



HUMBOLDT



Testing Equipment for Asphalt, Concrete & Soil

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1-619-425-1932

www.clarksonlab.com



H-1050

Ductility Testing Machine, 3-Speed for Standard Tests

Determines ductility of formed asphalt/cement or semi-solid bitumen by measuring distance of elongation before breaking point when ends of a briquet are pulled apart at a specific speed and temperature. Tests three briquets simultaneously. D.C. 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.

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. Elongation (pull) capacity is maximum carriage travel (150cm) with automatic stop.

Polished stainless steel trough has overflow connection. Gears are bronze; all other parts are solid brass to prevent rusting. Features 6' (183cm) cord, feed-through switch and 3-prong plug. Includes 3 standard H-1080 briquet molds with H-1090 plates. Trough overall dimension: 11-3/4x74x6-3/8"H. Meets ASTM D113, AASHTO T51.

Description	Model
Ductility testing machine, 3-speed. 110V. 60Hz. 1ph AC	H-1050
Ductility testing machine, 3-speed. 220V. 50Hz. 1ph AC	H-1050.5F

Shipping wt. 200 lbs. (90.7kg)

Ductility Testing Machine, 3-Speed, Electronically Controlled, for Standard Tests

Same dimensions as H-1050 with solid state speed controller on H-1050 ductility machine continually adjusts feedback to maintain even, proper speed. Direct drive 1/40 HP DC motor pulls carriage at 1/4, 1 or 5cm/min. Meets ASTM D113, AASHTO T51.

Description	Model
Electronically controlled ductility machine. 115V. 60Hz. AC	H-1075
Electronically controlled ductility machine. 230V. 50Hz. AC.	H-1075.5F

Shipping wt. 180 lbs. (81 kg)

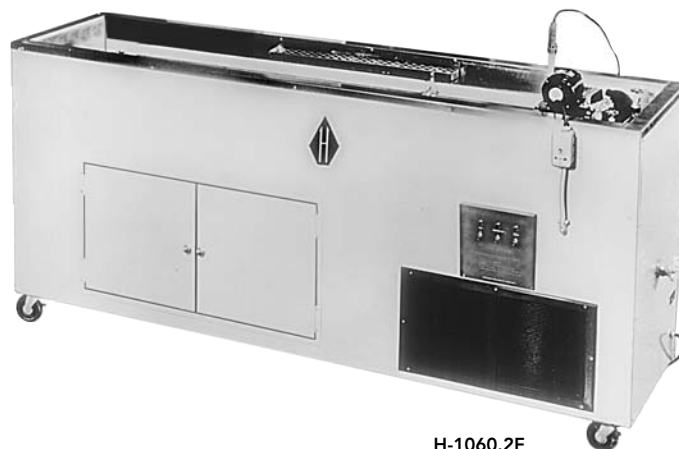
Ductility Testing Machine, Single-Speed for Standard Tests

Same size, capacity and dimension as H-1050, unit's direct drive 1/75 HP AC motor pulls carriage at one speed 5cm/min.

Description	Model
Single-speed ductility machine. 115V. 60Hz. AC	H-1070
Single-speed ductility machine. 230V. 50Hz. AC	H-1070.5F

Shipping wt. 180 lbs. (81 kg)

*Humboldt Testing Equipment
Is Engineered for Precision,
Accuracy, Greater Productivity,
Longer Life & Easier Use.*



H-1060.2F

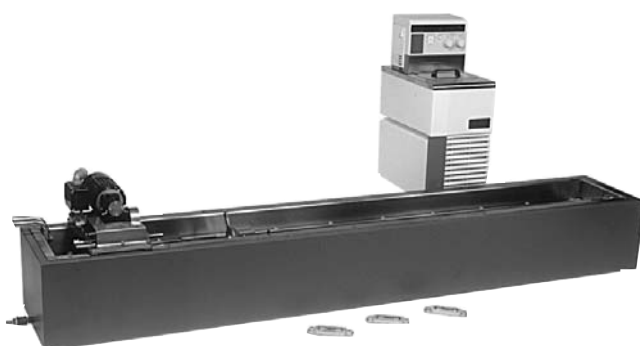
Ductility Testing Machine, 3-Speed Refrigerated for Both Standard and Forced Tests

Features same specification as H-1050 and a polypropylene bath designed for use with sodium chloride solutions. Heavy-gauge-steel enamel finish cabinet is fully insulated. Sealed space between inner and outer walls protects low-thermal conductivity properties of foam and fiberglass combination, is tested and proven 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 or refrigeration controls temperature range of 32°F (0°C) to 120°F (49°C) by 0.1°F. Cabinet is 90x41x23". Includes 3 H-1080 molds. Meets ASTM D113, AASHTO T51.

Description	Model
Refrigerated ductility machine 220V. 60Hz. 1ph AC.	H-1060.2F
Refrigerated ductility machine 220V. 50Hz. 1ph AC.	H-1060.5F

Shipping wt. 1,000 lbs. (454 kg)



H-1068 (includes both H-1068X and H-1068C)

Ductility Testing Machine, 3-Speed with Temperature-Control Circulator for Both Standard and Forced Tests

Designed for use with the force ductility test, unit features finned stainless steel tubes beneath a false bottom for efficient thermal transfer. Solid-state thermostatically controlled bath and circulator maintain water temperature within a $\pm 0.9^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$). Stainless steel interior; baked enamel stainless steel-wrapped exterior. Includes three H-1080 molds. H-1068PC Plastic Cover is recommended to maintain constant tank temperatures, highs and lows. Meets ASTM D113, D6084, D4.

Description	Model
Temp-control ductility machine. 120V. 60Hz. 1ph AC.	H-1068
Temp-control ductility machine. 220V. 50Hz. 1 ph AC.	H-1068.5F

Shipping wt. 430 lbs. (195 kg)

Ductility Testing Machine, 3-Speed for Both Standard and Forced Tests

Same as H-1068 without temperature-control circulator.

Description	Model
Ductility machine. 120V. 60Hz. AC.	H-1068X
Ductility machine. 220V. 50Hz. AC.	H-1068X.5F

Shipping wt. 350 lbs. (159 kg)

Temperature-Control Circulator for Ductility Testing Machine

For use with H-1068X.

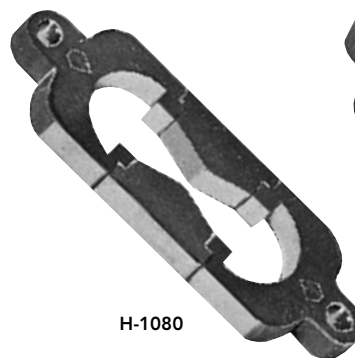
Description	Model
Temperature-control circulator. 120V, 60Hz AC.	H-1068C
Temperature-control circulator. 220V, 50Hz AC.	H-1068C.5F

Shipping wt. 80 lbs. (36 kg)

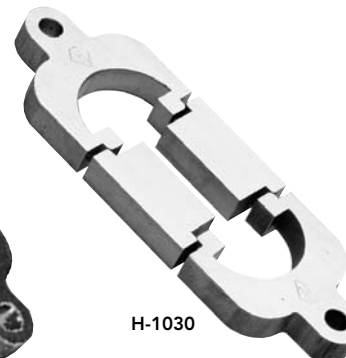
Ductility Machine Cover

Description	Model
Ductility machine temperature-control cover	H-1068PC

Shipping wt. 40 lbs. (18 kg) (Cannot ship via UPS)



H-1080



H-1030

Ductility Briquet Molds

Forms briquets to be tested in any ductility testing machine. 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. Meets ASTM D113, D5892, D6084, AASHTO T51.

Description					Model
Ductility briquet mold, angled sides for standard test. ASTM D113.					H-1080
Compatibility					
H-1050	H-1060	H-1068	H-1070	H-1075	
●	●	●	●	●	

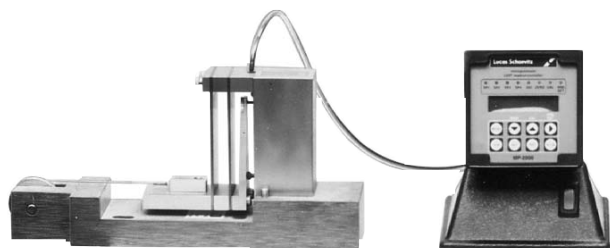
Description					Model
Ductility briquet mold, straight sides for forced test. ASTM D5892, D6084.					H-1030
Compatibility					
H-1050	H-1060	H-1068	H-1070	H-1075	
	●	●			

Base Plates

Perfectly flat surface of brass plate gives uniform contact with bottom surfaces of either one (single mold plate) or three (triple mold plate) H-1080 or H-1030 molds.

Description					Model
Base plate, single mold. Overall dimension: 5-1/2x 2x 1/8".					H-1090
Compatibility					
H-1050	H-1060	H-1068	H-1070	H-1075	
●	●	●	●	●	

Description					Model
Base plate, triple mold. Overall dimension: 5-1/2x 8x 1/8".					H-1090.3
Compatibility					
H-1050	H-1060	H-1068	H-1070	H-1075	
●	●	●	●	●	



H-1021



Force Determination Adapter and Digital Indicator

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; 60 maDC 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: 6x5-3/8x1-3/4".

Description	Model
Force determination adapter and digital indicator. 115V, 60 Hz.	H-1021
Force determination adapter and digital indicator. 220V, 50/60 Hz.	H-1021.4F

Shipping wt. 20 lbs. (9kg)

Chart Recorder

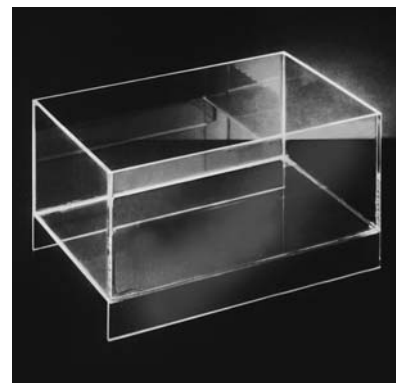
For accurate, permanent graphic record of the input signal on single-channel, multi-range potentiometric null balance servo recorder. Versatile precision instrument records a wide range of laboratory test results. Writing width is 7-3/4" (200mm). Dim. 15x4-1/4 x10".

Description	Model
Versatile chart recorder. 115V, 60Hz.	H-1026
Versatile chart recorder. 220V, 50/60Hz.	H-1026.4F

Shipping wt. 11 lbs. (4.9kg)



H-2266



H-2267

Heater/Circulator

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) I.D. 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. 6h x 5w x 13"d (15.2 x 12.7 x 33cm).

Heater/Circulator						
Temp Range	Temp Stability	Display	Accuracy	Pumping (liters/min)	Over-Temp Cutoff	Model
5°C above ambient to 150°C	± 0.05°C	°C or °F	± 0.5°C	7 or 15	Adjustable	
Heater/Circulator, 120V, 60Hz, 9 amp.						H-2266
Heater/Circulator, 230V, 50/60Hz, 4.5 amp.						H-2266.4F

Shipping wt. 10 lbs. (4.5kg)

Acrylic Tank

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). I.D. (HxWxD) 7-1/2x13-1/8x18" (190x333x457mm).

Description	Model
Acrylic tank	H-2267



H-4926, H-4928, H-4929



H-1352



H-2535



H-2515

Aluminum Moisture Boxes and Sample Cups

Flat-bottom seamless tin sample cups have telescoping covers. Hold samples for determining penetrations of 200 or less determinations of loss by heating.

Aluminum Moisture Boxes			
Description	Dia. in. (mm)	Height in. (mm)	Model
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.	2 (51) 2-1/2 (64) 3 (76) 3-1/2 (89)	7/8 (22) 1-3/4 (44) 1 (25) 2 (51)	H-4926 H-4927 H-4928 H-4929

Tin Sample Cups			
Capacity	Dimensions	Qty. in Set	Model
2.5-Oz. (71g)	1.87" (47.7mm) I.D. 1.41" (36mm) deep.	48	H-1350.3A
4.7-Oz (133g)	2.42" (61.5mm) I.D. 1.67" (42.6mm) deep.	36	H-1350.4A
5.6-Oz. (159g)	2.59" (66mm) I.D. 1.72" (43.4mm) deep.	36	H-1350.6A
8.2-Oz. (232g)	3.05" (77.5mm) I.D. 1.97" (50.1mm) deep.	18	H-1350.8A
16-Oz. (454g)	4" (102mm) I.D. 2-3/8" (51mm) deep.	1	H-1350.16
42.3-Oz. (1200g)	6.12" (155mm) I.D. 3" (76.2mm) deep.	1	H-1350.42
70.5-Oz. (2000g)	6.12" (155mm) I.D. 5" (127mm) deep.	1	H-1350.70

Transfer Dish

Plastic transfer dish has flat bottom, straight sides and metal centering lugs and magnet in the bottom. Size: 3-3/4" dia. x 3-1/4" deep. Meets ASTM D5.

Description	Model
Transfer dish.	H-1352

Lever-Operated Grease Worker

Tests consistency of lubricating greases by penetration of the standard cone after 60 double strokes in standard grease worker. Perforated brass plate has 51 holes, 1/4" (6.35mm) dia. Includes grease chamber, cover with stopcock and lever-operated plunger handle. Order H-2631D dial thermometer separately. Meets ASTM D217, D937.

Description	Model
Lever-operated grease worker.	H-2535

Shipping wt. 35 lbs. (15.9kg)

Micro Grease Worker

Grease worker prepares small grease samples for testing with quarter scale (1/4) H-2519 penetrometer cone. Perforated grease plate has 8-1/8" (3.2mm) dia. holes. Chamber is 3/4" dia. x 11/16" L (19x17mm). Order water baths separately. Meets ASTM D1403.

Description	Model
Micro grease worker.	H-2515

Shipping wt. 10 lbs. (4.5kg)

Grease Cutter

Grease cutter for block grease is mounted on cast-iron support base with plywood top. Features hardened, sharp rigidly mounted beveled blade. Meets ASTM D217.

Description	Model
Grease cutter.	H-2540

Shipping wt. 10 lbs. (4.5kg)



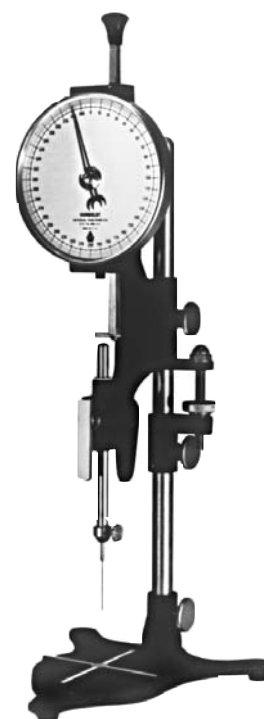
H-2540



H-1200



H-1240



H-1250

Universal Penetrometers

Direct-reading instruments for precision penetration measurements of bituminous materials, cement, petrolatum, and waxes—as well as food, cosmetic, and pharmaceutical products.

Universal Penetrometer

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. 10-1/2x13x22" (266.7x330.2x558.8mm). Meets ASTM D5, D217, D1168, D1191, D1321, D1403, D1831, D1855; AASHTO T49, T187, others.

Description	Model
Universal penetrometer, includes H-1280 bituminous penetration needle.	H-1200

Electric Penetrometer

Automatic. Digital timer with release mechanism is switchable to 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-1240.5F same as H-1240, except includes voltage adapter and internal switch on timing mechanism to change cycle to 50Hz.

Description	Model
Electric penetrometer, includes H-1280 bituminous penetration needle. 110V. 60Hz. 1ph AC.	H-1240
Electric penetrometer, includes H-1280 bituminous penetration needle. 230V. 60Hz. 1ph AC.	H-1240.2F
Electric penetrometer, includes H-1280 bituminous penetration needle. 230V. 50Hz. 1ph AC.	H-1240.5F

Shipping wt. 32 lbs. (14.5kg)

Portable Penetrometer

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. Overall dim. 7x7x16" (178x178x406mm).

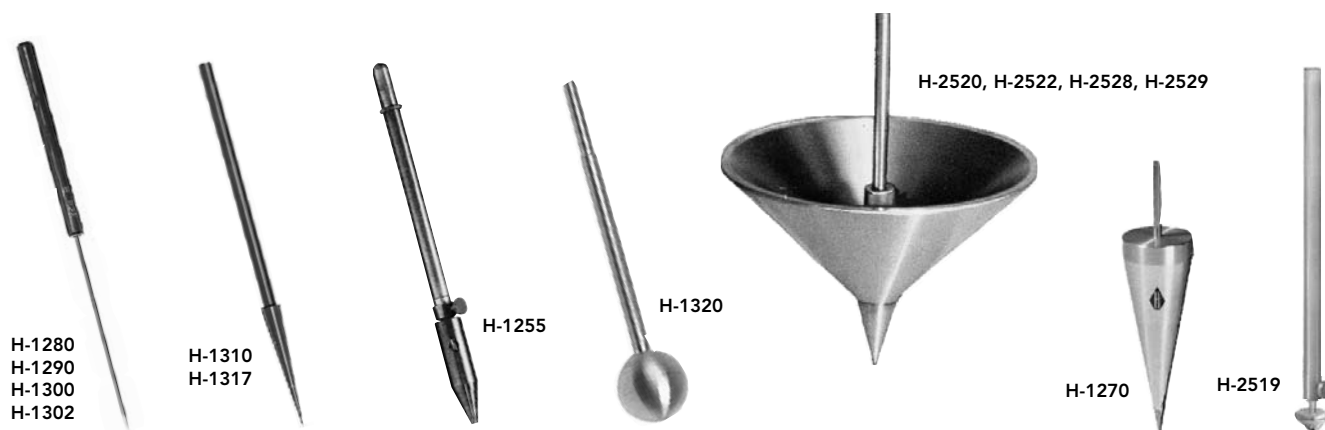
Description	Model
Portable penetrometer. Includes one 50g loading wt., one H-1280 penetrating needle.	H-1250

Shipping wt. 8 lbs. (3.6kg)

Penetrometers for Special Applications

Description	Includes	Shipping wt.	Model
Grease Penetrometer. Same as H-1200, except cone different.	One H-2520 grease penetration cone	30lbs (13.6kg)	H-2510
Battery Paste Penetrometer. Same as H-1200, except cone different.	One H-1255 special plunger/cone-shaped penetrating needle	30lbs (13.6kg)	H-1202
Portable Battery Paste Penetrometer. Same as H-1250, except cone different.	One H-1255 special plunger/cone-shaped penetrating needle	8lbs (3.6kg)	H-1252

Note: All penetrometers for special applications may be ordered in electric penetrometer versions. Call 1-800-544-7220.



