 230V, 60 Hz, 2800 watts. Shipping wt. 185 lbs (77.1kg)	Inside: 25.5" x 20" x 22.5" (660 x 508 x 572mm) Overall: 33" x 24" x 35.5" (838 x 610 x 902mm)
H-30160E.4F		E-Series digital control version of H-30160.4F	
H-30160.4FSS		Stainless Steel version of H-30160.4F	



Heavy-Duty Forced-Air, Convection Ovens

Ideally suited for soil and asphalt testing, the Despatch LBB series ovens feature fast heat-up rates and precise, easy-to-read digital controls. Powerful heating elements bring the oven to temperature very quickly, resulting in fast test results and improved sample quality. Digital controls deliver precise temperature and a large LED panel makes it easy to monitor oven temperatures. The LBB series ovens operate at temperatures up to 400°F (204°C) and use forced convection airflow for uniform temperatures throughout the oven chamber. Standard shelves can handle up to 50 lbs. (22.7kg) and are easy to slide out and reposition. Shelves that can handle 200 lbs. (90.7kg) of material are available as an option. Meets AASHTO uniformity requirements of $\pm 3^\circ$ at 150°C. Motor and fan are located above the stainless steel oven chamber to prevent damage if materials are spilled.

Heavy-Duty Laboratory Ovens

Chamber Size W x D x H	Capacity cu. ft. (L)	Oper. Range	Model	Despatch Model	Overall Size W x D x H	Electrical	Shpg. wt.
18 x 18 x 12" (46 x 46 x 31cm)	2.3 (65)	104°F to 399°F	H-30356	LBB1-23	24 x 24.5 x 26" (61 x 63 x 67cm)	50/60Hz, 1ph, 120V 15 amps, 1.2KW heater	205 lb (92 kg)
		40°C to 204°C	H-30356.4F			50/60Hz, 1ph, 240V 15 amps, 1.2KW heater	
24 x 14 x 22" (61 x 36 x 56cm)	4.3 (122)	104°F to 399°F	H-30358	LBB1-43	30 x 20.5 x 36.5" (77 x 53 x 93cm)	50/60Hz, 1ph, 120V 20 amps, 1.6KW heater	270 lb (121 kg)
		40°C to 204°C	H-30358.4F			50/60Hz, 1ph, 240V 15 amps, 1.6KW heater	
30 x 18 x 22" (77 x 46 x 56cm)	6.9 (196)	104°F to 399°F	H-30360	LBB1-69	36 x 24.5 x 36.5" (92 x 63 x 93cm)	50/60Hz, 1ph, 120V 21.6 amps, 2.4KW heater	320 lb (146 kg)
			H-30360.4F			50/60Hz, 1ph, 240V 10.8 amps, 2.4KW heater	
30 x 20 x 35" (77 x 51 x 89cm)	12.1 (340)	40°C to 204°C	H-30364.4F	LBB2-12	36 x 26.5 x 51.5" (92 x 68 x 131cm)	50/60Hz, 1ph, 240V 16.4 amps, 3.6KW heater	385 lb (175 kg)
37 x 24 x 35" (94 x 61 x 89cm)	18 (510)		H-30366.4F	LBB2-18	43 x 30.5 x 51.5" (110 x 78 x 131cm)	50/60Hz, 1ph, 240V 16.4 amps, 3.6KW heater	485 lb (221 kg)
37 x 37 x 35" (94 x 94 x 89cm)	27 (765)		H-30368.4F	LBB2-27	43 x 43.5 x 51.5" (110 x 111 x 131cm)	50/60Hz, 1ph, 240V 21.4 amps, 4.8KW heater	635 lb (289 kg)



High-Performance Forced-Air Bench-Top Ovens

For faster processing, testing, preheating, sterilizing, drying, aging, curing and other production applications. Despatch LAC ovens have microprocessor-based control system with single set-point operation, timer function and up to 48 steps of ramp/soak programming, as well as manual reset high-limit protection and solid-state relay switching. Horizontal air flow with high fan volume of forced recirculated air through perforated stainless steel walls for uniform heating. Welded double-wall construction, 3" Fiberglass insulation, rapid-response heater with 5-year warranty, baked enamel finish and stainless steel interior.



High-Performance Forced-Air Bench-Top Ovens

Chamber Size W x D x H	Capacity cu. ft. (L)	Oper. Range	Model	Despatch Model	Overall Size WxDxH	Electrical, Single Phase	Exhaust Dia. (on Chamber Back)	Cord and Plug	Doors	Shpg. wt.
14 x 12 x 12" (36x30x30cm)	1.1 (28)	35-260°C (95-500°F)	H-30320	LAC1-10	23 x 21 x 30" (58x53x76cm)	120V 50/60Hz, 10 amps, 1KW heater	1"	incl.	1	95 lb (43 kg)
19 x 18 x 19" (48x46x48cm)	3.8 (108)		H-30322	LAC1-38A	28 x 28 x 37" (71x71x93cm)	120V 50/60Hz, 16 amps, 1.6 KW heater	2"		1	165 lb (75 kg)
19 x 18 x 19" (48x46x48cm)	3.8 (108)		H-30322.4F	LAC1-38B	28 x 28 x 37" (71x71x93cm)	240V 50/60Hz, 9.2 amps, 1.8 KW heater	2"		1	165 lb (75 kg)
24 x 20 x 24" (61x51x61cm)	6.7 (190)		H-30324.4F	LAC1-67	36 x 30 x 42" (91x76x107cm)	240V 50/60Hz, 11.7 amps, 2.4 KW heater	2"		1	203 lb (92 kg)
24 x 24 x 36" (61x61x90cm)	12 (340)	50-260°C (122-500°F)	H-30326.4F	LAC2-12	36 x 33 x 54" (91x84x137cm)	240V 50/60Hz, 18.4 amps, 3.6 KW heater	2 to 2-1/2"	none	1	535 lb (243 kg)
36 x 24 x 36" (90x61x90cm)	18 (510)		H-30328.4F	LAC2-18	48 x 31 x 54" (122x79x137cm)	240V 50/60Hz, 23.4 amps, 4.8 KW heater	2 to 2-1/2"		2	720 lb (284 kg)



H-32300



H-32333



H-32343
(shown with
optional stand)

Large Capacity Bench Ovens

These economical, large-capacity, bench ovens are designed to handle a wide variety of applications, which require a maximum temperature of 400°F (204°C) with a ±0.5% control accuracy and ±8°F (4°C) uniformity for efficient drying of large samples.

All models feature an analog thermocouple-actuated, temperature controller and a 1/3 HP motor with a 400 CFM blower. Ovens have 2" (51mm) 6 lb/cf industrial rockwool insulation and the built-in baffle helps prevent radiant heat and optimizes oven heating operation. All ovens have 304 stainless steel interiors, explosion venting latches and incoloy sheathed tubular heating elements.

All ovens feature a UL-listed control panel and meet the requirements of National Fire Prevention Association Standard 86, Industrial Risk Insurers, Factory Mutual and OSHA standards. Motor starter and heating element contactors are electrically interlocked to shut off heaters if power to the blower is interrupted, and, permits operation of the blower without heat for cooling.