Penetration Needles and Cones

Penetration Needles and Cones			
Applications	Description	Meets Specs	Model
Bituminous materials	Standard hardened stainless steel needle, 40-45mm exposed needle length. Wt. 2.5g.	ASTM D5; AASHTO T49, IP49; ASA Std., A37.1; Fed Spec. SS.R. 406C, Meth. 214.01	H-1280
	Long hardened stainless steel needle, 50-55mm exposed needle length. Wt. 2.5g.		H-1290
	Same as H-1290. Certified for accuracy by independent laboratory. Wt. 2.5g.		H-1302
	Same as H-1280. Certified for accuracy by independent laboratory. Wt. 2.5g.		H-1300
Waxes with 250 or more penetration	Hardened stainless steel wax penetration needles with tapered point, blunt tip of truncated cone. Ferrule is approx. 3.2mm dia. Wt. 2.5g.	ASTM D1321	H-1310
	Same as H-1310. Certified for accuracy by independent laboratory.		H-1317
Battery paste	Hardened stainless steel tip with special plunger. Total wt. 60 gm \pm .050g.	N/A	H-1255
Joint sealant for asphalt & concrete pavements	Resilience ball penetration tool. Total wt. 27.5g.	ASTM D3407	H-1320
Grease-testing penetrometers	Hollow 90 brass cone, highly polished stainless steel tip. Removable nut and stem. Wt. 102.5g.	ASTM D217, D937 ASA Std. Z11.3	H-2520
	Same as H-2520, completely made of stainless steel. Wt. 102.5g.		H-2522
For all 90° cones	Stainless steel replacement tip, nut and stem.		H-2525
Grease-testing penetrometers	Magnesium cone and plunger, same dim. as H-2520. Total wt. cone and plunger 30.0g.	ASTM D2884	H-2524
Cone penetration of lubricating grease (alt. meth.) section through center of cone	Magnesium. Same dimension as H-2520. Total wt. 102.5g.	ASTM D217, Fig. H-4	H-2528
Food products and paste paints	Aluminum. Same dimension as H-2520. Total wt. 35g.	U.S. Dept. of Agriculture	H-2529
Measuring firmness of solid and plasticized fats (shortenings, margarine, butter, etc.)	10° aluminum cone, 3.2mm ferrule, 0.8mm stainless steel blunt tip. Overall length 106mm. Wt. 45g.	AOCS Cc 16-60	H-1270
Small obtainable samples (i.e., recovery of used grease)	1/4 scale. (Not considered a substitute for full-size cone specified in ASTM D217.) Wt. 9.38g.	ASTM D1403	H-2519



H-1720



H-1745

Constant Temperature Bath (Cannon Model CT-500)

- Temperature range: $\pm 20^{\circ}\text{C}$ to 100°C ($\pm 0.01^{\circ}\text{C}$)
- Quick-set dial for commonly used temperatures
- Variable setting to any temperature within the operating range

State-of-the-art, yet relatively inexpensive. Precision viscosity determination with glass capillary viscometers. Quick-set dial selects temperatures of 20, 25, 30, 40, 50, 60, 70, 80, 90, and 100°C . Two stainless steel encased thermistors and solid-state circuitry ensure accurate temperature control, plus over-temperature and liquid level protection. All wetted parts are stainless steel or glass. Frame is heavy aluminum, epoxy coated. Bath chamber is 17L Pyrex glass vessel. 16Wx14-1/4Dx24"H (407x362x610mm). Capacity 4.5 gal. (17L). Meets ASTM D445.

Description	Model
Constant Temperature Bath, Cannon Model CT-500. 120V, 50/60Hz, 1000 watts. Shipping wt. 75 lb. (34kg).	H-1720
Constant Temperature Bath, Cannon Model CT-500. 240V, 50/60Hz, 1000 watts. Shipping wt. 75 lb. (34kg).	H-1720.4F
Vacuum Manifold, Canon Model 3VM, for use with H-1720.	H-1745
IBF Bath Oil for use below 121 C, use with H-1720, 6 gal.	H-1732

Storage Unit for either H-1720 and/or H-1730

Sturdy two-drawer unit elevates either model Constant Temperature Bath for ease of viewing, plus ample storage of viscometers and accessories. 18W x 18D x 6.5"H (457 x 457 x 165mm).

Description	Model
Storage unit for either H-1720 and/or H-1730.	H-1722

Shipping wt. 30 lbs. (13.6kg).



H-1730



H-1735

Constant Temperature Bath (Cannon Model CT-1000)

- Temperature range: $\pm 20^{\circ}\text{C}$ to 150°C ($\pm 0.01^{\circ}\text{C}$) (Above 100°C temperature is controlled to 0.03°C)
- Quick-set dial for commonly used temperatures. Variable setting to any temperature within the operating range
- Radiant internal lighting provides improved viewing clarity
- Enclosed bath housing for rapid heat-up/greater safety

State-of-the-art, with higher temperature limit, plus added features over the CT-500, yet still relatively inexpensive. Precision viscosity determination with glass capillary viscometers. Quick-set dial selects temperatures of 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 135, and 150°C . Two stainless steel encased thermistors and solid-state circuitry ensure accurate temperature control, plus over-temperature and liquid level protection. All wetted parts are stainless steel or glass. Frame is heavy aluminum, epoxy coated. Bath chamber is 17L Pyrex glass vessel. 17-1/4Wx18-1/4Dx 23"H (438x464x584mm). Capacity 4.5 gal. (17L). Meets ASTM D445.

Description	Model
Constant Temperature Bath, Cannon Model CT-1000. 120V, 50/60Hz, 1400 watts. Shipping wt. 123 lb. (55.8kg).	H-1730
Constant Temperature Bath, Cannon Model CT-1000. 240V, 50/60Hz, 1400 watts. Shipping wt. 123 lb. (55.8kg).	H-1730.4F
Vacuum Manifold, Cannon Model 4VM, for use with H-1730.	H-1735
High-Temperature Bath Silicone for use above 135 C. Use with H-1730, 1/2 gal.	H-1733



H-1741H

H-1741V

Digital Vacuum Pressure Regulator All Solid-State; Uses No Mercury (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 \pm 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: $\pm 0.05\%$ of reading \pm the least significant digit (includes combined effects of linearity, repeatability, hysteresis, and temperature). NIST certification is supplied. Vacuum regulation accuracy: ± 0.5 mm HG. Operating temperature: 0 to 40°C (32 to 104°F). Upper/lower safety limit: 746mm HG below atmospheric pressure. Choice of horizontal: 18.5w x 18d x 6.75"h (470x457x171mm) or vertical: 6.75w x 18d x 18.5"h (171x457x470mm).

Description	Model
Digital vacuum regulator, Cannon DVR 1500H, horizontal, 120V, 50/60Hz, 175 watts.	H-1741H
Digital vacuum regulator, Cannon DVR 1500HF, horizontal, 240V, 50/60Hz, 175 watts.	H-1741H.4F
Digital vacuum regulator, Cannon DVR 1500V, vertical, 120V, 50/60Hz, 175 watts.	H-1741V
Digital vacuum regulator, Cannon DVR 1500VF, vertical, 240V, 50/60Hz, 175 watts.	H-1741V.4F

NOTE: Prices and delivery on Cannon-Manning, Cannon-Fenske, Lantz-Zeitfuchs, Modified Koppers and other viscometers are available for quotation on request.



H-1746 Series



H-1747 Series

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. Meets ASTM D2170; AASHTO T201.

Zeitfuchs® Cross-Arm Viscometer and Holder

Approx. Constant Cs/Sec.	Range Centistokes	Model
0.003	0.6 to 3	H-1746.1
0.01	2 to 10	H-1746.2
0.03	6 to 30	H-1746.3
0.1	20 to 100	H-1746.4
0.3	60 to 300	H-1746.5
1.0	200 to 1,000	H-1746.6
3.0	600 to 3,000	H-1746.7
10	2,000 to 10,000	H-1746.8
30	6,000 to 30,000	H-1746.9
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 neoprene rubber holder for 2" (51mm) dia. hole and certificate of calibration. Meets ASTM D2171; AASHTO T202.

Asphalt Institute Vacuum Viscometer

Viscometer Size/No.	Viscosity Range (Poise)	Model
25	42 to 800	H-1747.1
50	180 to 3,200	H-1747.2
100	600 to 12,800	H-1747.3
200	2,400 to 52,000	H-1747.4
400	9,600 to 200,000	H-1747.5



H-2165

Saybolt Viscometer Bath

Designed for Saybolt Universal and Furol viscosity testing, this new constant temperature bath meets all ASTM and AASHTO requirements for precise temperature control. The microprocessor 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 baths 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. Meets ASTM D88, D244, E102, AASHTO T72.

Description	Model
Saybolt Viscometer Bath. 115V, 50/60Hz, 12.3 Amps.	H-2165
Saybolt Viscometer Bath. 220-240V, 50/60Hz, 6.4 Amps	H-2165.4F

Shipping wt. 58 lbs. (26.3kg)

Saybolt Viscometer Components and Replacement Parts

Description	Model
ORIFICES	
Stainless steel universal orifice only.	H-2173
Stainless steel Furol orifice only.	H-2174
TUBES WITH ORIFICES	
Brass Saybolt viscometer tube. Stainless steel Universal orifice.	H-2180
Brass with stainless steel Furol orifice Saybolt viscosity tube.	H-2182
Stainless steel with stainless steel Furol orifice Saybolt viscosity tube.	H-2183
Brass with stainless steel Universal and Furol orifice Saybolt viscosity tube. Includes wrench.	H-2184
Stainless steel with stainless steel Universal and Furol orifice Saybolt viscosity tube. Includes wrench.	H-2185
TUBES	
Stainless steel Saybolt viscosimeter tube.	H-2171
Brass Saybolt viscosimeter tube.	H-2172
ACCESSORIES	
Tube cleaner.	H-2175
Saybolt viscosity flask; graduated 60 ml volumetric receiving flask.	H-2176
Saybolt withdrawal pipette and aspirator.	H-2177
White Mineral Oil, suitable for use at temperatures of up to 230°F (110°C)	H-2189
Strainer.	H-2178
High-temp Dow-Corning 200 Fluid, 100 centistoke oil, 5 gal., for use with H-2165. Shipping wt. 40 lbs. (18kg)	H-2199
Displacement ring.	H-2194
Thermometer support.	H-2195
Orifice wrench.	H-2196
Tube wrench.	H-2197
Saybolt viscosity thermometer (66 to 80°F).	H-2600.17F
Saybolt viscosity thermometer (94 to 108°F).	H-2600.18F
Saybolt viscosity thermometer (120 to 134°F).	H-2600.19F
Saybolt viscosity thermometer (134 to 148°F).	H-2600.20F
Saybolt viscosity thermometer (174 to 188°F).	H-2600.21F
Saybolt viscosity thermometer (204 to 218°F).	H-2600.22F
Saybolt viscosity thermometer (19 to 27°C).	H-2610.17C
Saybolt viscosity thermometer (34 to 42°C).	H-2610.18C
Saybolt viscosity thermometer (49 to 57°C).	H-2610.19C
Saybolt viscosity thermometer (57 to 65°C).	H-2610.20C
Saybolt viscosity thermometer (79 to 87°C).	H-2610.21C
Saybolt viscosity thermometer (95 to 103°C).	H-2610.22C



H-2405



H-2400

8-Oz. Bacon Bomb Sampler

Obtains bottom or any level sample, using thief method, from storage tanks, tank cars and drums. Plunger opens to admit the sample when bomb is lowered to the bottom or when plunger is released at a desired level. Plunger seals tight when bomb is withdrawn; features O-ring-type valve seal. Available in plated brass or stainless steel; specify B or S after model number when ordering, i.e., H-2405B. Capacity: 8 oz; 2" dia. x 10" L. Meets ASTM D117, D270, D923, D943.

Description	Model
8-Oz. opening Bacon bomb sampler, brass.	H-2405B
8-Oz. opening Bacon bomb sampler, stainless steel.	H-2405S

Shipping wt. 5 lbs. (2.3kg)

16-Oz. Bacon Bomb Sampler

Larger capacity with same features as H-2405. 2-3/4" dia. x 12"L. Shipping wt. 9 lbs. (4.1kg)

Description	Model
16-Oz. Bacon bomb sampler, brass.	H-2406B
16-Oz. Bacon bomb sampler, stainless steel.	H-2406S

32-Oz. Bacon Bomb Sampler

Larger capacity with same features as H-2405. 2-3/4" dia. x 15-1/4"L. Shipping wt. 15 lbs. (6.8kg)

Description	Model
32-Oz. Bacon bomb sampler, brass.	H-2407B
32-Oz. Bacon bomb sampler, stainless steel.	H-2407S

ASTM Oil Sampler

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. Meets ASTM D270.

Description	Model
ASTM oil sampler. 1-qt. capacity.	H-2400

Shipping wt. 6 lbs. (2.7kg)

1-1/2" Opening ASTM Oil Sampler

Same as H-2400 with 1-1/2" opening.

Description	Model
ASTM oil sampler.	H-2401

Shipping wt. 6 lbs. (2.7kg)

**Humboldt Testing Equipment
Is Engineered for Precision,
Accuracy, Greater Productivity,
Longer Life & Easier Use.**



H-1530 series, H-1535



H-1400



H-2560

Ford Viscosity Cups

Used in determining viscosity of paint, lacquers and related coatings. Cup-orifice combination (Ford 2, 3 or 4) should be selected to provide an efflux time within the 20-to-100-second range. Cup body is machined from aluminum; orifice is brass. Measurements with the Ford viscosity cup should be made at temperature of $25^{\circ}\text{C} \pm 0.1^{\circ}$ ($77^{\circ}\text{F} \pm 0.2^{\circ}$) with H-2610.17C (or H-2600.17F) thermometer. Order thermometers and stand separately. Meets ASTM D333, D365, D1200.

Description	Model
No. 1 Orifice For Viscosity Cup	H-1530.1
No. 2 Orifice For Viscosity Cup	H-1530.2
No. 3 Orifice For Viscosity Cup	H-1530.3
No. 4 Orifice For Viscosity Cup	H-1530.4
No. 5 Orifice For Viscosity Cup	H-1530.5

Viscosity Cup Stand

Features leveling base and adjustable support bracket for H-1530 Ford viscosity cups.

Description	Model
Viscosity cup stand.	H-1535

Asphalt Viscosimeter Float Test Set

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. Also available as components. Order thermometer separately. Meets ASTM D139, AASHTO T50.

Description	Model
Asphalt viscosimeter float test set.	H-1400
Asphalt viscosimeter float only.	H-1410
Three asphalt viscosimeter collars only.	H-1420

Cloud and Pour Point Apparatus Set

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, thermometer (H-2600.5F -36° to 120°F) fitted into cork for sealing test cylinder. Meets ASTM D97, D117, D2500.

Description, Complete Set	Model
Cloud and pour point apparatus set.	H-2560

Shipping wt. 6 lbs. (2.7kg)

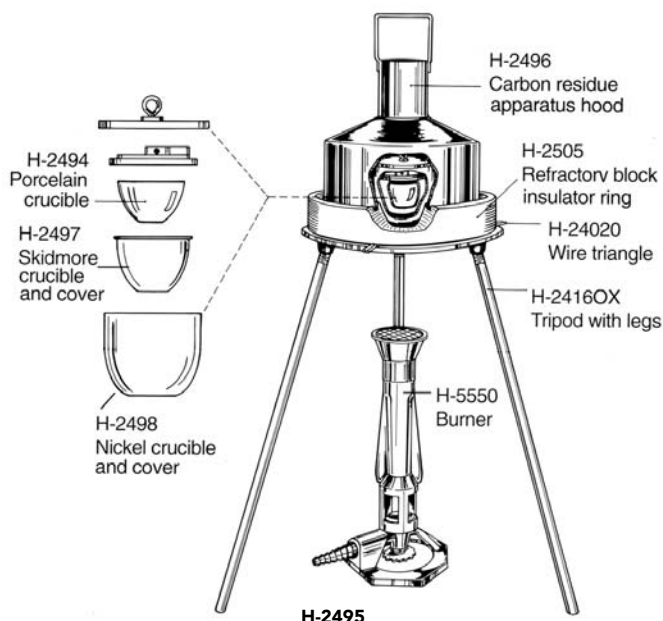
Description, Replacement Parts & Accessories	Model
Metal tripod base.	H-2560.1
Glass test jar.	H-2560.3
Glass battery bath jar.	H-2560.5
Brass cylinder.	H-2560.2
Cork discs.	H-2595
Cork rings.	H-2598
Thermometer -36 to 120°F.	H-2600.5F
Thermometer -38 to 50°C.	H-2610.5C
Thermometer -112 to 70°F.	H-2600.6F
Thermometer -80 to 20°C.	H-2610.6C

Spot Test Set of Asphaltic Materials

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. Meets AASHTO T102.

Description	Model
Spot test set.	H-1510

Shipping wt. 5 lbs. (2.2kg)

**H-2495**

Conradson Carbon Residue Apparatus

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. Meets ASTM D189, D2416.

Description, Complete Set	Model
Conradson carbon residue apparatus.	H-2495

Shipping wt. 7 lbs. (3.2kg)

Description, Replacement Parts & Accessories	Model
Porcelain crucible.	H-2494
Skidmore crucible and cover.	H-2497
Carbon residue apparatus hood.	H-2496
Nickel crucible with cover.	H-2498
Refractory block insulator ring.	H-2505

**HP-1108****HP-1160**

Stainless Steel Weight-Per-Gallon Cup

Corrosion-resistant stainless steel cup provides means of rapid, accurate determination of weight per gallon or specific gravity. Capacity of 83.2cc. Includes tight-fitting stainless steel cover. Meets ASTM D244.

Description	Model
Stainless steel weight-per-gallon cup.	HP-1108

Falling Sand Abrasion Tester

Falling sand test determines resistance of coatings, paint, varnish, lacquer and related products to abrasion. Test panel is enclosed in a receptacle with a window. Ottawa natural silica sand is considered standard for this test because of its known characteristics. Order H-3820 Ottawa silica test sand separately. Meets ASTM D333, D968, D1395, D2205.

Description	Model
Falling sand abrasion tester.	HP-1160

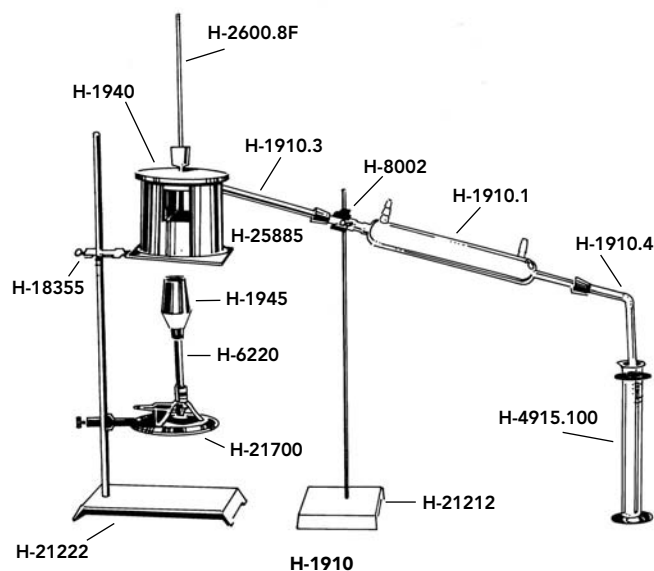
Shipping wt. 110 lbs. (49.9kg)

Ottawa Silica Sand

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. Meets ASTM C778.

Description	Model
Ottawa silica sand.	H-3820

Shipping wt. 50 lbs. (22.7kg)



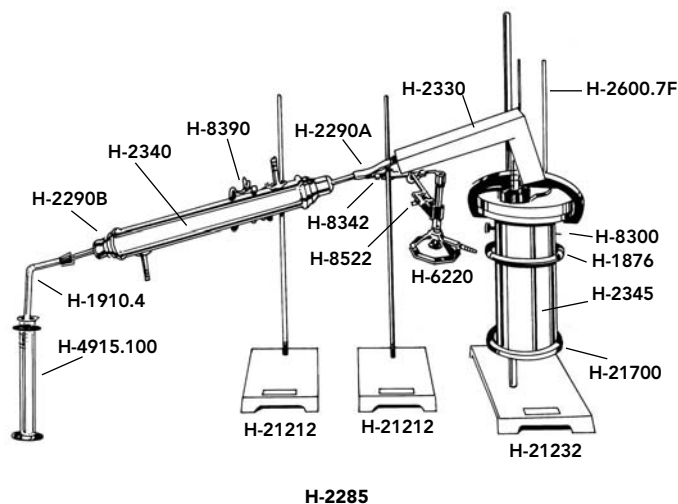
Distillation of Cut-Back Asphaltic (Bituminous) Products

Distillation apparatus accurately determines residue content and separates volatile and non-volatile cut-back asphaltic products. Fahrenheit thermometers furnished standard. Meets ASTM D402; AASHTO T78.

Description, Complete Set	Model
Distillation of cut-back asphaltic (bituminous) products.	H-1910

Shipping wt. 18 lbs. (8.2kg)

Description, Replacement Parts & Accessories	Model
Flask	H-1910.3
Condenser	H-1910.1
Adapter	H-1910.4
Distillation shield	H-1940
Flame shield	H-1945
Thermometer	H-2600.8F
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



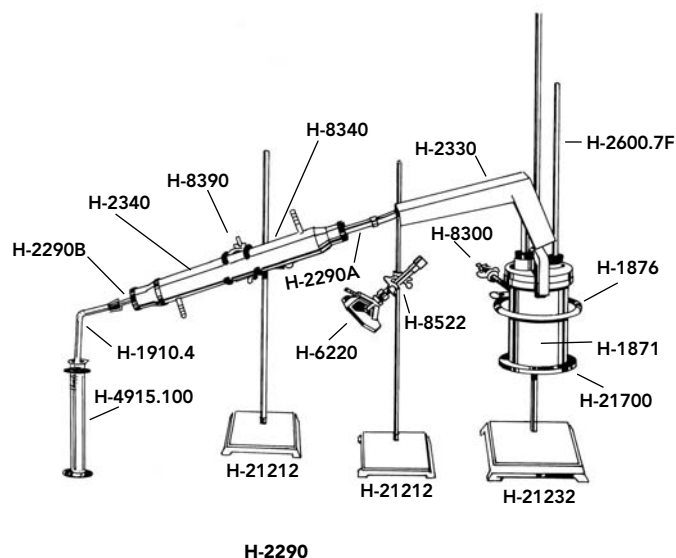
Emulsified Asphalts Distillation Apparatus

Distillation apparatus accurately determines representative portion of residue in emulsified asphalts. Fahrenheit thermometers furnished standard. Meets ASTM D244; AASHTO T59.

Description, Complete Set	Model
Emulsified asphalts distillation apparatus.	H-2285

Shipping wt. 30 lbs. (13.6kg)

Description, Replacement Parts & Accessories	Model
Ring burner	H-1876
Adapter (see H-1910 product illustration)	H-1910.4
Bent glass tube	H-2290A
Funnelled tube	H-2290B
Tube shield	H-2330
Condenser	H-2340
Aluminum still	H-2345
Thermometers (two in complete set)	H-2600.7F
Graduated cylinder	H-4915.100
Burner	H-6220
Clamp	H-8300
Clamp holders (two in complete set)	H-8342
Clamp	H-8390
Clamp	H-8522
Ring	H-18355
Support stands (two in complete set)	H-21212
Support stand	H-21232
Support shelf	H-21700



Emulsified Asphalts Water Content Distillation Apparatus

Same as H-2285 with smaller H-1871 still substituted for H-2345 still. Meets ASTM D244; AASHTO T59.

Description, Complete Set	Model
Emulsified asphalts water content distillation apparatus.	H-2290

Shipping wt. 30 lbs. (13.6 kg)

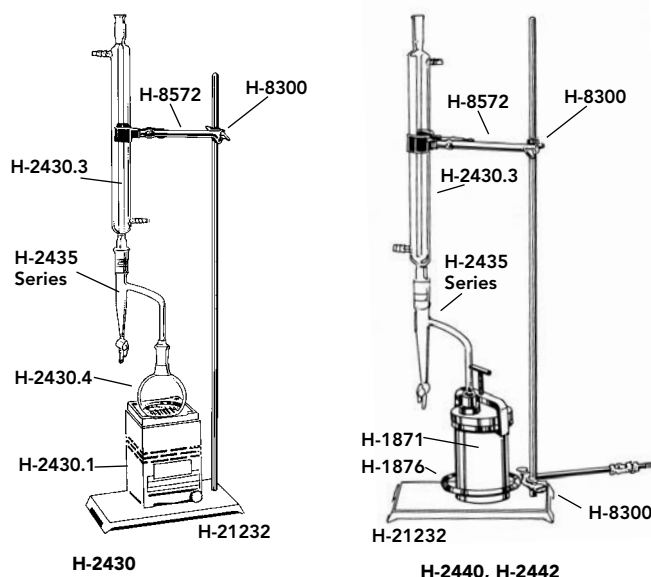
Dean-Stark Electric Apparatus for Water in Petroleum Products

Electrically heated apparatus determines water content in petroleum products and other bituminous materials. Meets ASTM D95, D244, E123; AASHTO T55, T59.

Description, Complete Set	Model
Dean-Stark electric apparatus for water in petroleum products. 115V, 60Hz, 1 ph, AC.	H-2430
Dean-Stark electric apparatus for water in petroleum products. 230V, 50Hz, 1 ph, AC.	H-2430.5F

Shipping wt. 30 lbs. (13.6kg)

Description, Replacement Parts & Accessories	Model
0 to 750W electric rheostat heater	H-2430.1
Condenser	H-2430.3
Flask	H-2430.4
20 ml distilling receiver trap with stopcock	H-2435.20
Clamp	H-8300
Burette clamp	H-8572
Rectangular support stand with rod	H-21232



Dean-Stark Gas-Heated Water in Petroleum Products Apparatus

Gas heated apparatus determines water content in petroleum products and other bituminous materials. Uses the same replacement parts as H-2430, except has still and burner (listed below) instead of heater and flask. Meets ASTM D95, D244, E123; AASHTO T55, T59.

Description, Complete Set	Model
Dean-Stark gas-heated water in petroleum products apparatus.	H-2440

Shipping wt. 30 lbs. (13.6kg)

Description, Replacement Parts & Accessories	Model
Tar still	H-1871
Ring burner	H-1876

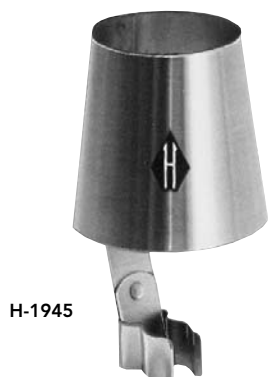
Distillation Apparatus for Moisture or Volatile Distillates in Bituminous Paving Mixtures

Same as H-2440, but the distilling receiver is a trap for moisture or volatile fractions of bitumen. Trap is graduated 0 to 5ml in 0.1ml divisions. Includes trap. Meets ASTM D1461; AASHTO T110.

Description	Model
Distillation apparatus with trap for VOLATILE distillates in bituminous paving mixtures.	H-2442.25
Distillation apparatus with trap for MOISTURE distillates in bituminous paving mixtures.	H-2442.10

Shipping wt. 25 lbs. (11.3kg)

Note: See following page for distillation accessories and replacement parts.



H-1945



H-1876



H-2345



H-1946



H-2340



H-2348



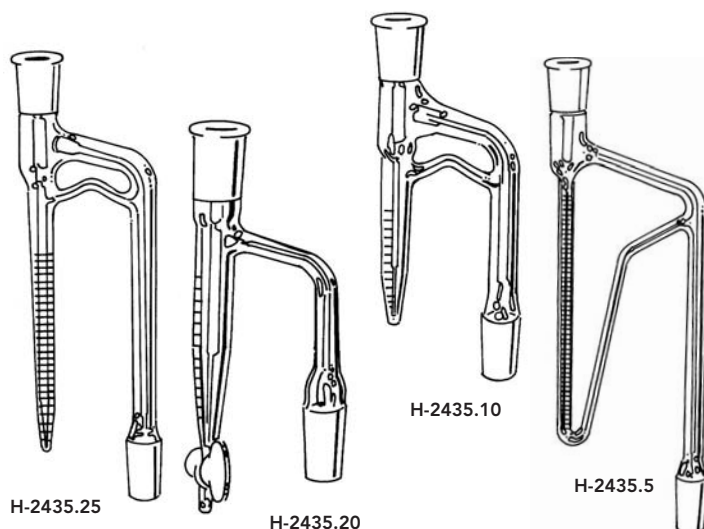
H-1871



H-1940

Distillation Apparatus Replacement Shields, Stills and Accessories

Part	Description	Used With	Specifications	Model
Aluminum Tar Still	For determining water in crude petroleum, tars and derivatives of those materials. Cover has 1 tubulure. Dimensions: I.D. 3-1/2" (89mm) x 6" (152mm) inside depth. 1 qt. (0.9 litre) capacity. Cast aluminum.	H-2290	ASTM D95, D244, D370, D1461; AASHTO T55, T59, T83, T110	H-1871
Aluminum Alloy Still	For identifying cationic emulsions and as 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) I.D. x 9-1/2" (241mm) inside depth.	H-2285	ASTM D95, D244; AASHTO T55, T59, T110	H-2345
	Same as H-2345, except cover has 4 tubulures (3 drilled 10/18 and 1 drilled 24/40).			H-2346
Ring Burner	Guide pins keep burner equidistant around still. Fletcher attachment regulates gas and air. I.D. 4-3/4" (121mm) x O.D. 5-1/2" (140mm). Overall shank length 11" (279mm); 3/8" (10mm) serrated hose connection	All gases	ASTM D244; AASHTO D59	H-1876
Distillation Shield	Flanged open-end stainless steel cylinder, with 1/8" ceramic lining and two-part cover. For 500ml flask. Flame distillation only.	H-1880	ASTM D402; AASHTO T78	H-1940
Flame Shield	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.			H-1945
Burner Chimney	Fits standard 4" (102mm) rings.	—	—	H-1946
Connecting Tube Shield	Stainless steel.	H-2285 H-2290	ASTM D244; AASHTO T59	H-2330
Condenser Jacket	Brass, 15" long. Inlet/outlet tubulures on opposite sides of jacket.			H-2340
Still Cleaner	Tool to remove residue from interior of still; 13x4" (328x101mm) dia.	H-1871 H-2345	None	H-2348



Distillation Replacement Traps

Description	Model
25ml cap trap for volatile distillates. Graduated 0.1ml from 0 to 1ml, 0.1ml from 0 to 25ml. Meets ASTM D95, D1461.	H-2435.25
20ml cap distillation trap, graduated in 0.2ml. Optional for ASTM D95.	H-2435.20
10ml cap trap for moisture distillates. Graduated 0.1ml from 0 to 1ml, 0.2ml from 1ml to 10ml. Meets ASTM D95, D1461.	H-2435.10
5ml cap distillation trap, graduated 0.1ml. Meets ASTM D1461.	H-2435.5

Bitumen Soluble in Organic Solvents Set

Used to determine solubility of asphalt cement materials.
Meets ASTM D4, D2042 AASHTO T44.

Description	Model
Bitumen soluble in organic solvents set.	H-1550

Shipping wt. 9 lbs.

Description, Replacement Parts & Accessories	Model
Gooch crucible.	H-1550.1
Crucible holder.	H-1550.2
Buchner funnel.	H-1550.3
Glass fiber pad.	H-1550.8
Adapter.	H-12155
Flask filter ring.	H-4913.500
Stopper #7.	H-1550.5



Particle Charge Meter

Particle charge meter identifies cationic emulsified asphalt, using 0-10DC milliammeter controlled by variable resistor. Fail-safe design prevents exceeding meter capacity. Includes positive- and negative-identified test clips and 3-wire plug. Order stainless steel plates separately. Meets ASTM D244; AASHTO T59.

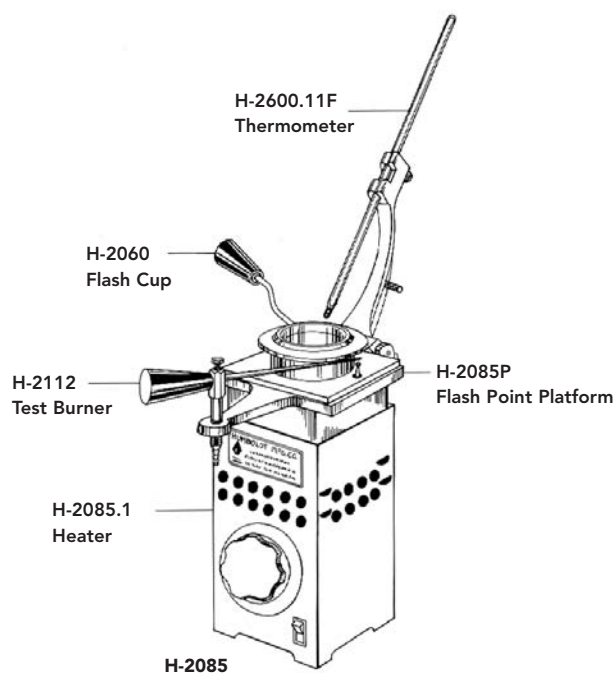
Description	Model
Particle charge meter. 115V AC operation.	H-2450

Note: Order H-1042 Transformer for 220V operation.

Particle Charge Meter Plates

Set of two 1x4" (25.4x101.6mm) stainless steel plates for use with H-2450.

Description	Model
Two particle charge meter plates.	H-2452



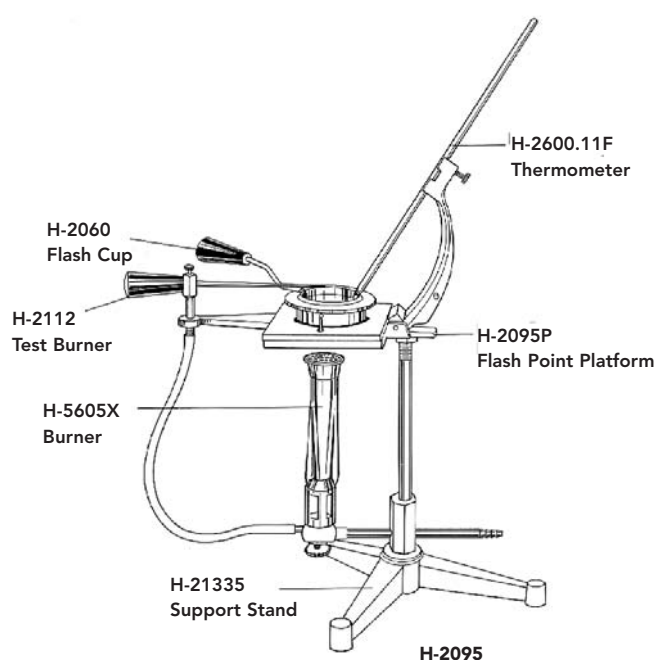
Electric Cleveland Flash and Fire Point Tester

Thermometer position is adjustable. Meets ASTM D92, D117; AASHTO T48.

Description, Complete Set	Model
Electric Cleveland open cup flash tester. 115V. 60Hz. 1ph. AC.	H-2085
Electric Cleveland open cup flash tester. 220V. 50/60Hz. 1ph. AC.	H-2085.4F

Shipping wt. 20 lbs. (9.1kg)

Description, Replacement Parts & Accessories	Model
Electric heater with rheostat.	H-2085.1
Flash-point platform.	H-2085P
Test burner.	H-2112
Flash cup.	H-2060
Thermometer.	H-2600.11F



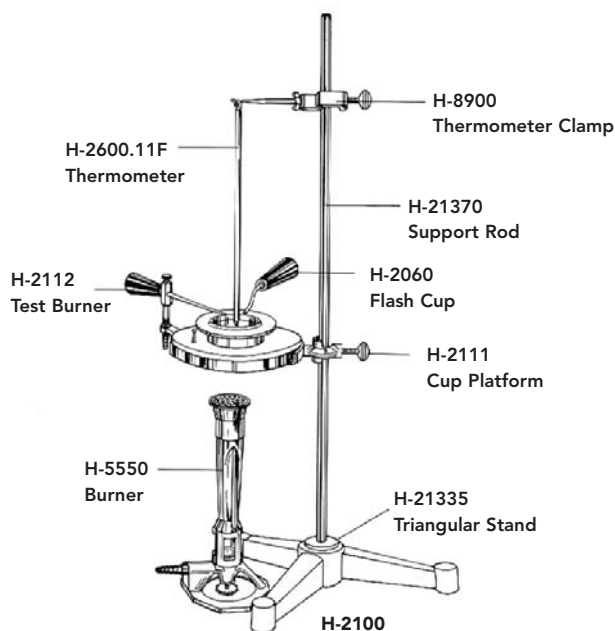
Natural Gas Cleveland Flash and Fire Point Tester

One source supplies gas for both heating and test flame. Replacement parts available separately. Meets ASTM D92, D117; AASHTO T48.

Description, Complete Set	Model
Gas Cleveland flash and fire-point tester.	H-2095

Shipping wt. 20 lbs. (9.1kg)

Description, Replacement Parts & Accessories	Model
Cast-iron tripod base with steel support rod	H-21335
High temperature burner with adjustable needle valve orifice	H-5605X
Flash-point platform	H-2095P
Test burner	H-2112
Flash cup	H-2060
Thermometer	H-2600.11F



Gas Cleveland Flash and Fire Point Tester

Meets ASTM D92; AASHTO T48.

Description, Complete Set	Model
Cleveland flash and fire point tester.	H-2100

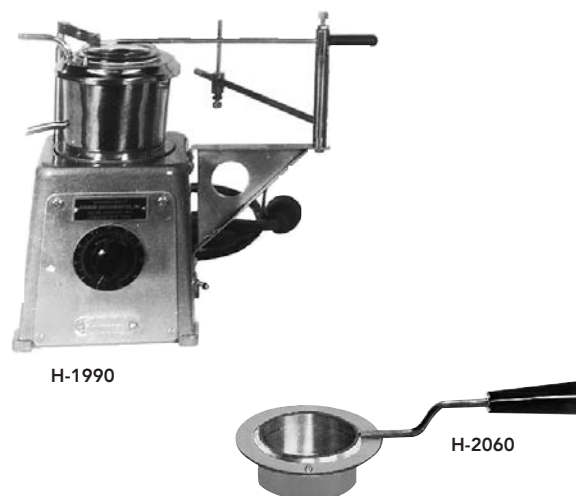
Shipping wt. 17 lbs. (7.7kg)

Description, Replacement Parts & Accessories	Model
Cast-iron tripod base with steel support rod.	H-21335
Support rod.	H-21370
Burner.	H-5550
Test burner.	H-2112
Thermometer clamp.	H-2113
Cup platform.	H-2111
Flash cup.	H-2060
Thermometer.	H-2600.11F

Flash Cup

Used with flash point testers, H-2085, H-2095, and H-2100.