Ovens include two (2) 50lb (22.7kg) capacity nickel-plated wired shelves, which can be placed on any of the 10 support channels, which are located on 3" centers. Extra shelves can be ordered to accommodate needs.

Digital Controller Option for Ovens—

A Digital, Microprocessor-based indicating, thermocouple-actuated temperature controller can be requested at time of order. Add the suffix. DIG2 to the oven model number, (ie: H-32300.DIG2).

Additional Shelf for H-32300—H-32300.1

Additional Shelf for H-32333—H-32333.1

Additional Shelf for H-32343—H-32343.1

50lb (22.7kg) capacity nickel-plated wired shelf for use with H-32300 oven.

Optional Stand for H-32300—H-32300.2

Optional Stand for H-32333—H-32333.2

Optional Stand for H-32343—H-32343.2

Designed to hold oven at convenient 24" working height. Specify model number of oven when ordering.

Large Capacity Bench Ovens

Volume Cu. ft (m)	Inside Dim. W x D x H	Max. Temp.	Model	Voltage	Outer Dim. W x D x H	Kw	Rise Time	Shpg. wt.
15.8 (.447)	36" x 21" x 36" (91 x 53 x 91cm)	400°F (204.4°C)	H-32300.2F	230V,60Hz 1ph.	40" x 28" x 47" (102 x 71 x 119cm)	4.4	18 min.	600 (272)
			H-32300.2F.3	230V,60Hz 3ph.				
			H-32300.8F	208V,60Hz 1ph.				
			H-32300.8F.3	208V,60Hz 3ph.				
			H-32300.9F.3	460V,60Hz 3ph.				
27 (.764)	36" x 36" x 36" (91 x 91 x 91cm)	400°F (204.4°C)	H-32333.2F	230V,60Hz 1ph.	40" x 43" x 47" (102 x 109 x 119cm)	6.6	18 min.	750 (340)
			H-32333.2F.3	230V,60Hz 3ph.				
			H-32333.8F	208V,60Hz 1ph.				
			H-32333.8F.3	208V,60Hz 3ph.				
			H-32333.9F.3	460V,60Hz 3ph.				
36 (1.01)	36" x 48" x 36" (91 x 122 x 91cm)	400°F (204.4°C)	H-32343.2F	230V,60Hz 1ph.	40" x 55" x 47" (102 x 140 x 119cm)	6.6	22 min.	850 (385)
			H-32343.2F.3	230V,60Hz 3ph.				
			H-32343.8F	208V,60Hz 1ph.				
			H-32343.8F.3	208V,60Hz 3ph.				
			H-32343.9F.3	460V,60Hz 3ph.				



H-4460

H-4461A



HM-4469.02

H-4466.30
H-4466.15
H-4466.10

H-4470

Dial Gauges

Indicators are built to American Gauge Design specifications for accuracy and are used in field and laboratory testing applications. Dials are high-quality, low-friction type, designed for long life and accurate repeatable readings. All dial indicators have continuous graduations and revolution counters that show revolutions of the indicator hand. They are furnished with a lug back (with a 90° mounting hole to be used vertically or horizontally), a regular contact point .25" long, and a dust cap. Dials listed are clockwise rotation; counter-clockwise rotation see note below.

Dial Gauges, Inches

For counter-clockwise dial indicators add "CC" suffix to part number, i.e.: H-4460CC.

Range	Division	Diameter	Brake	Model
.200"	.0001"	2.25"	No	H-4460
.200"	.0001"	2.25"	Yes	H-4461A
.300"	.0001"	2.25"	No	H-4462
.500"	.0001"	2.25"	No	H-4471
1.000"	.001"	2.25"	No	H-4158.1
2.000"	.001"	2.75"	No	H-4463
3.000"	.001"	2.75"	No	H-4464
4.000"	.001"	2.75"	No	H-4465
5.000"	.001"	2.75"	No	H-4466

Dial Gauges, Metric

For counter-clockwise dial indicators add "CC" suffix to part number, i.e.: H-4465.08CC.

Range	Division	Diameter	Brake	Model
8mm	.002mm	57mm	No	H-4465.08
12mm	.002mm	57mm	No	H-4465.12
25mm	.010mm	57mm	No	H-4465.25
50mm	.020mm	70mm	No	H-4465.50

Electronic Digital Indicators

For use in all Humboldt instrumentation. Switchable inch/metric digital indicators are accurate to ± 0.0001 (0.002mm). Feature instant "0" at any spindle position, lock in maximum reading, LCD display with .305"-high characters, infrared linear encoder, AC power or replaceable batteries. Order HM-4469.02 as a replacement indicator for H-4454-Series Proving Rings—see pages 83 and 155. Brake is available for most model dial indicators, call 1-800-544-7220

Range	Division	Model	Diameter	Peak Hold
0.2500" (6.250mm)	0.0001" (0.002mm)	HM-4469.02	2-9/32" (72mm)	Yes
0.6000" (15.000mm)	0.0001" (0.002mm)	HM-4469.05	2-9/32" (72mm)	Yes
1.0000" (25.400mm)	0.0001" (0.002mm)	HM-4469.10	2-9/32" (72mm)	Yes
2.0000" (50.800mm)	0.0001" (0.002mm)	HM-4469.20	2-9/32" (72mm)	Yes
4.0000" (101.600mm)	0.0001" (0.002mm)	HM-4469.40	2-9/32" (72mm)	Yes

Gauge Contact Point Extensions—

Used in applications where gauges require longer contact points to ensure correct gauge placement. Contact Points feature hardened steel points with polished tip to prevent scratching. Points fit all standard indicators and gauges. Not compatible with H-4471, H-4471CC, H-4465.12, and H-4465.12CC gauges.

Contact Point Extensions	Model
.25" (6.4mm) Extension	H-4466.2
1" (25mm) Extension	H-4466.10
1.5" (38mm) Extension	H-4466.15
2" (50mm) Extension	H-4466.20
3" (76mm) Extension	H-4466.30
5" (127mm) Extension	H-4466.5

Magnet Holder with Swivel Adapter Yoke—H-4470

Convenient, portable method of mounting dial indicators. Holder's Alnico magnetic base mounts on flat or curved metallic surfaces. Non-magnetic stainless steel holding rod is 6 x 1/4" (154 x 6.4mm) and set in hardened ball socket so indicator may be mounted in almost any position.