Description	Model
Flash cup.	H-2060



Tag Open-Cup Flash Tester

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. Choose electric, gas or alcohol burner; specify gas type. Order H-2610.9C thermometer, leveling device and draft shield separately. Meets ASTM D1310, D3143; AASHTO T79.

Description	Model
Tag open-cup flash tester, electric heat. 115V. 50/60Hz.	H-1990
Tag open-cup flash tester, electric heat. 230V. 50/60Hz.	H-1990.4F
Tag open-cup flash tester with gas burner.	H-1995

Shipping wt. 9-1/2 lbs. (4.3kg)

Description, Replacement Parts & Accessories	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



H-1456, H-1466, H-1471, H-1473

H-1452, H-1451, H-1474



H-1460, H-1461, H-1464, H-1465



H-1478



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. Meets ASTM D2172 (Method A).

Filter Papers						
for use with Centrifuge Extractors and Reflux Extraction Sets						
Size Inches (O.D. x I.D.)	Filter Speed	Thickness (mm)	Flow Rate (ml/min.)	Retention (µm)	Per Pkg.	Dry Strength Model
9-3/4x2-1/2"	Medium	0.71	85	4	100	H-1480.627
9-3/4x1-3/4"	Medium	0.71	85	4	100	H-1481.627
10x5"	Medium	0.71	85	4	100	H-1487.627
12-1/4x5"	Medium	0.71	85	4	100	H-1489.627
11-5/8x1-3/4"	Medium	0.71	85	4	100	H-1485.627
33cm dia	Very Fast	0.51	360	48	50	H-1497.617
33cm dia	Very Fast	1.02	435	31	100	H-1497.633
33cm dia	Fast	0.25	235	24	100	H-1497.615
33cm dia	Medium	0.17	60	6	100	H-1497.613
33cm dia	Medium	0.71	85	4	100	H-1497.627
40cm dia	Medium	0.71	85	4	100	H-1498.627
40cm dia	Medium Fast	0.17	60	6	100	H-1498.613
40cm dia	Medium Fast	0.25	235	24	100	H-1498.615
40cm dia	Very Fast	0.51	360	48	50	H-1498.617

**Centrifuge Extractors, Traditional Quality Cast Aluminum**

Analog Control Models with analog controller on base. 18x18x18" (457x457x457mm)						Replacement Parts	
Capacity	Open Motor		Explosion-Proof Motor		Shipping Wt.	Replacement Filter Rings	
	115V 60Hz	220V 50/60Hz	115V 60Hz	220V 50/60Hz			
1,500g	H-1456	H-1456.4F	H-1466	H-1466.4F	75 lbs. (33kg)	4-micron retention capability 10" O.D. x5" I.D. Package of 100. H-1487.627	Aluminum bowl for models H-1456 and H-1466 H-1456B Aluminum bowl for models H-1471 and H-1473 H-1471B
3,000g	H-1471	H-1471.4F	H-1473	H-1473.4F	80 lbs. (36kg)	4-micron retention capability 12-1/4" O.D. x5" I.D. Package of 100. H-1489.627	Aluminum bowl cover for models H-1456 and H-1466 H-1456BC Aluminum bowl cover for models H-1471 and H-1473 H-1471BC Cover nut. H-1456N Clamp for models H-1456 through H-1473 H-1471C
Automatic Digital Models with controller for wall mounting to minimize vibration problems. Push button and walk away while machine runs unattended. Memory holds "last test" cycle settings. Shuts off automatically at end of test cycle. 18x18x18" (457x457x457mm)							
Capacity	Open Motor		Explosion-Proof Motor		Shipping Wt.	Replacement Filter Rings	
	115V 60Hz	220V 50/60Hz	115V 60Hz	220V 50/60Hz			
1,500g	H-1460	H-1460.4F	H-1461	H-1461.4F	76 lbs. (34.5kg)	4-micron retention capability 10" O.D. x5" I.D. Package of 100. H-1487.627	Rubber viton O ring for models H-1456, H-1466, H-1471, H-1473. H-1471RV Brake band for models H-1456 through H-1473. H-1456BB
3,000g	H-1464	H-1464.4F	H-1465	H-1465.4F	80 lbs. (36kg)	4-micron retention capability 12-1/4" O.D. x5" I.D. Package of 100. H-1489.627	Brake band assembly for models H-1456 through H-1473. H-1471BBA

Centrifuge Extractors, Value Line

Analog Control Models with analog controller in base. 12x22x20" (304x559x508mm)							
Capacity	Open Motor		Explosion-Proof Motor		Shipping Wt.	Replacement Filter Rings	
	115V 60Hz	220V 50/60Hz	115V 60Hz	220V 50/60Hz			
1,500g	H-1452	H-1452.4F	H-1451	H-1451.4F	85 lbs. (39kg)	6-micron retention capability 9-3/4" O.D. x1-3/4" I.D. Package of 100. Shipping wt. 8lbs (3.6kg) H-1481.627	
3,000g	—	—	H-1474	H-1474.4F	140 lbs. (63.5kg)	6-micron retention capability 11-5/8" O.D. x1-3/4" I.D. Package of 100. Shipping wt. 8lbs (3.6kg) H-1485.627	

Centrifuge Extractor, Hand Driven

Hand Driven Model with machine-cut gears and anti-friction bearings operating in an oil bath. 13x13x17" (330x330x432mm)				Replacement Parts	
Capacity	Model		Shipping Wt.	Replacement Filter Rings	
1,500g	H-1478		50 lbs. (23kg)	4-micron retention capability 10" O.D. x5" I.D. Package of 100. H-1487.627	Aluminum bowl. H-1478B Aluminum bowl cover. H-1456BC Cover nut. H-1456N



H-1448



H-1449



H-1448GS



H-1857

Vacuum Extractors

Used for quantitative determination of bitumen in hot-mixed paving mixtures and pavement samples. Unit is stainless steel 3000g capacity combination vacuum/storage tank. and 12" (305mm) dia. filtering surface. Unit includes connecting hose, 50 H-1497.613 filter papers, test procedure, see-through extraction gauge, sight tube and vacuum gauge. For replacement filter paper, use H-1497 series. Order H-1760 vacuum pump separately. Meets ASTM D2172 (Meth. E); AASHTO T164 (Meth. E).

Description	Model
Vacuum extractor with storage tank.	H-1448

Shipping wt. 84 lbs. (38kg)

Description	Model
Vacuum extractor. Same as H-1448, except without storage tank, gauge, and sight tube.	H-1449

Shipping wt. 60 lbs. (27kg)

Vacuum Extractor Accessories	
Description	Model
Replacement fluorosilicone "O" ring for H-1448 or H-1449.	H-1448.1
Replacement gauge for H-1448.	H-1448G
Replacement glass tubing. Includes 2 "O" rings for H-1448.	H-1448GT
Free-Flow Vacuum Plate.	H-1448GS
Stainless steel plate. Same as provided with H-1448 or H-1449.	H-1448P
Heavy stainless steel plate for H-1448 or H-1449.	H-1448HP
Replacement rubber tubing for H-1448 or H-1449.	H-1448RT
Heavy-wall clear vacuum tubing for H-1448 or H-1449.	H-1446
4,000cc Erlenmeyer flask for H-1448 or H-1449. Meets ASTM D2172; AASHTO T164 (Meth. E).	H-4913.4M
8" sieve adapter for use with H-1448 or H-1449.	H-1447

Free-Flow Vacuum Plate

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 both models H-1448 and H-1449 Vacuum Extractors.

Description	Model
Free-Flow vacuum plate.	H-1448GS

Filterless Centrifuge Extractor

The new H-1857 series 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. Meets ASTM D1856; AASHTO T164, T170. Dimensions: 20x15x33" (508x380x840mm).

Description	Model
Filterless Centrifuge Extractor. 115V/60Hz/1Ph.	H-1857
Filterless Centrifuge Extractor. 230V/50Hz/1Ph.	H-1857.5F

Shipping wt. 150 lbs. (68kg)



H-1495, H-1499



H-1440, H-1442



H-1430

1,000g Reflux Extractor Set

Using hot solvent extraction, determines percentage of bitumen in paving mixture. Each cone has 500g capacity. Components are available as replacement parts. For replacement filter paper, use H-1497 series. Meets ASTM D2172; AASHTO T164 (Method B).

Description, Complete Set	Model
1,000g Reflux extractor set. 115V. 50/60Hz. 1ph. AC.	H-1495
1,000g Reflux extractor set. 240V. 50/60Hz. 1ph. AC.	H-1495.4F

Shipping wt. 26 lbs. (12kg)

Description, Replacement Parts & Accessories	Model
Wire-screen cone (two in complete set).	H-1495.1
Copper condenser with inlet/outlet water tubes	H-1495.2
Glass jar with ground open edges for tight fit. 6" O.D. x 18"H (152x457mm).	H-1495.3
Electric hot plate	H-4950
100-pack 33cm filter paper.	H-1497.613

2,000g Reflux Extractor Set

Similar to H-1495 except each cone has 1,000g capacity. For replacement filter paper use H-1482 or H-1498 series. Meets ASTM D2171; AASHTO T164 (Method B).

Description, Complete Set	Model
2,000g Reflux extractor set. 115V. 50/60Hz. 1ph AC.	H-1499
2,000g Reflux extractor set. 240V. 50/60Hz. 1ph AC.	H-1499.4F

Shipping wt. 26 lbs. (12kg)

Description, Replacement Parts & Accessories	Model
Wire-screen cone (two in complete set).	H-1499.1
Copper condenser with inlet/outlet water tubes	H-1499.2
Glass jar with ground open edges for tight fit. 8-3/4" O.D. x 18"H (222x457mm).	H-1499.3
Electric hot plate	H-4951
100-pack 40cm filter paper.	H-1498.613

Asphalt Dispenser

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; O.D. = 10-1/4" dia. x 14" height (260 x 356mm). I.D. = 6-3/4" dia. x 7-1/4" depth (171 x 184MM). 12-qt Capacity— 1,200 watts; O.D. = 15" dia. x 17" height (381 x 432mm). I.D. = 10" dia. x 9-1/2" depth (254 x 241mm). (Valve & controls excluded from dimensions.)

Description	Model
6-qt. melting pot, 110V, 60Hz.	H-1440
6-qt. melting pot, 220V, 50/60Hz.	H-1440.4F

Shipping wt. 30 lbs. (13.6kg)

Description	Model
12-qt. melting pot, 110V, 60Hz.	H-1442
12-qt. melting pot, 220V, 50/60Hz.	H-1442.4F

Shipping wt. 43 lbs. (19.5kg)

Solvent Reclaimer

Spee-Distill® reclaims up to 4-1/4 of 5 gallons of contaminated solvent at minimal cost. Operates unattended; shuts off when process is complete. Electric heater, controlled by adjustable thermostat. Will reclaim Trichlorethylene, Triclene D, Methylene Chloride, Trichlorethane, Perchlorethylene, Blacosolv, Percleve, Chlorothene Nu and other nonflammable solvents. Unit features 16" (404mm) I.D. glass-lined tank and condensing unit of corrosion-resistant incoloy tubing. Includes input and output water hoses, water-cooled heat exchanger, lid and seal, 6-ft. heavy-duty cord and 3-wire plug. Dimensions: 21" (534mm) O.D. x 27" (686mm)H. Solvent capacity 5 gallons (18.9L). Operating time: 1 hr., 50 min. Distilling cycle: 1.5 hrs. Consumes 73 gals (276.4 L) water.

Description	Model
Solvent reclaimer. 110V, 60Hz, 1ph AC.	H-1430
Solvent reclaimer. 230V, 50/60Hz, 1ph AC.	H-1430.4F

Shipping wt. 100 lbs. (45kg)



H-1750

H-1820

Vacuum Pycnometer (Rice Test) Set

Vacuum pycnometer is used in Rice testing to determine the maximum specific gravity of bituminous paving mixtures with maximum aggregate size up to 19.1mm (3/4in.). Designed for operator safety, set includes aluminum volumetric canister, volumetric lid, flat Plexiglas vacuum lid with O ring, volumeter, vacuum gauge with release valve and fittings (dial reading 0 to 30"), metal water vacuum aspirator with 3/8" IPT, 6' hose. Unit achieves vacuum using an aspirator or optional vacuum pump. Order H-1756 vibrating table, and H-1752, H-1754 or H-1754D manometer separately. See page 26 for vacuum pumps. Replacement parts are available separately. Meets ASTM D2041; AASHTO T209, T283.

Description	Model
Vacuum pycnometer, aluminum, 2kg capacity, 7-1/2" I.D. x 6" depth.	H-1750
Vacuum pycnometer, stainless steel, 2kg capacity, 7-1.2" I.D. x 6" depth.	H-1750SS
Vacuum pycnometer, 4" depth, I.D. 7-1/2".	H-1751

Description, Replacement Parts	Model
Replacement aluminum lid with one hole for use with H-1750, H-1751.	H-1750.2
Replacement O-ring for H-1750, H-1751	H-1750.3

Large-Capacity Vacuum Pycnometer (Rice Test) Set

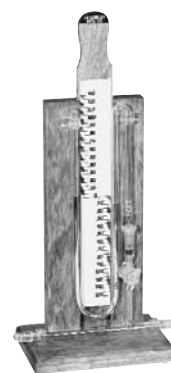
Larger-capacity unit has many of the same features as H-1750 but also has sample capacity of 10L (2.64 gal.), 6kg (13 lbs.) weight, with maximum aggregate size of 50mm (2in.). Set features domed transparent cover for easy observation of sample testing. Unit includes water inlet valve and 1/4" I.D. hose, quick-disconnect, vacuum gauge, vacuum hose and aspirator with 3/8" NPT fitting. Flange O.D. is 10-3/4" (273mm); maximum clearance above plate is 7-3/4" (197mm). Order H-1825 vibrating table, vacuum pump and H-1752, H-1754 or H-1754D manometer separately. Replacement parts are available separately. Dimensions: 9-7/16" I.D. x 12-1/8" (240 I.D. x 311mm). Meets ASTM D2041; AASHTO T209, T283.

Description	Model
Large-capacity vacuum pycnometer, 6kg cannister.	H-1820

Note: Please see Page 26 for our complete line of vacuum pumps.



H-1754D



H-1752



H-1754

Digital Manometer

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.

Description	Model
Digital manometer.	H-1754D
Digital manometer, certified.	H-1754DCA

Residual-Pressure Manometer (Rice Test)

Mandatory for ASTM D2041, residual-pressure manometer features sliding scale graduated above and below zero to 130x1mm. U-tube, mounted on wooden stand, includes mercury. Meets ASTM and AASHTO specifications.

Description	Model
Residual-pressure manometer.	H-1752
T-connector.	H-1752T

Closed-End Residual-Pressure Manometer

The Closed-end U-tube-type manometer has range of 1-150mm absolute pressure. Scale is graduated 0 to 75mm in 1mm divisions, upward and downward from mid-scale zero. Tubulations on base take 3/8-in. tubing.

Description	Model
Closed-end residual-pressure manometer.	H-1754

Vacuum Level Valve for Vacuum Pycnometers

For use with H-1750 & H-1751, for greater accuracy and shorter dry back time. Brass valve maintains 30mm vacuum pressure on sample. Meets ASTM D2041, AASHTO T283.

Description	Model
Vacuum level valve for vacuum pycnometers (Rice Test) H-1750 & H-1751.	H-1749



H-1782



H-1756A



H-1826A



H-1759



H-4296

Orbital De-Airing Table for H-1750

The new Humboldt Orbital De-Airing Table 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) table 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.

Description	Model
Orbital de-airing table for use with 2kg canister. 115V, 50/60 Hz.	H-1782

Shipping wt. 28lbs (13kg)

Note: For 220V operation, order Model H-1042 Transformer.

Vibrating Table for H-1750

Heavy-duty vibrating tables 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.

Description	Model
Vibrating table for use with 2kg canister. 3,000 VPMs. 115V. 60Hz.	H-1756A
Vibrating table for use with 2kg canister. 2,400 VPMs. 230V. 50Hz.	H-1756A.5F

Vibrating Table for H-1820

Heavy-duty vibrating tables 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 130x1mm.

Description	Model
Vibrating table for use with 6kg canister. 3,000 VPMs. 115V. 60Hz.	H-1826A
Vibrating table for use with 6kg canister. 2,400 VPMs. 230V. 50Hz.	H-1826A.5F

Shipping wt. 12lbs (5.4kg)

Universal Timer

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features two receptacles and 3-wire cord and plug.

Description	Model
Universal timer. 115V. 60Hz. 10 amps. 1ph. AC.	H-4296
Universal timer. 220V. 50/60Hz. 5 amps. 1ph. AC.	H-4296.4F

Flask Attachment For use with H-1756A and H-1782

Description	Model
Flask attachment.	H-1753

Drierite Desiccant

For use while performing Rice test. Protects vacuum pump by removing final trace of moisture. Must be used with H-1758 Indicating Drierite. Meets ASTM D2041.

Description	Model
Drierite desiccant, 1 lb.	H-1757

Indicating Drierite Desiccant

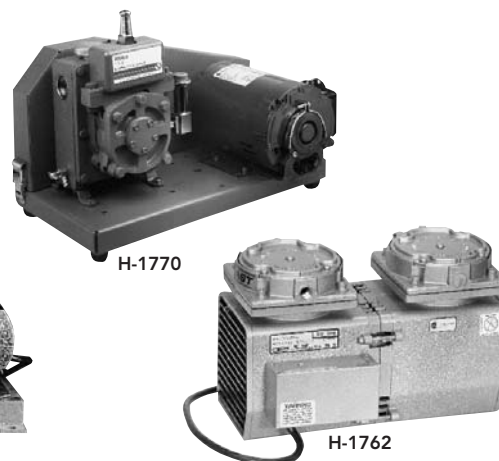
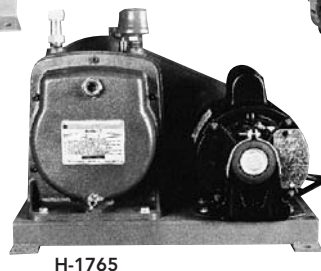
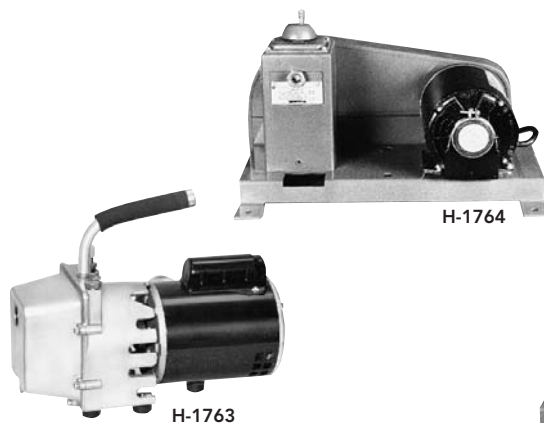
For use with H-1757 Drierite desiccant in performing Rice test. Blue desiccant turns red to show absorption and may be reused.

Description	Model
Indicating Drierite Desiccant, 1 lb.	H-1758

Indicating Drierite Air Drying Unit

Easily installs in-line between vacuum pump and rice test equipment. This refillable unit measures 2-5/8 by 11-3/8" (667x289mm) with hose barbs at both ends, which can accept 1/4" to 3/8" flexible tubing. Supplied complete with 650g of indicating desiccant.

Description	Model
Indicating Drierite Air Drying Unit.	H-1759



High Vacuum Pump

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 85 L 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" O.D. intake ports for 1/4" I.D. tubing. Dimensions: 11-1/4x15-1/2x6-1/2" (28.6x39.4x16.5cm).

Description	Model
High vacuum pump. 1/3HP. 115V. 60Hz.	H-1763
High vacuum pump. 1/3HP. 230V. 50/60Hz.	H-1763.4F

Shipping wt. 26 lbs. (12.7 kg)

Belt-Driven Two-Stage Vacuum Pump

Designed for continuous use, this two-stage 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.

Description	Model
Belt-driven two-stage vacuum pump. HyVac® 1 No. 91105-001. 115V, 60Hz	H-1764
Belt-driven two-stage vacuum pump. HyVac® 1 No. 91105-001. 230V, 60Hz	H-1764.2F
Belt-driven two-stage vacuum pump. HyVac® 1 No. 91105-001. 230V, 50Hz	H-1764.5F

Shipping wt. 80 lbs. (36.3 kg)

Belt-Driven Two-Stage Vacuum Pump with Gas Ballast

Same as H-1764 with gas ballast that consists of an adjustable valve to permit controllable proportion of air to be bled into exhaust stage for rapid purging of entrained water vapor in pump oil. For maximum vacuum, this can be operated totally closed. Pump pulls 29-30" maximum vacuum.

Description	Model
Belt-driven two-stage vacuum pump with gas ballast. HyVac® 7 No. 91506-001. 115V, 60Hz.	H-1765
Belt-driven two-stage vacuum pump with gas ballast. HyVac® 7 No. 91506-007. 230V, 50Hz.	H-1765.5F

Shipping wt. 110 lbs. (50kg)

Vacuum Pump

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). Requires vacuum tubing.

Description	Model
Vacuum pump with belt guard. 115V. 60Hz.	H-1770

Two-Stage Oil-less Diaphragm Vacuum Pump

Split-capacitor four-pole, two-stage oil-less diaphragm vacuum pump pulls 29" Hg maximum-obtainable vacuum.

Description	Model
Two-stage oil-less diaphragm vacuum pump. 110V. 60Hz. 1ph AC.	H-1762
Two-stage oil-less diaphragm vacuum pump. 230V. 50Hz. 1ph AC.	H-1762.5F

Shipping wt. 25 lbs. (11.36kg)

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).

Description	Model
1 qt. Bottle vacuum pump oil.	H-1766.2
1 gal. Bottle vacuum pump oil. Shipping wt. 9 lbs (4.0kg)	H-1766.3
5 gal. Bottle vacuum pump oil. Shipping wt. 56 lbs (25.4kg).	H-1766.4
12 qt. case, vacuum pump oil. Shipping wt. 26 lbs (11.8kg).	H-1766.5
6 gal. case, vacuum pump oil. Shipping wt. 37 lbs (16.8kg).	H-1766.6

Flushing Oil for Vacuum Pumps

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.

Description	Model
Flushing oil for vacuum pumps, 1 gallon.	H-1768.3

Shipping wt. 9 lbs. (4.1kg).



Basic Marshall Asphalt Stability Test Apparatus

Basic Marshall compression and testing machine for asphalt stability. Measures stability and plastic flow of bituminous paving mixtures. Basic set is ideal for field use. Superior construction minimizes deflection of the load frame to provide:

- Improved stability in testing
- Increased reliability of test results
- Improved stability in flow monitoring & measuring
- Increased Productivity
- Longer life & reduced repairs

Humboldt's electro-mechanical load frame has 1-1/4" (31.8mm) dia. rods & heavy-duty steel cross head. This design provides nearly twice the rigidity of other load frames on the market. The more rigid frame deflects less under test loading—yielding far more reliable test results.

A screw jack gear box & motor mounted inside the testing frame produce precise uniform vertical 2" (50.8 mm) platen movement per minute. Maximum piston travel is 3-1/2" (88mm). Limit switches increase safety, decrease equipment damage & repairs. Power to jack is automatically stopped when empty platen reaches top or bottom limit to prevent gear box jams.

Simple operation features: Adjustable cross head to accommodate specimen sizes; plus convenient front mounted power direction switch, and indicator lights for travel direction and limit.

Available as a set, or individual components/accessories. Meets ASTM D1559; AASHTO T245.

Description	Model
Basic Marshall asphalt stability test set with two compaction molds. Set includes: H-1339, H-1340, H-1341, H-1342, H-1343, H-1344 or H-1344M, H-1347, H-1348, and H-1390. 110V, 60Hz. 1ph, AC.	H-1335
Same as H-1335, except 230V, 60Hz. 1ph, AC.	H-1335.2F
Same as H-1335, except 230V, 50Hz. 1ph, AC.	H-1335.5F



H-1339A



HM-2000A

Marshall Compression and Testing Machine

For measuring resistance to plastic flow of bituminous paving mixtures. Testing Machine has motor with reversing switch that produces uniform vertical 2" (51mm) movement per minute. Includes calibrated load ring and dial indicator for determining test load. Load capacity is 10,000 lbs. (4500kg); maximum piston travel is 3-1/2" (88mm). Overall dimension: 18x18x38-1/2" H (457x457x978mm).

Description	Model
Motorized stability compression and testing machine 110V, 60Hz, 1ph AC.	H-1339A
Motorized stability compression and testing machine 220V, 60Hz, 1ph AC.	H-1339A.2F
Motorized stability compression and testing machine 220V, 50Hz, 1ph AC.	H-1339A.5F

Shipping wt. 185 lbs. (78.9 kg)

Digital Master-Loader

Handles a variety of tests with one load frame (Marshall, CBR, Unconfined, Unconsolidated undrained triaxial). Bench-mounted unit features pre-set speed selections and accessories. Variable speed setting allows stepless adjustment from 0.002" to 2.000" per minute. Order H-1342 breaking head, H-1344 flowmeter and H-4454.100 load ring separately. Meets ASTM D1633, D1883, D2166, D1559, D5581 and AASHTO T193, T208, T245.

Description	Model
Master Loader multi-use compression tester, 120V, 50/60 Hz, 1 ph AC.	HM-2000A
Master Loader multi-use compression tester, 240V, 50/60 Hz, 1 ph AC.	HM-2000A.4F

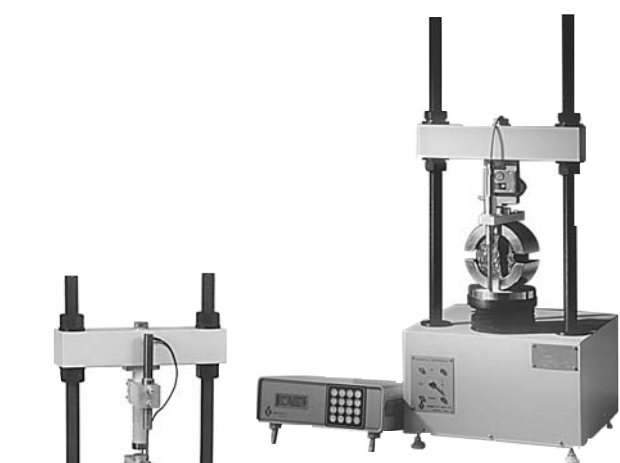
Shipping wt. 300 lbs. (137kg)

Digital Conversion Kit Includes Twin-Channel Digital Display

Twin-channel digital display for use with H-1339. Includes S-type 10,000 lbf (50kN) load cell, 0.4" (10mm) linear strain transducer, and transducer bracket. Display: 12x10 x4" (304x254x102mm).

Description	Model
Digital conversion kit. Includes twin-channel digital display, 120V 50/60Hz	H-1324A
Digital conversion kit. Includes twin-channel digital display, 220V, 50/60Hz	H-1324A.4F

Shipping wt. 10 lbs. (4.5 kg)



H-1339A, H-1324A



H-1339A, H-1329CK

Marshall Test Recorder Conversion Kit

Kit converts your H-1339 compression tester to an automatic Marshall compression tester and recorder. Includes LVDT sensor, electronic load cell, H-4454.100 load ring and plotter assembly.

Description	Model
Marshall test recorder conversion kit.	H-1329CK

Shipping wt. 18 lbs (8.2kg)

Accessories for Marshall Compression Testing Machines

See complete product specifications elsewhere in this section.

Description, Accessories	Model
4" Breaking head.	H-1342
6" Breaking head.	H-1362
4" Lottman head.	H-1349
6" Lottman head.	H-1369

Shipping wt. 20 lbs. (9.1 kg)

Description, Accessories	Model
Dial flowmeter.	H-1344
Metric dial flowmeter.	H-1344M
Dual-calibrated load ring 11,000 LBF (4,550kgF, 44,500KN).	H-4454.100

Shipping wt. 8 lbs. (3.7kg)



Marshall and TSR Compression Machine

The Humboldt H-1322, Marshall and TSR Compression Machine, is a state-of-the-art apparatus specifically designed for Marshall and TSR testing. These tests can be used to evaluate the relative quality of materials, as well as generate input for pavement design or pavement evaluation and analysis. The microprocessor-based system incorporates a 16-BIT Analog to Digital (AtoD) converter with chart recorder output and RS232 computer connection capabilities. The system automatically tests and records Marshall stability and plastic flow of Bituminous mixture on one chart with an accuracy to less than 1 percent over the total range, eliminating operator error in dial readings and manual recording of data. Meets ASTM D5581, D4123-82; AASHTO T245, T283, BS 598-107

Features include:

- The Marshall and TSR Compression Machine has a total frame capacity of 10,000lbs (45kN).
- Stress is measured with a supplied S-Type load cell.
- The apparatus features an AC single speed motor with an operating rate of 2 in/min or (50.8mm/sec.), and a built-in yt chart recorder, for monitoring load vs. rate of compression.
- The 16-BIT Analog to Digital converter can be connected directly to the computer or to a serial printer for live data monitoring.
- The apparatus automatically detects the peak value, automatically stops testing procedure upon completion and automatically activates the chart recorder for a hard copy of the test data.
- Maximum piston travel is 3-1/2 in. (88 mm) with limit switch to prevent gearbox jams and damages.

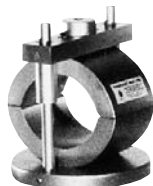
Specifications:

Dimensions (W x D x H)	36 x 18 x 38-1/2 in (914 x 457 x 978 mm)
Platen speed	2.0 in/min (50.8 mm per minute)
Shipping Weight	250 lbs (113.6 kg)

Description	Model
Automatic Marshall / TSR apparatus with load cell and chart recorder, 115 VAC, 60 Hz.	H-1322
Automatic Marshall / TSR apparatus with load cell and chart recorder, 220 VAC, 50 Hz.	H-1322.5F



H-1344



H-1342, H-1362



H-1349, H-1369



H-4454.100, H-4454.050

Dial Flowmeter

Consists of special dial indicator with a maximum position brake assembly and a guide sleeve that fits over either guide rod of the H-1342 or H-1362 stability test mold

Description	Model
Dial flowmeter with gage graduations of 0.01" div., range 1.00".	H-1344
Dial flowmeter with gage graduations of 0.25mm. div., range 25mm.	H-1344M

Dial Indicators

Replacement dial indicators with brake assembly for H-1344 dial flowmeter.

Description	Model
Dial indicator, range 1.00", graduation .010".	H-1344.2
Dial indicator, range 25mm; graduation 0.25mm.	H-1344.2M

Breaking Heads

Test heads consist of upper and lower cylindrical segments having inside radius of curvature of 3" for 6" sample 2" and for 4" sample. Lower segment is mounted on a base; two perpendicular guide rods extend vertically from the base. One guide rod is larger than the other, with a correspondingly larger guide sleeve in the upper segment to assure correct assembly. Guide sleeves in the upper segment bring the two sections together without appreciable binding or loose motion on the guide rods.

Description	Model
Breaking head for 4" Marshall samples. ASTM D1559.	H-1342

Shipping wt. 20 lbs. (9.1kg)

Description	Model
Breaking head for 6" Marshall samples. ASTM D5581.	H-1362

Shipping wt. 30 lbs. (13.65kg)

Lottman Breaking Heads

Breaking head tests tensile strength. H-1349 has 1/2" wide upper and lower segments for use on 4" mold. H-1369 has 3/4" wide upper and lower segments for use on 6" mold. Meets ASTM D4123, AASHTO T283.

Description	Model
Lottman breaking head for 4" mold.	H-1349
Lottman breaking head for 6" mold.	H-1369

Shipping wt. 10 lbs.

Dual-Calibrated Load Rings, 20lb Calibration

Dual-calibrated load rings are individually serial numbered for positive identification. 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. Also available with digital indicators, see below. Also calibrates load cell.

Description	Model
Dual-calibrated load ring 11,000 LBF (4,550kgF, 44.5KN).	H-4454.100

Shipping wt. 8 lbs. (3.7kg).

Dual-Calibrated Load Rings, 10lb Calibration

Same as H-4454.100 except calibration is every 10 lbs. Also available with digital indicators, see below. Also calibrates load cell.

Description	Model
Dual-calibrated load ring 5,500 LBF (2,500kgF, 25.0KN).	H-4454.050

Shipping wt. 8 lbs. (3.7kg).

Load Rings					
Description	Range and Measurement Units			Meets Spec.	Model (Analog Gauge) (Digital Gauge)
	lbf	kN	kgf		
Tensile steel load rings, 0.75% FS linearity, 0.15 % FS error, 8.20" high, 3/4-16 female mounting.	110	0.5	50	ASTM E74	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



H-1345



H-1360B



H-1360A



H-1364, H-1366 Series

4" and 6" compactors can be easily converted for testing either 4" or 6" samples by ordering the desired size hammer and mold separately.

Hand Compaction Set

Compaction pedestal features an adjustable guide that fits the handle of the hammer. Guide holds axis of the compaction hammer perpendicular to the base of the mold assembly during compaction.

Description, Complete Set	Model
Hand compaction set.	H-1345

Shipping wt. 165 lbs. (74.8 kg)

Description, Replacement Parts	Model
Compaction pedestal with steel plate.	H-1347
Compaction mold, 4" for H-1345.	H-1341
Compaction mold holder.	H-1343
Compaction hammer.	H-1340
Hammer support rod.	H-1345.6
Adjustable guide.	H-1345.5

Spare Hammers for H-1364, H-1366

Hammer assembly promotes operation, allows preheating of foot and acts as a stand-by replacement. Includes locator guide, redesigned rod release mechanism assembled with screws to avoid broken welds, weight and foot.

Description	Model
Spare 4" hammer with tapered foot for rotating base compactors.	H-1360A
Spare 4" hammer with flat foot for non-rotating base compactors.	H-1360AF

Shipping wt. 10 lbs. (4.5kg)

Description	Model
Spare 6" hammer with tapered foot for rotating base compactors.	H-1360B
Spare 6" hammer with flat foot for non-rotating base compactors.	H-1360BF

Shipping wt. 22.5 lbs. (10.2kg)

Marshall Heavy-Duty Automatic Single Compactor with Rotating Base for 4" or 6" Diameter Specimens

For preparing 4" or 6" diameter compacted specimens, model has beveled foot on hammer and mold that rotates throughout compaction, giving a modified kneading action. Spare molds recommended. 23-1/4x21x64-1/4" (591x534x1,632mm).

Description, Complete Set	Model
Automatic single mechanical compactor with rotating base for 4" diameter specimens. 115V, 60Hz.	H-1364R
Automatic single mechanical compactor with rotating base for 4" diameter specimens. 230V, 60Hz.	H-1364R.2F
Automatic single mechanical compactor with rotating base for 4" diameter specimens. 230V, 50Hz.	H-1364R.5F
Automatic single mechanical compactor with rotating base for 6" diameter specimens. 115V, 60Hz.	H-1366R
Automatic single mechanical compactor with rotating base for 6" diameter specimens. 230V, 60Hz.	H-1366R.2F
Automatic single mechanical compactor with rotating base for 6" diameter specimens. 230V, 50Hz.	H-1366R.5F

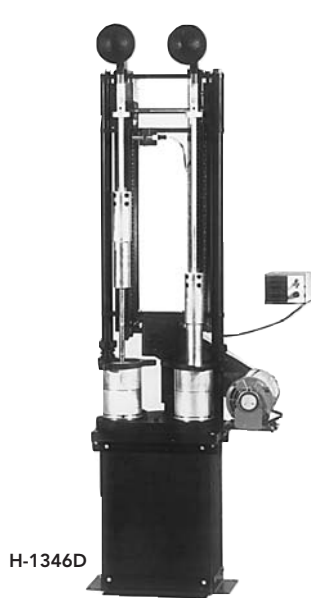
Shipping wt. 400 lbs. (181.4kg)

Marshall Heavy-Duty Automatic Single Compactor with Non-Rotating Base for 4" or 6" Diameter Specimens

Same as H-1364R and H-1366R, except non-rotating mold and flat hammer.

Description, Complete Set	Model
Single mechanical compactor with non-rotating base for 4" diameter specimens. 115V, 60Hz.	H-1364
Single mechanical compactor with non-rotating base for 4" diameter specimens. 230V, 60Hz.	H-1364.2F
Single mechanical compactor with non-rotating base for 4" diameter specimens. 230V, 50Hz.	H-1364.5F
Single mechanical compactor with non-rotating base for 6" diameter specimens. 115V, 60Hz.	H-1366
Single mechanical compactor with non-rotating base for 6" diameter specimens. 230V, 60Hz.	H-1366.2F
Single mechanical compactor with non-rotating base for 6" diameter specimens. 230V, 50Hz.	H-1366.5F

Shipping wt. 400 lbs. (181.4kg)



Marshall Standard-Duty 4" Automatic Single Compactor

Ease sample preparation with automatic mechanical compactor. Apparatus compacts samples at preset number of hammer blows and shuts off on completion. Automatic unit includes mechanical compactor, automatic counter, oak compaction pedestal and H-1341 mold assembly. Additional mold and hammer assemblies are recommended.

Description	Model
Automatic single mechanical compactor. 115V, 60Hz, 15.0 amps.	H-1336D
Automatic single mechanical compactor. 230V, 60Hz, 10.0 amps.	H-1336D.2F
Automatic single mechanical compactor. 230V, 50Hz, 10.0 amps.	H-1336D.5F

Shipping wt. 198 lbs. (89.8kg)

Marshall Automatic Double Mechanical Compactor with Rotating Base for 4" Diameter Specimens

Automatically compacts dual samples at a preset number of hammer blows and shuts off automatically on completion. Unit includes mechanical compactor, automatic counter, oak pedestal and mold assembly. Total dimensions: 10x21x66"H.