Graduated Glass Beakers

Description	Capacity	Grad. Range	Interval	Model
Griffin low-form beakers for general laboratory use have pourout lip. Design provides greater strength via heavier uniform walls.	50ml	10-40	10	H-4911.050
	100ml	20-80	10	H-4911.100
	250ml	25-200	25	H-4911.250
	400ml	25-325	25	H-4911.400
	600ml	50-500	50	H-4911.600
	800ml	50-750	50	H-4911.800
	1000ml	50-950	50	H-4911.1M
	2000ml	50-1950	50	H-4911.2M
	3000ml	50-2950	50	H-4911.3M
	4000ml	50-3950	50	H-4911.4M

Graduated Glass Cylinders

Description	Capacity	Model
Glass graduated cylinders. Graduated circular divisions, double-numbered, reading up and down. Calibrated to deliver the indicated capacities. Packed one cylinder to a carton.	10ml	H-4915.010
	25ml	H-4915.025
	50ml	H-4915.050
	100ml	H-4915.100
	250ml	H-4915.250
	500ml	H-4915.500
	1000ml	H-4915.1M
	2000ml	H-4915.2M

Graduated Plastic Beakers

Description	Capacity (ml)	Model
Low-form laboratory beakers with slightly tapered heavy walls provide firm grip and convenient stacking. Beakers have pourout spout and graduation markings (±5%).	50	H-4912P.050
	100	H-4912P.100
	250	H-4912P.250
	400	H-4912P.400
	600	H-4912P.600
	1000	H-4912P.1M
	2000	H-4912P.2M

Graduated Plastic Cylinders

Description	Capacity	Model
Polypropylene graduated cylinders are double scale with easy-to-read numbers. Stable base makes cylinders tip- and roll-proof. 10ml size has flared top for easy filling.	10ml	H-4916P.010
	25ml	H-4916P.025
	50ml	H-4916P.050
	100ml	H-4916P.100
	250ml	H-4916P.250
	500ml	H-4916P.500
	1000ml	H-4916P.1M
	2000ml	H-4916P.2M



Polyethylene Dispensing Bottle
Easy-to-squeeze, resilient bottles provide excellent leak-proof dispensing units. Heavier flow rate can be accomplished by cutting back dispenser tip.

Capacity	Model
8 oz. (250ml)	H-3398
16 oz. (500ml)	H-3399
32 oz. (1000ml)	H-3399XL



H-3397

Guth Wash Bottle— H-3397
Bottle has aspirator bulb with integral passageways and neck-mounted check-valve on a 1,000ml borosilicate florence flask. Includes bent delivery tube and flexible tubing tip. Flask allows natural grip with either hand. Forefinger closes the opening while the other fingers squeeze the bulb ejecting a stream of liquid.



H-4913.250

H-4913.1M

H-4917.2M

Erlenmeyer Flasks

Description	Capacity (ml)	Model
Narrow-mouth flasks feature heavy-duty rim, volume graduations, tubulation and matte spot for temporarily identifying contents.	250	H-4917.250
	500	H-4917.500
	1000	H-4917.1M
	2000	H-4917.2M
	4000	H-4917.4M

Erlenmeyer Flasks—Vented

Description	Capacity (ml)	Model
Narrow-mouth flasks feature heavy-duty rim, volume graduations, tubulation and matte spot for temporarily identifying contents.	250	H-4913.250
	500	H-4913.500
	1000	H-4913.1M
	2000	H-4913.2M
	4000	H-4913.4M

Rubber Stoppers for Erlenmeyer Flasks

Description	Capacity (ml)	Model
Rubber stopper with brass hose fitting for use with Erlenmeyer flasks.	250	H-4913.250S
	500	H-4913.500S
	1000	H-4913.1MS
	2000	H-4913.2MS
	4000	H-4913.4MS



H-4913.1MS

H-4913.250S

**Material Handling Scoops**

Model	Size	Description	Shpg. Wt.
H-1702	8" H x 15" W x 23" L (203 x 381 x 584mm)	Material Handling Scoop	12 lb (5.4kg)
H-4308	15" x 30" x 4" (381 x 762 x 102mm)	Welded steel construction with open chute simplifies transfer or bag loading. Front swing-down handle folds inside pan to permit criss-cross stacking. Tapered scoop section controls flow.	9 lb (4.1kg)
H-4309	12" x 20" x 4" (305 x 508 x 102mm)		

Moisture and Immersion Pans

Model	Size	Description	Shpg. Wt.
H-3700	18 x 18 x 1-1/2" deep (457 x 457 x 38mm)	Galvanized iron with wire-bound, rolled-top edges. Features 2 drop handles, straight sides. ASTM D2234, D2961	10 lb (4.5kg)
H-3707	18 x 18 x 3" deep (457 x 457 x 76mm)		
H-3705	18 x 18 x 3" deep (457 x 457 x 76mm)	Same as H-3700, except with tapered sides for nesting. ASTM D346, D2013, D2234	12 lb (5.4kg)
H-3710	24 x 24 x 4" deep (610 x 610 x 102mm)	Same as H-3700. ASTM D346, D2013, D 2234	20 lb (9kg)
H-3712	24 x 24 x 6" deep (610 x 610 x 152mm)		
H-3723	10 x 20 x 3" deep (254 x 508 x 76mm)	Same as H-3700, except with tapered sides for nesting.	9 lb (4.1kg)
H-3725	24 x 24 x 3" deep (610 x 610 x 76mm)	Same as H-3700, except with tapered sides for nesting. ASTM C192	18 lb (8.2kg)

Stainless Steel Rectangular Pans

Model	Dimensions	Shpg. Wt.
H-3981S	6-1/2" x 6" x 4-1/2" D (165 x 152 x 114)	3 lb (1.4kg)
H-3986S	10-1/2" x 5-1/2" x 4-1/2" D (267 x 40 x 114)	4 lb (1.8kg)
H-3967S	13-1/2" x 6-3/4" x 5" D (343 x 171 x 127)	5 lb (2.3kg)
H-3993S	22" x 6-1/2" x 5-1/4" D (559 x 165 x 133)	6 lb (2.7kg)
H-3996S	15-1/2" x 8" x 7" D (394 x 204 x 178)	6 lb (2.7kg)

Tin Rectangular Mixing Pans

Model	Dimensions	Shpg. Wt.
H-3981	8 x 5-1/4 x 4-1/4" (203 x 133 x 108mm)	1 lb (.45kg)
H-4934	8-1/2 x 4-1/2 x 2-1/2" (216 x 114 x 64mm)	1 lb (.45kg)

Bakalon Rectangular Mixing Pans

Model	Dimensions	Shpg. Wt.
H-4359A	18 x 13 x 1-7/8" D (457 x 330 x 47mm)	1 lb (.45kg)



Aluminum Rectangular Mixing Pans

Model	Size (L x W x D)
H-4351.2	15-3/8" x 10-7/8" x 2-3/8" (390 x 276 x 60mm)
H-4351.4	17-5/8" x 11-3/4" x 2-3/8" (447 x 298 x 60mm)
H-4351.6	25-3/4" x 17-3/4" x 3-1/2" (654 x 450 x 89mm)
H-4941	8" x 8" x 2" (203 x 203 x 51mm)

Stainless Steel Round Mixing Bowls and Pans

Model	Size and Volume
H-4936	7-1/4" x 3" (198 x 76mm) 1-1/2 qt. (1.4L)
H-4937	9-1/2" x 3-1/2" (241 x 89mm) 3 qt. (2.8L)
H-4938	12-1/2" x 5-1/2" (318 x 140mm) 8 qt. (7.6L)
H-4939	10-3/4" x 4-3/4" (273 x 121mm) 5-1/2 qt. (5.2L)
H-4939.5	17-1/2" x 6-1/2" (444 x 165mm) 16 qts. (13.9L)

Aluminum Round Mixing Bowls and Pans

Model	Size (L x W x D)
H-4940.2	9" x 1-1/2" (228 x 38mm)
H-4940.4	10" x 1-1/2" (254 x 38mm)
H-4940.6	12" x 1-1/2" (304 x 38mm)
H-4940.8	15" x 1-1/2" (381 x 38mm)

Stainless Steel Rectangular Mixing Pans

Model	Dimensions
H-3969	10-3/8 x 6-3/8 x 2-1/2" (264 x 162 x 64mm)
H-4352.2	20-3/4 x 12-3/4 x 2-1/2" (527 x 323 x 63mm)
H-4352.4	20-3/4 x 12-3/4 x 4" (527 x 324 x 102mm)
H-4352.6	20-3/4 x 12-3/4 x 6" (527 x 324 x 152mm)
H-4353.2	13-7/8 x 12-3/4 x 2-1/2" (346 x 323 x 63mm)
H-4353.4	13-7/8 x 12-3/4 x 4" (346 x 323 x 102mm)
H-4353.6	13-7/8 x 12-3/4 x 6" (346 x 323 x 152mm)
H-4354.2	10-3/8 x 12-3/4 x 2-1/2" (264 x 342 x 64mm)
H-4354.4	10-3/8 x 12-3/4 x 4" (264 x 342 x 102mm)
H-4354.6	10-3/8 x 12-3/4 x 6" (264 x 342 x 152mm)
H-4355.2	6-7/8 x 12-3/4 x 2-1/2" (174 x 342 x 64mm)
H-4355.4	6-7/8 x 12-3/4 x 4" (174 x 342 x 102mm)
H-4355.6	6-7/8 x 12-3/4 x 6" (174 x 342 x 152mm)
H-4356.2	14-7/8 x 10-1/4 x 2" 376 x 269 x 50mm)
H-4356.4	16-1/8 x 11-1/8 x 2-1/4" (409 x 282 x 57mm)
H-4356.6	18-1/8 x 12-3/8 x 2-3/8" (460 x 314 x 60mm)



Nickel Crucibles & Covers

Nickel crucibles from pure heavy sheet nickel. Suitable for fusions, including those with sodium peroxide. Highly resistant to dilute alkalis.

Capacity	Top Dia.	Height	Crucible	Cover
20ml	38mm	35mm	H-4922.020	H-4922C.020
30ml	42mm	45mm	H-4922.030	H-4922C.030
50ml	45mm	51mm	H-4922.050	H-4922C.050
75ml	51mm	57mm	H-4922.075	H-4922C.075
100ml	60mm	64mm	H-4922.100	H-4922C.100
250ml	83mm	83mm	H-4922.250	H-4922C.250
500ml	102mm	92mm	H-4922.500	H-4922C.500
1000ml	127mm	114mm	H-4922.1M	H-4922C.1M

Nickel Evaporating Dishes

Capacity	Dia	Height	Description	Model
40ml	2-1/4" (57mm)	1" (25mm)	Heavy gauge pure nickel dishes have straight sides, flat bottom, pour lip.	H-4924.040
100ml	2-3/4" (70mm)	1-3/8" (35mm)		H-4924.100
200ml	3-3/8" (86mm)	1-13/16" (46mm)		H-4924.200
300ml	3-7/8" (98mm)	2-1/4" (57mm)		H-4924.300

Stainless Steel Measures

Capacity	Description	Model
500ml	Measures feature convenient handle and graduations in milliliters and ounces on inside.	H-4923.500
1,000ml		H-4923.1M
2,000ml		H-4923.2M

Aluminum and Nickel Beakers

Capacity	Description	Aluminum	Nickel
60ml	Low-form laboratory beakers with pour spout.	H-4920.060	H-4921.060
125ml		H-4920.125	H-4921.125
250ml	One-piece construction eliminates breakage.	H-4920.250	H-4921.250
500ml		H-4920.500	H-4921.500
1,000ml		H-4920.1M	H-4921.1M
2,000ml		H-4920.2M	H-4921.2M



Aluminum Moisture Dish— H-17150

Inverted slip-in cover with beaded edge for tight sealing, can be handled with crucible tongs. Inside dia at top 2-1/4" x 3/4" deep (57mm x 19mm). Drawn aluminum construction. Packed 10 per ctn.



H-4914.08



H-4927



H-4930.250



H-4184

H-4183



H-4962



H-4960

Sample Cans

For receiving, transporting and storing sample materials. Has friction-type lid. H-4183, 1 gal-capacity (3.48L), can adequately hold all material from an average-sized density hole.

Capacity	Dimensions	Model
1 qt. (.87L)	4-1/8" dia. x 4-7/8" (105 x 124mm)	H-4183
1 gal. (3.48L)	6-1/2" dia. x 7" (165 x 178mm)	H-4184

Desiccator Jar, 5" (128mm) Diameter— H-4960

Desiccator Jar, 8" (203mm) Diameter— H-4961

Heavy-walled, annealed jar has finely ground flanges and cover knob. Includes specimen plate. 5" (128mm) Jar has 5" inside diameter and 5-1/4" (134mm) inside height, and, 8" (203mm) jar has 8" inside diameter and height.

Specimen Plate for H-4960 Desiccator Jar— H-4960P

Specimen Plate for H-4961 Desiccator Jar— H-4961P

Desiccab Desiccator— H-4962

Stainless steel cabinet with Clear-Vue door eliminates danger of glass breakage. Interior has chemical-resistant finish; door is sealed with two firm-grip latches and molded rubber gasket. Includes glass desiccator tray and two heavy-gauge ceramic shelves that are fully adjustable with 1/2" (13mm) centers. Inside dimensions: 13" x 13" x 13-1/4" (330 x 330 x 336mm).

Porcelain Evaporating Dishes

Capacity	Top Dia	Height	Description	Model
120ml	90mm	37mm	Shallow porcelain dish has pour lip, glazed inside, partly glazed	H-4930.120
250ml	115mm	45mm		H-4930.250
765ml	185mm	54mm		H-4930.765
1,285ml	215mm	63mm		H-4930.M1285

Aluminum Moisture Boxes

Dia	Height	Description	Model
2" (51mm)	7/8" (22mm)	Seamless aluminum flat bottom, straight side box has tight fitting cover that fits bottom of box also. Sample is protected from exposure during weighing operations.	H-4926
2-1/2" (64mm)	1-3/4" (44mm)		H-4927
3" (76mm)	1" (25mm)		H-4928
3-1/2" (89mm)	2" (51mm)		H-4929

Plastic Jars with Caps

Capacity	Description	Model
4 oz (113.4g)	White plastic jar with cap; 12 per pack.	H-4914.04
8 oz (226.8g)		H-4914.08
16 oz (453.6g)		H-4914.16