Description	Model
Automatic double mechanical compactor. 115V, 60 Hz.	H-1346D
Automatic double mechanical compactor. 230V, 60Hz.	H-1346D.2F
Automatic double mechanical compactor. 230V, 50Hz.	H-1346D.5F

Shipping wt. 265 lbs. (120.2kg)

Marshall Automatic Triple Mechanical Compactor with Rotating Base for 4" Diameter Specimens

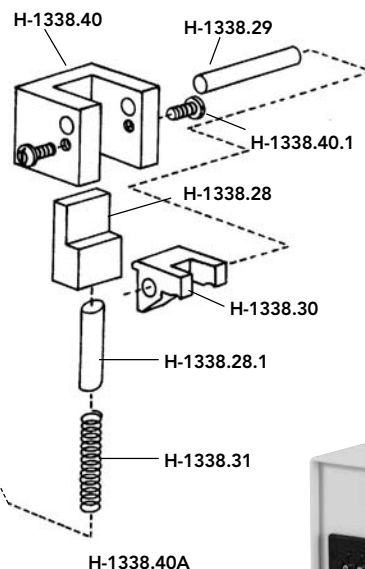
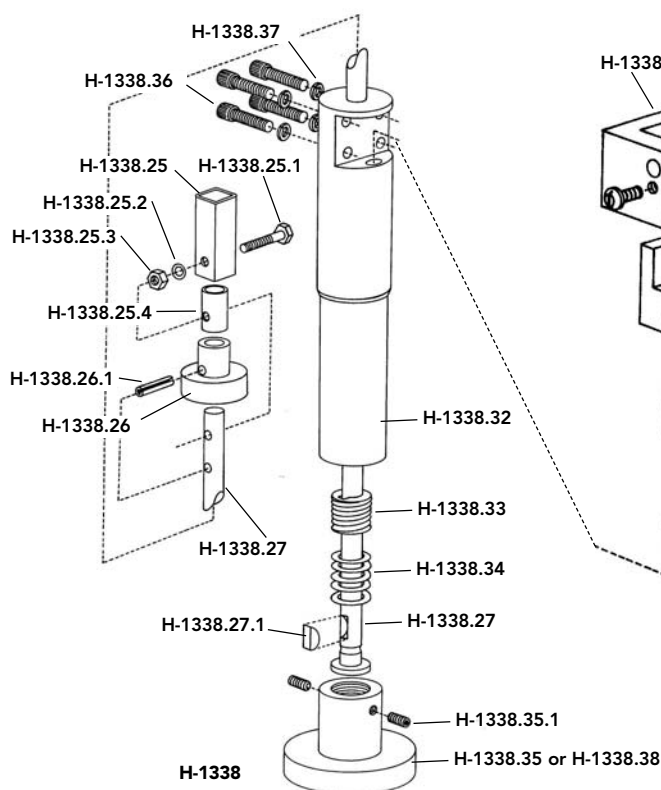
Triple simultaneous specimen compactations are produced automatically at a preset number of hammer blows. Machine shuts off on completion. Units include mechanical compactor, automatic counter, oak pedestal and mold assembly. Total dimension: 16x22x66"H.

Description	Model
Automatic triple mechanical compactor. 115V, 60 Hz, 15.0 amps.	H-1356D
Automatic triple mechanical compactor. 230V, 60Hz, 10.0 amps.	H-1356D.2F
Automatic triple mechanical compactor. 230V, 50Hz, 10.0 amps.	H-1356D.5F

Shipping wt. 400 lbs. (181.4kg)

Description, Replacement Parts	Model
Automatic counter for use with all compactor models.	H-1334A
Compaction mold, 4" non-rotating, for H-1336.	H-1341
Compaction mold, 4" rotating, for H-1346, H-1356, H-1364 series.	H-1337
Compaction mold, 6" for H-1366 series.	H-1367
Pedestal for H-1336, H-1364, H-1366 series.	H-1347M
Lift chain for H-1336, H-1346, H-1356.	H-1336.21
Lift chain for H-1364 and H-1366 series.	H-1360.21

Description, Replacement Parts	Model
Hammer assembly, 4" with tapered foot for H-1346, H-1356.	H-1338B
Compaction mold, 4" for H-1346, H-1356.	H-1337
Pedestal, for H-1346	H-1347.2M
Pedestal, for H-1356	H-1347.3M
Lift chain for H-1336, H-1346, H-1356	H-1336.21



Spare Hammer Assemblies

Hammer assembly promotes compaction operation, allows preheating of foot and acts as a stand-by replacement. Includes **complete lift catch assembly**, locator guide, weight, foot, and a redesigned rod release mechanism assembled with screws to avoid broken welds. Same model as furnished with original Marshall mechanical compactors. Use model H-1338A with H-1336 only; H-1338B with H-1346 and H-1356 mechanical compactors only. Meets ASTM D1559, AASHTO T245.

Description, Complete Set	Model
Spare flat-foot hammer assembly for H-1336.	H-1338A
Spare tapered-foot hammer assembly for H-1346 and H-1356.	H-1338B
Spare Canadian spec tapered foot for H-1346 and H-1356.	H-1338C
Complete lift catch assembly.	H-1338.40A

Shipping wt. 24 lbs. (10.9kg)

Description, Replacement Parts & Accessories	Model
Clevis pin with screw.	H-1338.29.3
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

Spare Hammer Lift Catch Assembly

Also sold as part of H-1338.

Description, Complete Set	Model
Complete lift catch assembly for compaction hammers.	H-1338.40A

Description, Replacement Parts & Accessories	Model
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

Automatic Counter

Automatic counter with 3-digit LCD readout features non-contact sensor to record preset number of hammer blows and automatic shut off when number is reached. Main unit should be isolated from the machine to avoid vibration damage. For use with H-1336, H-1346, H-1356, H-1364 and H-1366 mechanical compactors. Specify compactor model when ordering.

Description	Model
Automatic counter 115V, 50/60Hz, 1ph.	H-1334A
Automatic counter 220V, 50/60Hz, 1ph.	H-1334A.4F

Shipping wt. 4 lbs. (1.8kg)



H-1340



H-1337, H-1341, H-1367



H-1348, H-1363



H-1347

Hand Compaction Hammer, 4"

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). Two compaction hammers are recommended.

Description	Model
Hand compaction hammer.	H-1340

Shipping wt. 20 lbs. (9.0kg)

Marshall Compaction Mold, 4" For Hand and Non-rotating Base Compactors

Stability compaction mold for preparing test specimens. 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) I.D. by 3" (76mm) high. Use H-1341 molds with H-1340 compaction hammer and H-1336 mechanical compactor only.

Description	Model
Compaction mold.	H-1341

Shipping wt. 10 lbs. (4.5 kg)

Marshall Compaction Mold, 4" For Rotating Base Compactors

4" compaction mold for all rotating base compactors. For use with H-1346, H-1356 and H-1364 mechanical compactors only. Base plate is designed for indexing during compacting.

Description	Model
Marshall compaction mold for rotating base compactors.	H-1337

Shipping wt. 10 lbs. (4.5kg)

4" or 6" Paper Discs

Circular, smooth-edged 4" or 6" diameter disc fits in bottom of H-1337 and H-1341 (4") or H-1367 (6") compaction molds before introducing mixture prior to compaction test. Facilitates removal of sample specimen cylinders.

Description	Model
4" paper disc for use with H-1337 and H-1341 compaction molds.	H-1341P
6" paper disc for use with H-1367 compaction mold.	H-1361P

Compaction Mold, 6"

Stability compaction mold for preparing test specimens. 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. Use of three mold cylinders is recommended by ASTM and AASHTO. Use H-1367 molds with H-1366 and H-1366R compaction hammers only.

Description	Model
Compaction mold for 6" Marshall samples.	H-1367

Shipping wt. 15 lbs. (6.8kg).

Mold Extractors

Used with compression tester for removing 4" or 6" compaction mold specimens.

Description	Model
Mold extractor, 4".	H-1348
Mold extractor, 6".	H-1363

Shipping wt. 8 lbs. (3.6kg).

Mold Holder for Hand Compaction, 4"

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 of specimens.

Description	Model
Mold holder for hand compaction, 4".	H-1343

Shipping wt. 7 lbs. (3.2 kg)

Pedestal for Hand Compaction, 4"

Necessary to stabilize mold during compaction. Consists of 8x8x18" (203x203x457mm) wooden post capped with 12x12x1" (305x305x25mm) steel plate. Pedestal mounts to a concrete slab with four angle brackets at bottom of pedestal.

Description	Model
Pedestal for hand compaction, 4".	H-1347

Shipping wt. 90 lbs. (40.8kg)



Hand-Operated Sample Ejector

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. Overall dimensions 13"Wx6"Dx27"H. (330x152x686mm).

Description	Model
Sample ejector.	H-1353A

Motorized Sample Ejector

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. Overall dimensions excluding pump 13"Wx6"D.x29"H. (330x152x737mm).

Description	Model
Motorized sample ejector. 115V, 50/60Hz.	H-1355
Motorized sample ejector. 230V, 50/60Hz.	H-1355.4F

Pedestals for Mechanical Compactors

Description	Model
Pedestal for use with H-1336 Marshall single mechanical compactor.	H-1347M

Shipping wt. 43 lbs. (19.5kg)

Description	Model
Pedestal for use with H-1346 Marshall double mechanical compactor.	H-1347.2M

Shipping wt. 54 lbs. (24.5kg)

Description	Model
Pedestal for use with H-1356 Marshall triple mechanical compactor.	H-1347.3M

Shipping wt. 84 lbs. (38.1kg)

Procedure Booklet— Marshall Mix Design and Testing

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.

Description	Model
Technical Booklet—Marshall Mix Design and Testing.	H-1328A

Marshall Sample Storage Can

Description	Model
Lidded 2 lb. can for storing Marshall samples.	H-1331

Hubbard 24ml Specific Gravity Bottle

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. Meets ASTM D70, D115, D1963; AASHTO T228.

Description	Model
Specific gravity bottle.	H-2640

Hubbard-Carmick 24ml Specific Gravity Bottle

Modified wide-mouth Hubbard-Carmick, Erlenmeyer-style bottle allows easier filling and cleaning and is more stable. Meets ASTM D70, D115, D1963; AASHTO T228.

Description	Model
Specific gravity bottle.	H-2660



H-1382, H-1383



H-1390, H-1392

Circulating Water Bath

Thermostatically controlled, fully insulated water bath with magnetic circulator heats up to twelve 4" diameter Marshall specimens at a time. Shelf supports molds and allows free circulation of 2" of water above and below molds. Magnetic circulator assures water temperature is constant throughout tank. Temperature controls provide range from ambient to 150°F (65.5°C), accurate to within ±1°F (±1°C). I.D. 11-1/2x19-1/2x8" deep. Steel exterior, stainless steel tank. Volume: 7.76 gal (29.398 liters), 1,780 cu. in. Meets ASTM D1559.

Description	Model
Water bath with magnetic circulator. 120V, 60Hz.	H-1383

Shipping wt. 47 lbs. (21.4kg).

Non-Circulating Water Bath

Thermostatically controlled, fully insulated water bath heats up to twelve 4" diameter Marshall specimens at a time. Same product features as H-1383, without magnetic circulator.

Description	Model
Water bath. 120V, 60Hz.	H-1382

Shipping wt. 44 lbs. (20kg).

NOTE: Model H-1383 and H-1382 baths are not available in 220V versions. See H-1390 and H-1392 for 220V models.

Water Bath with Microprocessor-based Temperature Control

Microprocessor-based temperature controller throughout range from ambient up to 180°F (82°C), with accuracy of ±0.1% of input span. Fully insulated, models are available with or without magnetic circulator which assures constant water temperature throughout bath.

- Auto-tuning is fast & effortless
- Dual digital display simultaneously shows set point & process temperature
- Ramp-to-set point handles critical temperature processes smoothly
- Set point range limiting protects process & 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. Samples are supported by a shelf which allows free circulation of 2" of water above and below. Volume: 7.76 gals. (29.398 L). I.D.: 19.5Wx11.5Dx8" H (495.3x292.1x203.2mm). Meets ASTM D1559.

Description	Model
Water bath with microprocessor-based temperature control, with magnetic circulator. 110V, 60 Hz.	H-1390
Water bath with microprocessor-based temperature control, with magnetic circulator. 220V, 50/60 Hz.	H-1390.4F
Water bath with microprocessor-based temperature control, without magnetic circulator. 110V, 60 Hz.	H-1392
Water bath with microprocessor-based temperature control, without magnetic circulator. 220V, 50/60 Hz.	H-1392.4F

Shipping wt. 44 lbs. (20kg)



H-1394

Extra-Large Capacity Circulating Water Bath

This new bath is ideal for the larger samples used in Superpave and Marshall test applications. The bath features a microprocessor-based digital controller with built-in magnetic circulator for precise temperature control throughout the range from ambient to 180°F (82°C) at an accuracy $\pm 1\%$ of input span. The dual digital display simultaneously shows the set point and process temperature. All exposed parts are stainless steel and the front control panel is designed for water and corrosion resistance. Samples are supported by a shelf that rests 2" (51mm) above the bottom of the bath for free circulation of water above and below the test samples. Bath volume is 14.0 gal. (53 liters) and the inside dimensions are 20x20x10" deep (508x508x254mm).

Description	Model
Extra-large capacity water bath with microprocessor control, with circulator. 110V, 60Hz	H-1394
Extra-large capacity water bath with microprocessor control, with circulator. 220V, 50/60Hz	H-1394.4F

Shipping wt. 74 lbs. (33.5kg)

Economy Water Bath

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). I.D. 11-1/2 x 19-1/2 x 8" (293x 497x204mm) deep.

Description	Model
Water bath 120V, 60Hz, 1425W.	H-1380
Water bath 220V, 50Hz, 1425W.	H-1380.5F

Shipping wt. 28 lbs. (12.7kg).



H-1380



H-2988

Heater/Circulator

Analog controller with proportional temperature control. Low liquid safety. 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) I.D. tubing for external circulation. Suitable for use with wide variety of fluids. 6x5x13" (15.2x12.7x33mm).

Heater/Circulator					
Temp Range	Temp Stability	Display	Pumping (liters/min)	Over-temp Cutoff	Model
5°C above ambient to 100°C	±0.2°C	H-2614 Thermometer (included)	7 or 15	Adjustable	H-2988
Heater/Circulator, 120V,60Hz, 9 amp.					H-2988.4F
Heater/Circulator, 220v, 50/60Hz, 5 amp.					

Shipping wt. 10 lbs (4.5kg)



H-30065



H-1540

Revolving Shelf Oven

Oven used to conduct "thin film" tests determines effect of heat and air on a film of semisolid asphaltic materials when heated to $163^{\circ}\text{C} \pm 1^{\circ}\text{C}$. Temperature range to 40°C to 260°C (up to 500°F). Revolving 13-1/2" (342mm) dia. shelf holds four 5-1/2" (140mm) H-1540 or H-1541 pans or nine 2.17" (55mm) dia. H-1350 sample cups. Has externally mounted 5 RPM induction motor without brushes, non-exposed heaters clamped between double walls, heavy-gauge steel insulated door and an 11x11" (27.9x27.9cm) double-paned window. Features interior light with separate switch, power switch, three-wire cord and H-2610.13C. ASTM loss-on heat thermometer. Inside dimensions: 19x18x15" (48x46x38cm). Overall dimensions: 27x26x39" (68x66x99cm). Order test pans and sample cups separately. Meets ASTM D1754, D6; AASHTO T179, T47.

Description	Model
Revolving shelf oven. 120V. 60Hz. 1340W.	H-30065
Revolving shelf oven. 220V. 50Hz. 1340W.	H-30065.5F

Shipping wt. 270 lbs. (122kg)

Thin Film Test Pan

Used with H-30065 revolving shelf oven in testing the effect of heat and air on semisolid asphaltic materials. Flat-bottom pan is 5-1/2 ID x 3/8" (140x9.5mm). Available in stainless steel or aluminum. Meets ASTM D1754, AASHTO T179.

Description	Model
Stainless steel thin film test pan.	H-1540
Aluminum thin film test pan.	H-1541



H-30068



H-30068.12

Asphalt Rolling Thin Film Oven

The rolling thin film oven is used to measure the effect of heat and air on a moving film of semi-solid asphaltic materials. 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 40W x 36H x 26"D (1016x3292x660mm). Meets ASTM D2872, AASHTO T240 and California test method 346. A clean, dry compressed air source is required for oven operation.

Description	Model
Asphalt rolling thin-film oven. 208-230V. 60Hz. 1ph AC.	H-30068
Asphalt rolling thin-film oven. 220V. 50Hz. 1ph AC.	H-30068.5F

Shipping wt. 380 lbs. (173kg)

Glass Container for Asphalt Rolling Thin-Film Oven

Heat resistant glass oven jar. 64mm O.D. (2.52") x 139.7mm H (5.50"). Meets ASTM D2872, AASHTO T240.

Description	Model
Glass container for asphalt rolling thin-film oven.	H-30068.12

SHRP Gyratory Compactor

The SHRP Gyratory Compactor is designed for use in Superpave asphalt mix design. The system has undergone complete testing and was approved by the South Central Superpave Center. Test results were comparable a perfect 12 out of 12 times. Weighing only 550 lbs (249kg), the system ideally suited for both laboratory and field job site applications. The unit is supplied complete with one 150mm mold. Meets all AASHTO and FHWA specifications.

Features include:

- Supplied complete with PC, calibration equipment and software.
- Completely enclosed compaction chamber.
- Continuous height measurement of specimen during testing to within ± 0.1 mm.
- Built-in power assisted specimen extractor.
- Real-time display of test data.
- User-friendly software programs for editing test data acquisition and analysis.
- See-through door with safety switch and illuminated test chamber.
- Interchangeable 100mm and 150mm molds.

Specifications:

- Consolidation pressure 200 to 1,000 kPa.
- Consolidation ram travel adjustable, factory set at 10mm/second.
- Angle of gyration adjustable from 0.5° to $2.0^\circ \pm 0.02^\circ$ (factory set at 1.25°).
- Rate of gyration 30.0 rpm ± 0.5 rpm, constant.
- Automated shutoff for preset specimen height, Nmax or number of gyrations.
- Mold height 250mm.
- Mold wall thickness 9.5mm minimum.
- RS232 communications port.
- Dimensions 21.15"Wx28"Dx63"H (537x711x1600mm) excluding PC.
- Weight 550 lbs (249kg).