Stainless Steel Scoops

Model	Teflon® Coated	Scoop No.	Nose	Bowl Vol./ Water (oz/cu. in.)	Length	Bowl Dimensions Width	Depth	Overall Length
H-3734	H-3734TC	–	Round	3.3 (6.1)	5" (114mm)	2-1/2" (63mm)	1" (25.4mm)	9" (228mm)
H-3735	H-3735TC	–	Flat	6.6 (12.2)	5-1/2" (139mm)	3" (76mm)	1-1/2" (38mm)	9.3" (236mm)
H-3736	H-3736TC	–	Flat	29 (53)	8" (203mm)	5-1/2" (139mm)	2-1/2" (63mm)	13-1/2" (343mm)
H-3738		–	Curved	–	2-1/2" (635mm)	2-1/2" (635mm)	–	9" (228mm)

Aluminum Scoops

Model	Teflon® Coated	Scoop No.	Nose	Bowl Vol./ Water (oz/cu. in.)	Length	Bowl Dimensions Width	Depth	Overall Length
H-3729	H-3729TC	1	Round	13.5 (24.4)	6-3/4" (172mm)	4" (102mm)	2-1/2" (64mm)	10" (254mm)
H-3730	H-3730TC	–	Square	6.7 (12.2)	6" (152mm)	3-3/4" (95mm)	2" (51mm)	9-1/4" (235mm)
H-3731	H-3731TC	2	Round	20 (36.6)	8-1/4" (210mm)	5-1/4" (133mm)	3" (76mm)	12-1/4" (311mm)
H-3732	H-3732TC	3	Round	33 (61.02)	10-1/4" (260mm)	5-3/4" (146mm)	3-1/2" (89mm)	14-1/2" (368mm)



Plastic Scoop

Model	Teflon® Coated	Scoop No.	Nose	Bowl Vol./ Water (oz/cu. in.)	Length	Bowl Dimensions Width	Depth	Overall Length
H-3727	-	-	Flat	67 (115.5)	9" (228mm)	4" (102mm)	5-1/2" (139)	9" (228mm)

Trowel— H-3760

Forged steel trowel for mixing cement batches, filling molds, etc., has flat pointed blade and rubber/plastic handle. Dimensions: 2-3/4" x 5" (70 x 127mm)

Trowel— H-3780

Forged steel trowel for mixing cement batches, filling molds, etc., has flat pointed blade and rubber/plastic handle. Dimensions: 5-1/4" x 10" (133 x 254mm)

Trowel— H-3761

Forged steel trowel for striking off molds, etc., has edges ground straight and rubber/plastic handle. Complies with ASTM C109; AASHTO T106. Dimensions: 2-3/4" x 5" (70 x 127mm)

Trowel— H-3762

Plasterer-type trowel's flat rectangular blade is fastened to the mounting and wood handle with stainless steel pins. Dimensions: 4-1/2" x 10" (114 x 254mm)

Spoon — H-4974

For mixing and transferring soils, handling corrosive chemicals, etc., stainless steel spoon is 13" (330mm) long.

Spatulas —

Flexible stainless steel blades with straight edges and rounded ends. Blade is riveted into wooden handle. H-4907 complies with ASTM C185, C780; AASHTO T137.

H-4904—

4" long, straight-edge spatula, 3/4" x 4" (19mm x 102mm)

H-4906—

6" long, straight-edge spatula, 7/8" x 6" (22mm x 152mm)

H-4907—

6" long, straight-edge spatula, 1/2" x 6" (13mm x 152mm)

H-4908—

8" long, straight-edge spatula, 1-1/4" x 8" (32mm x 204mm)

H-4910—

10" long, straight-edge spatula, 1-1/4" x 10" (32mm x 254mm)

Preparation Knife — H-4973

Used for sample preparation and general lab work, knife has 6"-long thin, sharp blade and wood handle.



Hammers

Size	Model
14 oz. Rock Pick—Pointed tip: nylon-vinyl grip	H-4891
22 oz. Rock Pick—Pointed tip; leather grip	H-4892
20 oz. Rock Pick—Chiseled edge; nylon-vinyl grip	H-4893
22 oz. Rock Pick—pointed tip, 16-1/4" long	H-4894
3 lb. Crack Hammer—painted w/nylon-vinyl grip	H-4895
3 lb. Cross Peen Hammer (for EDG)	H-4890A

Rubber Mallets

ASTM Weight	Head (L x Dia)	Handle	Model
2.10 lbs (0.95 kg)	5 x 2.5" (127 x 64mm)	12.75" (324mm)	H-4975
1.30 lbs (0.59 kg)	3.75 x 2.25" (95 x 57mm)	11" (280mm)	H-4976

Chisels

Description	Length	Cut Point	Stock	Model
Pocket Chisel	12" / 305mm	.625" / 16mm	.375" / 10mm	H-4896
Gad Point Chisel	9" / 229mm	.75" / 19mm	.75" / 19mm	H-4897
Splitting Chisel	8" / 203mm	1.125" / 28mm	.75" / 19mm	H-4898
Rock Chisel	7" / 178mm	2.375" / 60mm	.625" / 16mm	H-4899
Chisel w/Guard	8" / 203mm	1.0" / 25.4mm	.75" / 19mm	H-4970
Pocket Chisel	12" / 305mm	.625" / 16mm	.5" / 12.7mm	H-4896
Concrete Chisel	10" / 254mm	2" / 50.8mm	.625" / 16mm	H-4889
Stone Chisel	8" / 203mm	2.25" / 57mm	1" / 25mm	H-4902
Bull Point Chisel	12" / 305mm	point	.75" / 19mm	H-4903
Dura-Soft Chisel	9" / 229mm	2" / 50.8mm	.625" / 16mm	H-4905



Clear Safety Goggles — H-4900
soft vinyl frame and replaceable lens


Brushes

Description	Model	Handle	Bristle	Bristle Length (mm)	Overall Dimension (mm)
Wire Scratch Brush*	H-4259	Wood	Wire No. 26 gauge flat	2" x 2" x 7" (51 x 51 x 178)	7-3/4" x 2-5/8" (197 x 67)
Mold Cleaning Brush	H-3800	Wood	Brass Wire	2" x 7/8" x 5-1/4" (25 x 22 x 133)	10-1/4" (360)
Acid-proof Crete Brush	H-3639.8	Plastic	Polypropylene	2" x 3" x 4" (51 x 76 x 102)	8-1/4" (210)
Acid-proof Crete Brush	H-3639.20	Plastic	Polypropylene	2" x 3" x 4" (51 x 76 x 102)	20" (508)
Sieve Brush, Oval Shaped	H-3799	Wood	Horsehair	2-3/4" x 1-1/8" x 3/4" (70 x 29 x 19)	10-1/2" (267)
Sieve Brush, Fine Mesh	H-3770	Wood	Horsehair	2-1/2" x 1" x 3/8" (64 x 25 x 10)	10-1/2" (267)
Sieve Brush, Coarse Mesh	H-3772	Wire Loop	Wire	1/2" x 1/2" x 1-3/8" (13 x 13 x 35)	5 1/2" (140)
Sieve Brush, Fine Mesh	H-3773	Plastic	Wire	1-1/2" x 3/4" x 1/8" (38 x 19 x 3)	7-1/4" (184)
Sieve Brush, Fine Mesh	H-3774	Wood	Horsehair	1-1/2" x 1-1/4" dia. (38 x 32)	5-1/4" (133)
Table Brush	H-3776	Wood	Horsehair	2-1/4" x 2" x 8" (57 x 51 x 203)	13-1/2" (343)

Model	Dimensions
H-4144.8	8" Straightedge, 1/8 x 1-1/4 x 8" (3 x 32 x 203mm)
H-4144.12	12" Straightedge, 1/8 x 1-1/4 x 12" (3 x 32 x 305mm)
H-4144.16	16" Straightedge, 1/8 x 1-1/4 x 16" (3 x 32 x 406mm)
H-4144.24	24" Straightedge, 1/8 x 1-1/4 x 24" (3 x 32 x 610mm)

Straight Edges

For striking-off samples in containers, measures or molds. Ground steel with beveled edge. Meets ASTM C185, D558, D559, D560, D698; AASHTO T137.

**Round Point Shovel — H-4982**

Heat-treated high-carbon steel round-pointed blade has 27" (69cm) D-grip handle and full wooden yoke with steel casing.

Square-Point Shovel — H-4983

Heat-treated high-carbon steel 9-3/8 x 11-1/2" (24 x 29cm) square-pointed blade with 48" (122cm) handle.

Rubber Gloves—H-3740

For use in compaction, concrete and general lab work, medium thickness short-form gloves without gauntlets are chemical and abrasion resistant and feature curved fingers and contoured palm for ease while working.

Heavy-Weight Heat-Resistant Gloves—H-3742

Made from heavy-weight hot mill, kevlar cotton blend. Cotton acrylic liner with nitrile N-coating. Reversible.

Nitrile-Coated Hot Mill Glove, Size 9—H-3743.9**Nitrile-Coated Hot Mill Glove, Size 10—H-3743.10**

Non-woven, felt insulation and a full-length heat barrier protect hands. Nitrile coating prevents cuts and abrasions. For use in handling hot objects up to 400°F.

Heavyweight Terrycloth Glove—H-3745

Heavyweight terrycloth glove; one size.

Heat-Resistant Gloves—H-3746

Made with large thumb, fingers and loose-fitting palm with wide gauntlet, gloves feature one-piece full-length palm and finger portions, keeping seams to a minimum.

Sample Bags—

Heavy-duty material in lined and un-lined configurations. All bags have drawcord and can be used for various applications involving soils, aggregates, sands and similar materials.

Plastic-lined Sample Bags

Size	Model
10 x 18" (254 x 457mm)	H-4208
17 x 32" (432 x 813mm)	H-4209

Sample Bags

Size	Model
10 x 18" (254 x 457mm)	H-4206
17 x 32" (432 x 813mm)	H-4207

Economy Sample Bags

Size	Model
10 x 19" (254 x 483mm)	H-4206A
15x 29" (381 x 737mm)	H-4207A

Stepdown Transformers

Allow use of 115-volt electrical equipment on 230-volt line current. Features case and core internally connected to third conductor of NEMA standard cord and receptacle for safety. Has 3-conductor 8' 0" (2.4m) line cord and plug on primary side and female receptacle as output connection.

Available in 250W, 500W, 750W, 1,000W, 1,500W, 2,000W.

Model	Model Description
H-1042	250-watt transformer. Shipping wt. 10 lbs. (4.5kg)
H-1042.5	500-watt transformer. Shipping wt. 12 lbs. (5.4kg)
H-1042.7	750-watt transformer. Shipping wt. 16 lbs. (7.3kg)
H-1042.10	1,000-watt transformer. Shipping wt. 17 lbs. (7.7kg)
H-1042.15	1,500-watt transformer. Shipping wt. 21 lbs. (9.5kg)
H-1042.20	2,000-watt transformer. Shipping wt. 28 lbs. (12.7kg)



Mortar & Pestle (Plattner's)— H-17270

For crushing small samples of ore. Made of hardened alloy tool steel. Mortar has flat-bottomed cylindrical cavity with removable sleeve for containing crushed material. Mortar: 3" (76mm), O.D. cavity: 1" dia x 1/4" deep (25mm x 6.4mm). Guide sleeve: 1-1/2" (38mm) long. Pestle: 1" dia x 3" long (25 x 76mm).

Mortar & Pestle— H-17280

Meets U.S. Pharmacopeia XIX. Made from hardened tool steel in accordance with specifications for Powdered Glass Test. Mortar has a flat-bottomed cylindrical cavity. Mortar: 76.2mm. O.D. cavity: 50.8mm dia x 43.9mm deep; Pestle: 50.4mm dia, 108mm overall length, Shipping. wt. 8 lbs

Mortar & Pestle, Hardened Tool Steel— H-17300

Pestle Only— H-17301

Mortar Only— H-17302

Made of hardened alloy tool steel, this mortar and pestle is designed for crushing hard, tough substances. Pestle has ball-end to fit bottom of mortar cavity. Mortar: 3" x 3" x 4-1/2"H (76 x 76 x 114mm); bore: 2" dia x 3" deep (51 x 76mm). Pestle: 9-1/2" (241mm) overall length.

Mortar and Pestle Compaction Mold— H-1675

Mortar and pestle compaction mold used to prepare powdered samples to test softening point of resins and other bituminous materials using ring-and-ball method. Mortar, pestle, sleeve, knockout button and ring support are C.R. steel. Meets dimensions in Fig. 3 of ASTM E28.

Digital Calipers — H-2616, H-2616.8, H-2616.12

May be used for outside, inside, depth and step measurements. Switchable from inches to millimeters.

Dimensions:

H-2616 – 0-6" (0-150mm), Range: ±0.001" accuracy.

H-2616.8 – 0-8" (0-200mm), Range: ±0.001" accuracy.

H-2616.12A – 0-12" (0-300mm), Range: ±0.0015" accuracy.

Stainless Steel Dial Caliper 6" (150mm)—H-2817M

Easy to read black face dial caliper with combination inch and metric scales features 0.001" / 0.1mm graduations, hardened and ground stainless steel main beam with hardened, ground and lapped measuring faces.

Stainless Steel Dial Caliper (6 inch)—H-2817

Similar to above, features a 6" measuring range with .001" graduations and .100" per revolution

Durometers

Type	Applications/Indenter	Model
Type A	Soft rubber, plastics, and elastomers, printer's rolls. Flat cone point 35° included angle.	H-4222A
Type B	Harder elastomers and plastics. Paper and fibrous materials above 93 Duro A. Sharp Cone Point 30°	H-4222B
Type C	Medium hard elastomers and plastics. Useful to avoid surface marks. Flat cone point 35° included angle	H-4222C
Type D	Hard rubber and plastics, thermo plastics, flooring materials. Sharp cone point 30° included angle	H-4222D

Durometers—

Durometers are used to test the hardness of materials, such as the base of a Liquid Limit Machine. Precision construction delivers lifetime accuracy. Sealed springs maintain load deflection rate to a tolerance of .0004". H-4222D is used to check the hardness of the base of Liquid Limit Machines and complies with ASTM D4318, D2240.