H-1610

Description	Model
SHRP gyratory compactor with PC, calibration equipment and 150mm mold.120V, 60Hz	H-1610
SHRP gyratory compactor with PC, calibration equipment and 150mm mold.220V, 60Hz	H-1610.2F
SHRP gyratory compactor with PC, calibration equipment and 150mm mold.220V, 50Hz	H-1610.5F

Description, Replacement Parts & Accessories	Model
Piston face conversion kit for 100mm samples.	H-1612
Mold assembly, 100mm.	H-1614
Mold bottom, 100mm.	H-1614B
Filter paper, 100mm. Pkg. of 1000.	H-1614P
Mold assembly, 150mm	H-1616
Mold bottom, 150mm	H-1616B
Filter paper, 150mm. Pkg. of 500.	H-1616P
Calibration kit. Includes indicator, mounting brackets and gauge blocks.	H-1620
Material Handling Chute.	H-1702



F85930, F85938



H-4122



H-1304

Asphalt Content/Binder Ignition Furnaces

- Barnstead/Thermolyne Model F85930 Model F85938
- With Internal Automatic Balance

Environmentally friendly and cost effective method for the accurate determination of asphalt content. Developed by NCAT, the National Center for Asphalt Technology.

- Large Capacity—handles samples up to 4,000 grams
- Automatic—frees technician for other tasks during testing
- Fast—ignition method reduces testing time compared to solvent testing methods
- Temperature Range—392 to 1,202°F (200 to 650°C)
- Accurate Internal Balance—to within ± 0.1 gram, monitored automatically throughout ignition
- Easy operation—simply enter sample weight, calibration factor, load the sample, and push start-at the ending beep, push stop, and sign receipt
- Safer—eliminates harmful solvents
 - software-activated lock prevents door opening during test
 - automatic interlock cuts power when door is opened
 - door opens full 180 degrees for easier/safer loading & unloading
 - door hinge has stop to prevent opened door from floating closed

Chamber dimensions: 14Wx10.5Hx14"D (355x266x355mm).

Overall dimensions: 21.75Wx36.75Hx25.75"D (552x933x654mm).

Description	Model
Asphalt content/binder ignition furnace (Barnstead/Thermolyne model F85930), 240V, 60Hz, 20 amp, 4,800 watt, with internal automatic balance.	F85930
Asphalt content/binder ignition furnace (Barnstead/Thermolyne model F85938), 208V, 60Hz, 23 amp, 4,800 watt, with internal automatic balance.	F85938

Shipping wt. 290 lbs. (131.6kg)

Description, Accessories	Model
Accessories package for use with F85930 and F85938—includes 4 baskets, 2 trays, 2 covers, handle, cooling cage, insulated plate, gloves, face shield, 4 rolls of printer tape, balance calibration plate, and androl oil.	AY1087X1
Exhaust Tubing.	H-1515
Exhaust Tubing, stainless steel.	H-1515SS
Printer Paper.	PRX2

QUARTERMASTER™ (includes buckets) Hot Asphalt Mix Sample Sizer

The QUARTERMASTER™ is ideal for dividing the larger asphalt mix samples required in Superpave specifications. The hopper accepts and quarters into four equal parts up to 120 lbs. (54kg) of any mix with aggregates between 9.5 to 37.5mm. In operation, a simple throw of a lever divides the sample. Using the device insures greater control, consistency and uniformity in the preparation of test samples. The unit is supplied complete with four sample containers. Dimensions 14Wx17Dx48"H (356x432x1219mm). Order H-1702 materials handling scoop separately.

Description	Model
QUARTERMASTER™ asphalt mix sample sizer.	H-4122

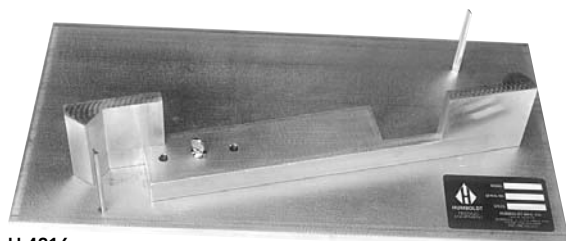
Shipping wt. 84 lbs. (38kg)

Description, Replacement Parts & Accessories	Model
Utility Bucket.	H-3372
Quick Funnel.	H-4122QF

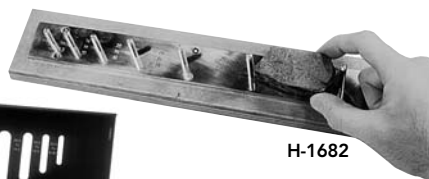
Rhoma-Sol™ Specialty Emulsifier

Spray-on solution used to remove bituminous deposits and stains from test equipment, counters and tools. Rhoma-Sol™ contains no hazardous petroleum solvents and is 100% biodegradable. When applied to equipment prior to contact with asphalt, the gelled formulation helps to reduce asphalt from sticking to the treated surface. Rhoma-Sol™ should be only used in a well-ventilated area and eye and skin contact should be avoided.

Description	Model
Rhoma-Sol™ Specialty Emulsifier, 18oz. (532g) Spray Can	H-1304



H-4216



H-1682



H-1684



H-1680A



H-1686

Proportional Caliper Device

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. 6x16" (152.4x406.4mm) 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. Meets ASTM D4791.

Description	Model
Proportional caliper device.	H-4216

Elongation Index for Classification of Aggregate Particles

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. Meets BS 812.

Description	Model
Elongation index for classification of aggregate particles.	H-1682

Flakiness Gauge for Classification of Aggregate Particles

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. Meets BS 812.

Description	Model
Flakiness gauge for classification of aggregate particles.	H-1684

Void Content Apparatus for Fine Aggregates

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. Meets ASTM C1252, AASHTO TP33.

Description	Model
Void content apparatus.	H-1680A

Shipping wt. 10 lbs. (4.5kg)

Description, Replacement Parts & Accessories	Model
Extra glass plate.	H-3049
Sample retainer pan, aluminum, 12" diam x 1-1/2"h (302x37mm).	H-4940.6
Spatula, 7/8w x 6"L (22x152mm).	H-4906

Void Content Apparatus for Coarse Aggregates

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 off 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. Meets AASHTO TP56. Order overflow pan and material handling scoop separately.

Description	Model
Void content apparatus for coarse aggregates.	H-1686

Description, Accessories	Model
Plastic overflow pan.	H-1686.1
Material handling scoop.	H-1702



H-1690



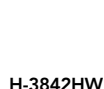
H-3842



H-3843



H-3842HA



H-3842HW



H-3843HW

Asphalt/Concrete Mixers

Ideal for sample or batch mixing in either laboratory or field. Separate utility bucket cradles securely inside enameled steel mixer frame. Bucket is rotated by chain drive at 60 rpm, while a stationary paddle scrapes insides and bottom of bucket to insure thorough mixing.

Description	Model
Asphalt/concrete mixer, stationary, 5-gal. Includes bucket, cover, paddle. Shipping wt. 45 lbs (20.4kg).	H-1690
Asphalt/concrete mixer, portable, 5-gal. Includes bucket & frame only. Shipping wt. 81 lbs (36.7kg). Order mixing paddle separately.	H-1691
Asphalt/concrete mixer, portable, 10-gal. Includes bucket & frame only. Shipping wt. 97 lbs (44kg). Order mixing paddle separately.	H-1692

Description, Replacement Parts & Accessories	Model
Bucket & cover for stationary, 5-gal. Shipping wt. 7 lbs (3.2kg)	H-1690.1
Mixing paddle for stationary, 5-gal. Shipping wt. 6 lbs (2.7kg)	H-1690.2
Deluxe mixing paddle for stationary, 5-gal. Shipping wt. 6 lbs (2.7kg)	H-1690.3
Bucket for portable, 5-gal. Shipping wt. 5 lbs (2.2kg)	H-1691.4
Bucket for portable, 10-gal. Shipping wt. 11 lbs (5.0kg)	H-1692.5
Asphalt paddle for portable, 5-gal. Shipping wt. 7 lbs (3.2kg)	H-1691.6
Asphalt paddle for portable, 10-gal. Shipping wt. 8 lbs (3.6kg)	H-1692.6
Concrete paddle for portable, 5-gal. Shipping wt. 3 lbs (1.4kg)	H-1691.8
Concrete paddle for portable, 10-gal. Shipping wt. 4 lbs (1.8kg)	H-1692.9

Laboratory Bench Mixer, Heating Adapter Kits

Used to improve mixing efficiency and ensure proper temperatures of asphaltic concrete mixes. Kits consist of heating mantle and solid-state proportional temperature controller. Meets ASTM D1559; AASHTO T245, TP4; SHRP M-002

Description, Accessories	Model
Heating Adapter Kit for 12 Qt. Mixer. 115V, 50/60Hz, 600 watts.	H-3842HA
Heating Adapter Kit for 12 Qt. Mixer. 230V, 50/60Hz, 600 watts.	H-3842HA.4F
Heating Adapter Kit for 20 Qt. Mixer. 115V, 50/60Hz, 600 watts.	H-3843HA
Heating Adapter Kit for 20 Qt. Mixer. 230V, 50/60Hz, 600 watts.	H-3843HA.4F

12-Qt. Laboratory Bench Mixer

Hobart Model A-120's bowl has 12-qt. (0.401 cu. ft.) mixing capacity and 15-minute motor-driven timer. Planetary action of 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: 14-3/4x20x29-9/16" (375x508x750cm).

Description	Model
12-Qt. Laboratory bench mixer. 115V. 60Hz. 1ph. AC. 1/3HP. 373 W.	H-3842
12-Qt. Laboratory bench mixer. 230V. 50/60Hz. 1ph. AC. 1/3HP. 373 W.	H-3842.4F

Shipping wt. 185 lbs. (83.9 kg)

Description, Accessories	Model
Aluminum beater.	H-3842.1
12-Qt. Stainless-steel bowl.	H-3842.2
Aluminum dough hook.	H-3842DH
Stainless-steel wire loop whip.	H-3842WW
*Custom heavy-duty 1/4" diam wire stainless steel whip.	H-3842HW

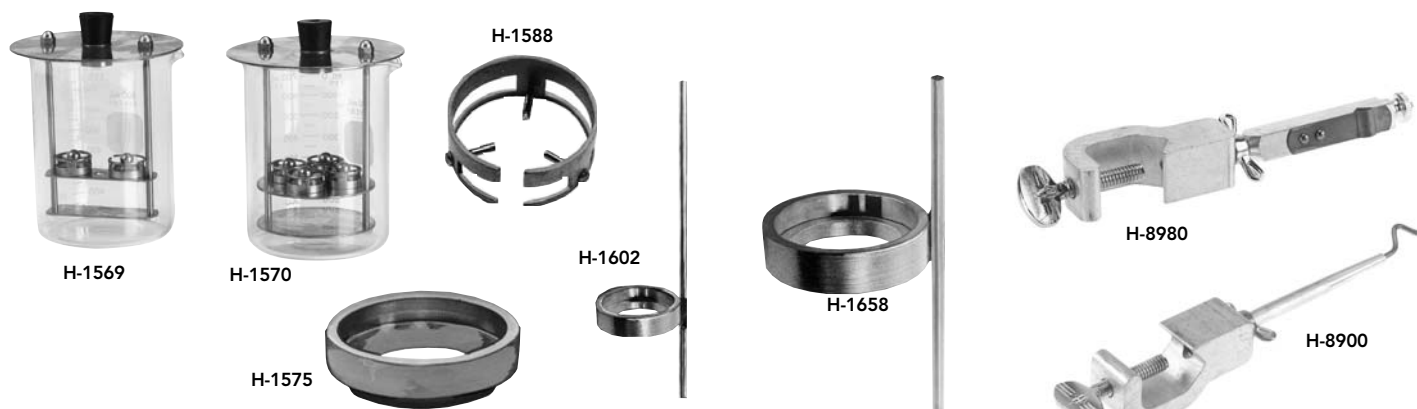
20-Qt. Laboratory Bench Mixer

With 20-qt.-capacity (0.6684 cu. ft.) bowl, Hobart A-200 mixer has 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: 21x21-1/2x 41-1/4" (533x546x1048cm).

Description	Model
20-Qt. Laboratory bench mixer. 115V. 60Hz. 1ph. AC. 1/2HP. 373 W.	H-3843
20-Qt. Laboratory bench mixer. 230V. 50/60Hz. 1ph. AC. 1/2HP. 373 W.	H-3843.4F

Shipping wt. 226 lbs. (102kg)

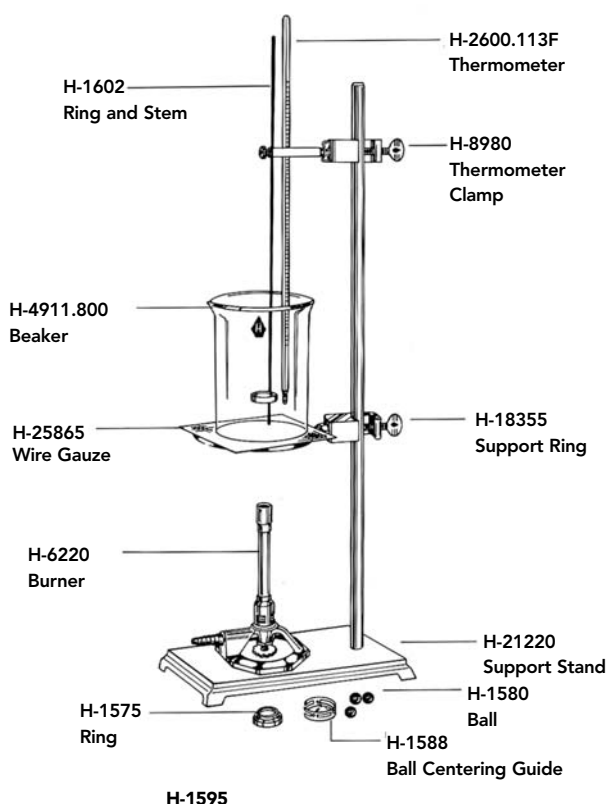
Description, Accessories	Model
Aluminum flat-type grid beater.	H-3843.1
Stainless-steel bowl, 20-qt.	H-3843.2
Aluminum dough hook.	H-3843DH
Stainless-steel wire loop whip.	H-3843WW
*Custom heavy-duty 1/4" diam wire stainless steel whip.	H-3843HW



Softening Point Apparatus

Ring and ball method softening point apparatus used for single determinations, asphalts, pitches, tars and most resins. All apparatus meet ASTM D36, E28; AASHTO T53.

Description	Model
Includes 800ml beaker, 2 standard balls, 2 shouldered rings and 2 ball centering guides. Order thermometer separately, see chart this page.	H-1569
Same as H-1569, with 4 standard rings and 4 standard balls and 4 ball centering guides. Order thermometer separately, see chart this page.	H-1570
Includes burner, beaker, support stand and 1 ring, wire gauze with asbestos center, thermometer clamp, shouldered ring and stem and hardened steel ball. Includes H-2600.113F thermometer, others available separately, see chart this page.	H-1595



Softening Point Replacement Parts and Accessories

All meet ASTM D36, E28; AASHTO T53.

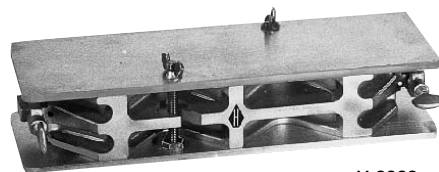
Softening Point Replacement Parts		
Description	For Use With	Model
Brass-shouldered ring. Top 23mm O.D., 19.8mm I.D.; bottom, 19mm O.D., 15.9mm I.D.; top to shoulder, 4.4mm high; shoulder to bottom, 2mm high. 10 per package.	H-1569	H-1575
Hardened steel ball. 3/8" (9.5mm) dia.; weight between 3.45 and 3.55g. 10 per package.	H-1569 H-1595 H-1645	H-1580
Ball centering guides for shouldered rings. Ball is centered on specimen by 3 locator pins.	H-1575	H-1588
Ring and stem assembly, 16" (406mm) long brass wire stem with H-1575 ring.	H-1595	H-1602
Ring and stem assembly 2-1/2" (64mm) long brass wire stem with shouldered brass ring.	H-1645	H-1658
Steel clamp hook supports suspended thermometers, drying tubes, potash bulbs, etc. Locks into any position with check-nut. Max. distance from center of muff to hook 4-1/4" (108mm); minimum distance 3-7/8" (98mm).	All H-2600 thermometers	H-8900
Thermometer clamp with adjustable 360° muff, phosphor-bronze jaws, 3-1/2" (89mm) long.	H-1570	H-8950
Thermometer clamp similar to H-8950 but holds H-1602 ring and stem in addition to the thermometer.	H-1595	H-8980

Thermometers for Softening Point Apparatus

Description, Thermometers	Model
Thermometer with 30 to 180°F range (ASTM 15F).	H-2600.15F
Thermometer with -2 to 80°C range (ASTM 15C).	H-2610.15C
Thermometer with 85 to 392°F range (ASTM 16F).	H-2600.16F
Thermometer with 30 to 200°C range (ASTM 16C).	H-2610.16C
Thermometer with 30 to 350°F range (ASTM 113F).	H-2600.113F
Thermometer with -1 to 175°C range (ASTM 113C).	H-2610.113C



H-2810



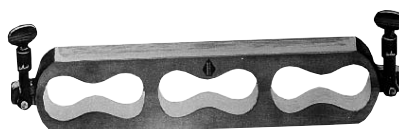
H-2823



H-2820



H-2809



H-2800



H-2822

Cube Molds, 3-Gang Compression Type

Applications	Description	Meets Specs	Model
For compression strength tests of Portland cement, mortars, lime and gypsum.	2" Cube Mold, parallel arrangement, 316 series stainless steel. Fitted with angles for attaching to studs threaded into detachable base plate. Shipping wt. 15 lbs. (6.8kg)	ASTM C87, C91, C109, C141, C267, C311, C472, C617, C618, C1073; AASHTO T71, T106	H-2810
	Same as H-2810 except 50mm parallel arrangement.		H-2810M
	2" Cube Mold, diagonal arrangement, forged bronze. Reinforcing rib prevents spreading. Detachable base plate. Shipping wt. 15 lbs. (6.8kg)		H-2820
	Same as H-2820 except 50mm diagonal arrangement.		H-2820M
For compression strength tests of expansive grout.	Cube Mold for Expansive Grout. Similar to H-2820. Top plate is fastened to top of mold. Shipping wt. 19 lbs. (8.6kg)		H-2823
For slowing the cooling rate as compound is poured.	Cover plate for H-2820. Shipping wt. 7 lbs. (3.2kg)	ASTM C617; AASHTO T231	H-2822

Stamped Cube Mold

Model has diagonal arrangement of three cube compartments and is constructed from stainless steel sheet. The 2" (50.8mm) cube mold forms specimens for compressive tests of cement, gypsum, lime, mortars, etc. Each cube from this mold must be individually measured. These molds do not meet ASTM or AASHTO specifications.

Description	Model
Stamped cube mold.	H-2809

Briquette Mold

Cast bronze briquette mold for hydraulic cement mortar tensile strength tests. Bronze clamps with pins hold two halves securely. Designed to prevent spreading during molding.

Description	Model
Briquette mold.	H-2800

Replacement parts are available for all cube molds.



H-2860



H-3840



H-2816.8



H-2817

Tamper

Rubber compound or wood construction, tamper is 6" (152mm) long with 1/2x1" (13x25mm) cross section. Meets ASTM C87, C109, C157, C185, C596; AASHTO T106, T137, T160.