H-2496	175	H-2604.C18	228	H-2605.22C	228	H-2616	227, 263
H-2497	175	H-2604.C19	228	H-2605.22F	228	H-2616.12	263
H-2498	175	H-2604.C2	228	H-2605.2C	228	H-2616.8	263
H-2505	175	H-2604.C20	228	H-2605.2F	228	H-2617	227
H-2519	169	H-2604.C21	228	H-2605.56C	228	H-2618	227
H-2520	169	H-2604.C22	228	H-2605.56F	228	H-2619	227
H-2522	169	H-2604.C23	228	H-2605.58C	228	H-2620	227
H-2524	169	H-2604.C24	228	H-2605.58F	228	H-2628	231
H-2525	169	H-2604.C25	228	H-2605.59C	228	H-2628H	231
H-2529	169	H-2604.C26	228	H-2605.59F	228	H-2629	231
H-2550.1	188	H-2604.C27	228	H-2605.5C	228	H-2630	227
H-2560	173	H-2604.C28	228	H-2605.5F	228	H-2631D	227
H-2560.1	173	H-2604.C29	228	H-2605.62CC	228	H-2632D	227
H-2560.2	173	H-2604.C3	228	H-2605.62FC	228	H-2633	227
H-2560.3	173	H-2604.C30	228	H-2605.63CC	228	H-2634D	227
H-2560.5	173	H-2604.C31	228	H-2605.63FC	228	H-2639	227
H-2570.5	188	H-2604.C32	228	H-2605.64CC	228	H-2640	213
H-2595	173	H-2604.C33	228	H-2605.64FC	228	H-2660	213
H-2598	173	H-2604.C34	228	H-2605.65CC	228	H-2712A	212
		H-2604.C35	228	H-2605.65FC	228	H-2712A.4F	212
		H-2604.C4	228	H-2605.66CC	228	H-2712A.6	212
		H-2604.C5	228	H-2605.66FC	228	H-2712A.6.4F	212
		H-2604.C6	228	H-2605.67CC	228	H-2713A	212
		H-2604.C7	228	H-2605.67FC	228	H-2713A.4F	212
		H-2604.C8	228	H-2605.91C	228	H-2715	212
		H-2604.C9	228	H-2610.10C	229	H-2727D	225
		H-2604.F1	228	H-2610.110C	229	H-2732	104
		H-2604.F10	228	H-2610.113C	174, 229	H-2734	103
		H-2604.F11	228	H-2610.11C	229	H-2734.1	103
		H-2604.F12	228	H-2610.12C	229	H-2734.2	103
		H-2604.F13	228	H-2610.15C	174, 229	H-2734.3	103
		H-2604.F14	228	H-2610.16C	174, 229	H-2734.4	103
		H-2604.F15	228	H-2610.17C	172, 229	H-2734.5	103
		H-2604.F16	228	H-2610.18C	172, 229	H-2735.5F	103
		H-2604.F17	228	H-2610.19C	172, 229	H-2735C	105
		H-2604.F18	228	H-2610.1C	229	H-2735C.1	105
		H-2604.F19	228	H-2610.20C	172, 229	H-2735C.4F	105
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Notes

Two columns of horizontal lines for taking notes.



Conversion Charts

Use the charts on these pages to convert between units. To convert, find the 1 value in the column of the unit you desire to convert. Moving left or right on the same row as the 1 value for the unit you want to convert reveals the conversion factor for the new unit.

Weight (Mass)							
Tonne (Mg)	kg	g	UK Ton	US Ton	cwt	lb	oz
1	1000	10 ⁶	0.9842	1.1011	19.66	2.205 x 10 ³	3.527 x 10 ⁴
10 ³	1	1000	9.842 x 10 ⁻⁴	1.101 x 10 ⁻³	10966 x 10 ⁻²	2.2046	35.274
10 ⁻⁶	10 ⁻³	1	9.842 x 10 ⁻⁷	1.101 x 10 ⁻⁶	1.966 x 10 ⁻⁵	2.204 x 10 ⁻³	3.527 x 10 ⁻²
1.016	1016	1.016 x 10 ⁶	1	1.12	20	2240	35840
0.9081	908.1	9.081 x 10 ⁵	08928	1	17.856	2000	32000
5.085 x 10 ⁻²	50.85	5.085 x 10 ⁴	0.05	0.0560	1	112	1792
4.536 x 10 ⁻⁴	0.4536	453.6	4.46 x 10 ⁻⁴	5 x 10 ⁻⁴	8.92 x 10 ⁻³	1	16
2.835 x 10 ⁻⁵	2.835 x 10 ⁻²	28.349	2.79 x 10 ⁻⁵	3.125 x 10 ⁻⁵	5.580 x 10 ⁻⁴	6.25 x 10 ⁻²	1

Length							
km	m	mm	mile	yard	ft	in	10 ⁻³ in
1	1000	10 ⁶	0.6214	1094	3281	3.937 x 10 ⁴	3.937 x 10 ⁷
10 ⁻³	1	1000	6.214 x 10 ⁻⁴	1.0936	3.281	39.370	3.937 x 10 ⁴
10 ⁻⁶	10 ⁻³	1	6.214 x 10 ⁻⁷	1.094 x 10 ⁻³	3.281 x 10 ⁻³	3.937 x 10 ⁻²	39.37
1.6094	1609.4	1.609 x 10 ⁶	1	1760	5280	63360	6.336 x 10 ⁷
9.144 x 10 ⁻⁴	0.9144	914.41	5.682 x 10 ⁻⁴	1	3	36	36000
3.048 x 10 ⁻⁴	0.3048	304.8	1.894 x 10 ⁻⁴	0.3333	1	12	12000
2.54 x 10 ⁻⁵	0.0254	25.4	1.578 x 10 ⁻⁵	2.778 x 10 ⁻²	8.333 x 10 ⁻²	1	1000
2.54 x 10 ⁻⁸	2.54 x 10 ⁻⁵	0.0254	1.578 x 10 ⁻⁸	2.778 x 10 ⁻⁵	8.333 x 10 ⁻⁵	10 ⁻³	1

Area								
km ²	m ²	cm ²	mm ²	sq. mile	acre	yd ²	ft ²	in ²
1	10 ⁻⁶	10 ¹⁰	10 ¹²	0.38612	247.11	1.196 x 10 ⁶	1.076 x 10 ⁷	1.550 x 10 ⁹
10 ⁻⁶	1	10 ⁴	10 ⁶	3.86 x 10 ⁻⁷	3.86 x 10 ⁻⁴	1.11960	10.764	1550
10 ⁻¹⁰	10 ⁻⁴	1	100	3.86 x 10 ⁻¹¹	3.86 x 10 ⁻⁸	1.196 x 10 ⁻⁴	1.076 x 10 ⁻³	0.1550
10 ⁻¹²	10 ⁻⁶	10 ⁻²	1	3.86 x 10 ⁻¹³	3.86 x 10 ⁻¹⁰	1.196 x 10 ⁻⁶	1.076 x 10 ⁻⁵	1.550 x 10 ⁻³
2.590	2.59 x 10 ⁶	2.59 x 10 ¹⁰	2.59 x 10 ¹²	1	639.96	3.097 x 10 ⁶	1.076 x 10 ⁷	4.01 x 10 ⁸
4.047 x 10 ⁻³	4047	4.047 x 10 ⁷	4.047 x 10 ⁹	1.563 x 10 ⁻³	1	4840	43560	6.273 x 10 ⁶
8.36 x 10 ⁻⁷	0.8361	8.36 x 10 ⁵	8.36 x 10 ⁵	3.228 x 10 ⁻⁷	2.066 x 10 ⁻⁴	1	9	1296
9.29 x 10 ⁻⁸	9.29 x 10 ⁻³	929	92900	3.587 x 10 ⁻⁸	2.296 x 10 ⁻⁵	0.1111	1	144
6.45 x 10 ⁻¹⁰	6.45 x 10 ⁻⁴	6.4516	645.16	2.491 x 10 ⁻¹⁰	1.594 x 10 ⁻⁷	7.716 x 10 ⁻⁴	6.944 x 10 ⁻³	1

Volume							
m ³	dm ³ liter	cm ³ (ml)	yd ³	ft ³	in ³	UK gallon	US gallon
1	10 ⁻³	10 ⁶	1.3079	35.311	6102	219.97	264.17
10 ⁻³	1	10 ³	1.308 x 10 ⁻³	3.531 x 10 ⁻²	61.02	0.2200	0.2642
10 ⁻⁶	10 ⁻³	1	1.308 x 10 ⁻⁶	3.531 x 10 ⁻⁵	6.102 x 10 ⁻²	2.199 x 10 ⁻⁴	2.642 x 10 ⁻⁴
0.7646	764.6	7.646 x 10 ⁵	1	27	46650	168.19	201.99
2.832 x 10 ⁻²	28.32	2.832 x 10 ⁻⁴	3.704 x 10 ⁻²	1	1728	6.229	7.481
1.639 x 10 ⁻⁵	1.639 x 10 ⁻²	16.387	2.144 x 10 ⁻⁵	5.787 x 10 ⁻⁴	1	3.605 x 10 ⁻³	4.329 x 10 ⁻³
4.546 x 10 ⁻³	4.546	4.546 x 10 ³	5.946 x 10 ⁻³	0.1605	277.42	1	1.2008
3.785 x 10 ⁻³	3.785	3.785 x 10 ³	4.951 x 10 ⁻³	0.1337	231	0.8327	1

Conversion Charts

Density					
Tonne/m ³ Mg/m ³ g/cm ³	kg/m ³	lb/in ³	UK Ton/yd ³	US Ton/ yd ³	lb/ft ³
1	1000	0.03613	0.75247	.08428	62.43
10 ⁻³	1	3.613 x 10 ⁻⁵	7.525 x 10 ⁻⁴	8.428 x 10 ⁻⁴	6.243 x 10 ⁻²
27.680	27680	1	20.828	23.328	1.728 x 10 ³
1.3289	1.328 x 10 ³	4.801 x 10 ⁻²	1	1.12	82.955
1.1865	1.1186 x 10 ³	4.287 x 10 ⁻²	0.8928	1	74.074
1.602 x 10 ⁻²	16.019	5.787 x 10 ⁻⁴	1.205 x 10 ⁻²	1.35 x 10 ⁻²	1

Permeability					
m/s	cm/s	m/year	Darcy	ft/yr	ft/day
1	100	3.156 x 10 ⁷	1.04 x 10 ⁵	1.035 x 10 ⁸	2.835 x 10 ⁵
0.01	1	3.156 x 10 ⁵	1.04 x 10 ³	1.035 x 10 ⁶	2.834 x 10 ³
3.169 x 10 ⁻⁸	3.169 x 10 ⁻⁶	1	3.28 x 10 ³	3.281	8.982 x 10 ⁻³
9.66 x 10 ⁻⁶	9.66 x 10 ⁻⁴	304	1	1000	2.74
9.658 x 10 ⁻⁹	9.659 x 10 ⁻⁷	0.3048	10 ⁻³	1	2.738 x 10 ⁻³
3.527 x 10 ⁻⁶	3.527 x 10 ⁻⁴	111.33	0.365	365.25	1

Force and Weight					
MN	kN	N	kgf	tonf	lbf
1	1000	10 ⁶	1.0196 x 10 ⁵	100.4	2.248 x 10 ⁵
10 ⁻³	1	10 ³	101.96	0.1004	224.82
10 ⁻⁶	10 ⁻³	1	0.10196	1.004 x 10 ⁻⁴	0.2248
9.807 x 10 ⁻⁶	9.807 x 10 ⁻³	9.807	1	9.842 x 10 ⁻⁴	2.2048
9.964 x 10 ⁻³	9.964	9964	1016	1	2240
4.448 x 10 ⁻⁶	4.448 x 10 ⁻³	4.448	0.45455	4.464 x 10 ⁻⁴	1

Pressure, Stress and Modulus of Elasticity										
Mn/m ² MPa	kN/m ² kPa	kp kgf/cm ²	bar	atm	m H ₂ O	ft H ₂ O	mm Hg	Ton/ft ²	psi lbf/in ²	lbf/ft ²
1	1000	10.197	10	9.869	102.2	355.2	7500.6	9.320	145.04	20866
0.001	1	1.019 x 10 ⁻²	0.0100	9.87 x 10 ⁻³	0.1022	0.3352	7.5006	0.0093	0.14504	20.886
9.807 x 10 ⁻²	98.07	1	0.9807	0.9678	10.017	32.866	735.56	0.9139	14.223	2048.1
0.100	100	1.0197	1	0.9869	10.215	33.515	750.06	0.9320	14.504	2088.6
0.1013	1.0133	1.0332	1.0132	1	10.351	33.959	760.02	0.9444	14.696	2116.2
9.788 x 10 ⁻³	9.7885	9.983 x 10 ⁻²	9.789 x 10 ⁻²	9.661 x 10 ⁻²	1	3.2808	73.424	9.124 x 10 ⁻²	1.4198	204.45
2.983 x 10 ⁻³	2.935	3.043 x 10 ⁻²	2.984 x 10 ⁻²	2.945 x 10 ⁻²	0.3048	1	22.377	2.781 x 10 ⁻²	0.43275	62.316
1.333 x 10 ⁻⁴	0.1333	1.3595 x 10 ⁻²	1.333 x 10 ⁻³	1.315 x 10 ⁻³	1.362 x 10 ⁻²	4.469 x 10 ⁻²	1	1.243 x 10 ⁻³	1.934 x 10 ⁻²	2.7846
0.1073	107.3	1.0942	1.0730	1.0589	10.960	35.960	804.78	1	15.562	2240
6.895 x 10 ⁻³	6.895	7.031 x 10 ⁻²	6.895 x 10 ⁻²	6.805 x 10 ⁻²	0.7043	2.3108	51.714	6.426 x 10 ⁻²	1	144
4.788 x 10 ⁻⁵	4.788 x 10 ⁻²	4.883 x 10 ⁻⁴	4.788 x 10 ⁻⁴	4.725 x 10 ⁻⁴	4.891 x 10 ⁻³	1.605 x 10 ⁻²	0.3591	4.464 x 10 ⁻⁴	6.944 x 10 ⁻³	1

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