Description	Model
Rubber Compound Tamper.	H-2860
Wood Tamper.	H-2860W

Tapping Stick

Maple wood with 5/8" (16mm) dia. and 6" (152mm) length. Meets ASTM C185; AASHTO T137.

Description	Model
Tapping stick.	H-3855

Rubbing Block

Ground steel block 3" dia. x 1" (76x25mm) for removing loose sand grains and encrustations from concrete specimen surfaces before compressive testing.

Description	Model
Rubbing block.	H-2812

400ML Measure

Calibrated to 400ML, measure is used to determine air content of hydraulic cement mortar. Cylindrical with 3" (76mm) I.D., approximately 3-15/32" (88mm) depth. Meets ASTM C185, C780; AASHTO T137.

Description	Model
400ML measure.	H-3840

Digital Calipers

Provides accurate outside, inside, depth and step measurements. Both calipers feature large, easy-to-read LCD digits, rolling thumb wheel; plus control buttons for zero, on/off and inch/mm functions.

Description	Model
Digital Caliper, 0-8" (0 to 200mm) range. 0.001" accuracy	H-2816.8
Digital Caliper, 0-12" (0 to 300mm) range. 0.0015" accuracy	H-2816.12

Stainless Steel Dial Caliper

Stainless steel dial caliper may be used for outside, inside, depth and step measurements up to 6" in .1" increments. Caliper delivers direct .001" reading and is adjustable to 0.

Description	Model
Stainless steel dial caliper.	H-2817

Tensile Test Ottawa Sand C190

Sand is specially graded natural silica sand to pass a No. 20 (850 μ) sieve. Specific gravity is 2.65. Packed in 50 lbs. (22.7kg) cloth bags. Meets ASTM C91, C141, C185, C190, C359, C778; AASHTO T132, T137, T185.

Description	Model
Tensile test sand.	H-3820

Shipping wt. 50 lbs. (22.7kg)

Cube Test Ottawa Sand C109

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) cloth bags. Meets ASTM C87, C109, C348, C359, C593, C778; AASHTO T71, T106, T185.

Description	Model
Cube test sand.	H-3825

Shipping wt. 50 lbs. (22.7kg)



H-3050



H-3051



H-3133



H-3135, H-3137

Vicat Consistency Testers

Type	Description	Meets Specifications	Model
Vicat Consistency Apparatus	Reversible stainless steel plunger; 10mm dia. one end, 1mm dia. stainless steel needle on the other end. 300g weight, including adjustable indicator. Graduated 0-50mm scale. Includes frame, moveable rod with a variable weights and plunger assemblies. Includes H-3080 conical mold. Shipping wt. 8 lbs. (3.6kg)	ASTM C91, C141, C187, C191, C308, C451, C472; AASHTO T129, T131, T186	H-3050
Automatic Recording Vicat Apparatus	Used to determine the initial and final setting times. Fully automatic test cycle with data recorded on chart recorder. Includes 1mm and 1.13mm diam. Needles, two conical molds, glass base plate, recording pen, pencil and 100 recording charts. 110V.60Hz.	ASTM C191, AASHTO T131, EN196/3.	H-3051
	Same as above except 220-240V. 50HZ.		H-3051.5F
Modified Vicat Apparatus	Similar to H-3050, with a 400g total weight of 10mm plunger, indicator and added weight. Includes H-3080 conical mold.	ASTM C359; AASHTO T185	H-3060
Time of Setting Vicat Needle Apparatus	Similar to H-3060, with 17.5mm dia. needle for consistency determination; 400g total weight. Includes H-3086 76mm I.D. x 40mm brass ring mold. Shipping wt. 6 lbs. (2.7kg).	ASTM C807	H-3085
Modified Vicat Consistency Apparatus	Features 19mm dia. plunger. Total 50g weight. Includes plunger, rod and indicator. Includes frame, moveable rod with variable weights and plunger assemblies. Shipping wt. 6 lbs. (2.7kg).	—	H-3090
Modified Vicat Consistency Apparatus	Similar to H-3090, with 12.5mm dia. plunger and 30g total weight.	ASTM C110	H-3120
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 Apparatus	Includes 35g magnesium cone for use on unsanded plaster. Includes H-3080 mold. Shipping wt. 6 lbs. (2.7kg).	ASTM C472	H-3135
	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

**Gillmore Apparatus**

Gillmore Apparatus	Two stainless steel needles, cylindrical for 3/16" (4.8mm). One is 1/12" (2.12mm) dia.; 1/4 lb. (113.4g) weight; second is 1/24" (1.06mm) dia., 1 lb. (453.6g) weight. Shipping wt. 10 lbs. (4.5kg)	ASTM C91, C141, C150, C266, C414; AASHTO T154	H-3150
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Replacement Parts for Vicat Consistency Testers

Part	Description	For Use With	Model
Plunger Plunger Plunger Plunger	With Vicat needle and indicator; 300g total weight. With shaft only, as used on H-3090. Total weight 50g. Includes bushings to fit H-3050 Vicat needle stand. Same as H-3110, with weight adjusted to 30g. Cone and plunger assembly. Includes spacers.	H-3050 H-3090 H-3050, H-3120 H-3135	H-3055 H-3110 H-3130 H-3135.1
Needle Needle Final Needle	Stainless steel 1mm diam with knurled threaded holder. Stainless steel 113mm diam x 50mm with knurled threaded holder. Determination of initial and final setting of cement. Needle has an air vent and an annular attachment.	H-3050 (fits one end) H-3050 H-3050	H-3070 H-3072 H-3075
Needle	2mm stainless steel Vicat needle.	H-3085	H-3147
Weight Weight Weight Weight	Replaces 1mm needle. Threaded one end. Provides 400g uncalibrated total weight. One end bored to fit over 1/4" (6.4mm) dia. plunger shaft; 100g to increase weight of plunger furnished with H-3090 to 150g. One end bored to fit over plunger. Total wt. 15g. One end bored to fit over plunger. Total wt. 65g.	H-3060 H-3090 H-3135 H-3135	H-3061 H-3100 H-3136 H-3138
Conical mold	70mm bottom dia. x 60mm top dia. x 40mm high plastic mold.	H-3050, H-3060, H-3090, H-3120, H-3135, H-3137	H-3080
Mold Container	76mm I.D. x 40mm deep brass mold. For false set test. 2 x 2 x 6": (50x50x150mm) I.D. Overall: 9-1/4" (240mm)	H-3085 H-3060, H-3137	H-3086 H-3065
Glass Plate	4" x 4" (101.6 x 101.6mm)	H-3050	H-3049

Replacement Parts for Gillmore Apparatus

Gillmore Test Sample Template	Flat plate with 1/2" sides for striking off sample to exact 1/2" thickness for Gillmore testing.	H-3150	H-3154
Needle	1/24" (1.06mm) dia. with weight.		H-3151
Needle	1/12" (2.12mm) dia. with weight.		H-3152
Needle	.050" dia. Gillmore needle.		H-3152.4



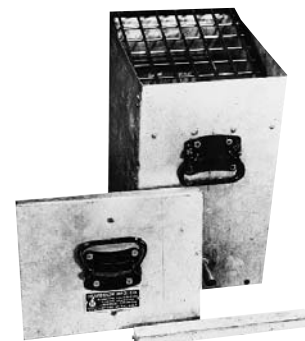
H-3251, H-3253



H-3252, H-3254, H-3256



H-3260



H-3265

Prism Molds

Designed to produce required 10" effective gauge length, prism molds feature removable partitions and 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.

Prism Molds			
Description	Applications	Meets Specs	Model
2x2x10" (51x51x254mm) 2-gang, cold-rolled steel	Volume change tests of mortars. Shipping wt. 27 lbs. (12.2kg)	ASTM C151 C157 C227 C311 C342 C441 C452 C490 C531 and AASHTO M210 T107 T160	H-3251
1x1x10" (25x25x254mm), 1-gang, cold-rolled steel	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.		H-3252
1x1x10" (25x25x254mm), 2-gang, cold-rolled steel	Shipping wt. 10 lbs. (4.5kg)		H-3253
Same dimensions as H-3253, 2-gang, stainless steel			H-3253S
3x3x10" (76x76x254mm), 1 gang, cold-rolled steel	Volume change of cement paste; length change of mortar and concrete. Shipping wt. 25 lbs. (11.4kg)		H-3254
1x1x5" (25x25x127mm), 2-gang, cold-rolled steel	Same as H-3251 and H-3253. Shipping wt. 10 lbs. (4.5kg)		H-3255
4x4x10" (102x102x254mm), 1-gang, cold-rolled steel	Volume change tests. Shipping wt. 35 lbs. (15.9kg)		H-3256

Replacement Gage Studs for use with Prism Molds

H-3260 series Gage Studs have stainless steel contact points and are knurled and threaded for use with cement prism molds. Packaged 10 per bag. Meets ASTM C151, C157, C227, C490; AASHTO M210, T107,

Description	Model
Gage Studs, 316 Stainless Steel (Pkg of 10)	H-3260

Prism Mold Parts & Accessories	Model
Tamping Rod. Round, straight steel 3/8" dia. x 12" (10x300mm). Both ends rounded to a hemispherical tip the same diameter as the rod. Meets ASTM C157, C192; AASHTO T160.	H-2905.1
Rectangular Mortar Bar Container. To store test specimens, stainless steel container has tight-fitting cover that prevents moisture loss from mortar bars. Container supports up to 36 bars vertically. Dimensions: 9x11x15-1/2" (229x279x394mm). Meets ASTM C227. Shipping wt. 25 lbs. (11.3kg)	H-3265
Round Mortar Bar Container. Plastic container includes test bar rack that supports 8 bars vertically. Dimensions: 6x17" (150x430mm). Meets ASTM C227. Shipping wt. 12 lbs. (5.44kg)	H-3267
Mortar Bar Container. Stainless steel. Dimensions: 1-1/4x3-1/2x12" (32x89x305mm) I.D. Tight-fitting cover prevents moisture loss. Capacity not more than 315ml of water, which completely immerses three specimens supported above bottom of container. Meets ASTM C342.	H-3264
Retaining Cage. For 2x2x10" (508x508x2,540mm) prism molds. Features 1/4-20 continuous threaded rod and acorn nuts. Meets ASTM C806.	H-3251RC
Retaining Cage. For 3x3x10" (762x762x2,540mm) prism molds. Features 10-24 continuous threaded rod. Meets ASTM C878.	H-3257



H-3251RC, H-3257



H-3267

**H-3250****H-3250D**

Comparators

Two models of comparators measure length changes of hardened cement paste, mortar and concrete prismatic specimens. Indicator is mounted on a sturdy upright support attached to solid triangular base. Model H-3250 includes mechanical dial indicator. Model H-3250D features easy-to-read digital indicator eliminating need to count revolution hands. 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 4x4" (102x101mm) cross section. Overall dimensions: 17x11-1/2x11" (432x292x279mm). Meets ASTM C151, C157, C227, C311, C341, C342, C452, C490, C596; AASHTO M210, T107, T160.

Comparator for Standard 10" Effective Gauge Length

Description	Model
Comparator for standard 10" (254mm) effective gauge length. Features sensitive dial indicator: 3-5/8" (92mm) dia. continuous dial with 0-10 reading, total range .400" and .0001" divisions.	H-3250
Comparator for standard 10" (254mm) effective gauge length with digital indicator. Measures inches and metric; .500" (12.6mm) range and .0001" (.0025mm) divisions. Includes AC adapter. Includes batteries.	H-3250D

Shipping wt. 32 lbs. (14.5kg)

Comparator for Special 16" Effective Gauge Length

Description	Model
Comparator for special 16" (406.4mm) effective gauge length. Features sensitive dial indicator: 3-5/8" (92mm) dia. continuous dial with 0-10 reading, total range .400" and .0001" divisions.	H-3248
Comparator for special 16" (406.4mm) effective gauge length with digital indicator. Measures inches and metric; .500" (12.6mm) range and .0001" (.0025mm) divisions. Includes AC adapter. Includes batteries.	H-3248D

Shipping wt. 38 lbs. (17.2kg)

Description, Replacement Parts & Accessories	Model
Invar reference bar for use with H-3250 and 10" (254mm) specimens.	H-3249
Replacement dial indicator, as furnished with H-3250.	H-3250.3
Replacement digital indicator, as furnished with H-3250D.	H-3250.3D
Replacement anvil with collar (one each). Same as furnished with comparators.	H-3250.4
Replacement anvil only.	H-3250.4.4
Replacement collar only.	H-3250.4.3
Elevating screw, nut collar and anvil assembly.	H-3250.7

Custom lengths are available, contact Humboldt for details.



Cement Autoclave

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: 17x48x28" (431x1219 x711mm) 1700W maximum power demand. Meets ASTM C151; AASHTO T107.

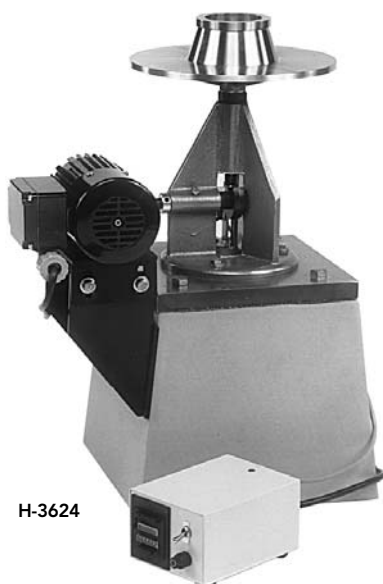
Description	Model
Autoclave. 110V. 50/60Hz.	H-3240
Autoclave. 220V. 50/60Hz.	H-3240.4F

Shipping wt. 171 lbs. (77.7kg)

Rupture Disk

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. See chart to right.

Description, Replacement Parts & Accessories	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
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. Meets ASTM C141, C151; AASHTO T107.	H-3243B
Lower heating unit; two heaters in one housing. 115V. 50/60Hz. Shipping wt. 8 lbs. (3.6kg)	H-3244
Upper heating element; two-piece wrap-around type. 115V. 50/60Hz.	H-3245
Upper heating element; one-piece wrap-around type. 115V. 50/60Hz.	H-3246
Thermometer, 20 to 580 F.	H-2600.2F
Thermometer, -5 to 300 C.	H-2610.2C
Rupture disk, Monel.	H-3240.21M
Rupture disk, Nickel.	H-3240.21N
Holder for rupture disk.	H-3240.22

**H-3624****H-3622****H-3620****H-3621**

Flow Tables (Pedestal not included)

Use 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, 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) is

measured. Mounts to user's pedestal (not included). Heavy-duty frame. Cast bronze table resists corrosion for long life. Shipped complete with one bronze flow mold. Optional motor conversion kit for increased operator convenience and productivity. Meets ASTM & AASHTO, see chart.

Flow Tables

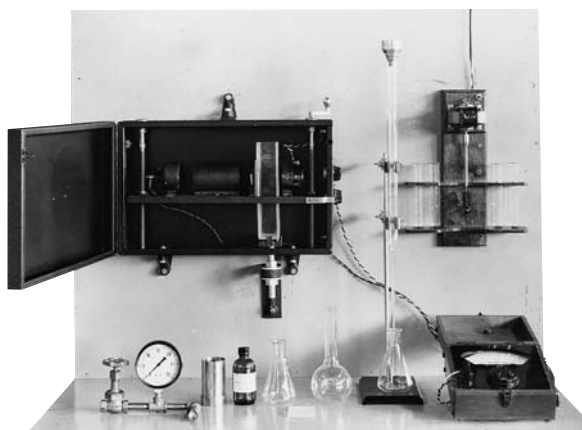
Application	Description	Meets Specs	Model
Compression strength and air content tests of cement mortar; flow tests of hydraulic cement mortars; consistency tests of magnesium oxychloride cements; flexural strength test for bond strength of mortar to masonry units.	10" (254mm) dia. top, motorized table with automatic counter. Motor stops automatically after pre-set number of drops. Includes 110V, 60Hz motor and mold. Shipping wt. 108 lbs. (49kg)	ASTM C87, C109, C110, C185, C230, C243, C348, C593; AASHTO T71, T106, T137, M152	H-3624
	Same as H-3624 with 220V, 50Hz, 1ph AC operation. Shipping wt. 118 lbs. (53.5kg)		H-3624.5F
Determining consistency of cement mortars	10" (254mm) dia. top, hand-driven table. Includes mold. Shipping wt. 30 lbs. (13.6kg)	ASTM C230	H-3620
	Same as H-3620, motorized. Shipping wt. 100 lbs. (45kg)		H-3625
	Same as H-3620, motorized with 220V, 50Hz, 1ph AC operation. Shipping wt. 110 lbs. (49.9kg)		H-3625.5F

Description, Replacement Parts & Accessories

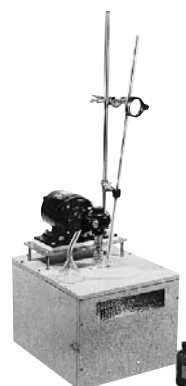
Description, Replacement Parts & Accessories	Model
Automatic predetermining counter kit for use with H-3624.	H-3614A
Caliper. To measure mortar diameter and indicate percentage of flow. Meets ASTM C87, C185, C230; AASHTO M152, T71, T137.	H-3621
Flow mold. Cast bronze cone mold, 2-3/4" dia. x 2" H and 4" base dia. Meets ASTM C230; AASHTO M152.	H-3622
Flow mold. Same as H-3622 except 70mm dia. x 50mm H and 100mm base dia.	H-3622M
Circular shield for use with H-3622 flow mold to prevent mortar from spilling on table top. Meets ASTM C230; AASHTO M152.	H-3623
Straight edge. Ground steel with bevelled edge. 1/8x1-1/4x8" (3x32x200mm). Meets ASTM C185, D558, D559, D560, D698; AASHTO T137.	H-4144.8
Pedestal form.	H-3624F



H-3810



H-3805



H-3160

Blaine Air Permeability Apparatus

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. Meets ASTM C204; AASHTO T153.

Description	Model
Blaine air permeability apparatus.	H-3810

Shipping wt. 15 lbs. (6.8kg)

Description, Replacement Parts & Accessories	Model
Rubber Bulb.	H-3811
Stainless steel test cell and plunger.	H-3812
Perforated brass disc.	H-3813B
Perforated stainless steel disc.	H-3813S
Manometer fluid, 8 oz. (240ml) bottle.	H-3814
Manometer U-tube, calibrated.	H-3815
Filter paper discs, medium retentive. Package of 500.	H-3816
NBS 114 Portland calibration testing cement. 1 vial.	H-3817
NBS 114 Portland calibration testing cement. 20 vials.	H-3817.20

Wagner Turbidimeter

Determines fineness of portland cement, using photoelectric cell to measure light passing through suspended pulverized material. Microammeter 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, microammeter, 3 flasks, 4 test tubes, stirring apparatus and instruction book. Battery not included. Meets ASTM C115; AASHTO T98.

Description	Model
Wagner turbidimeter. 110V. 60Hz. 1ph. AC.	H-3805
Wagner turbidimeter. 220V. 50Hz. 1ph. AC.	H-3805.5F

Shipping wt. 140 lbs. (53.5kg)

Cement Calorimeter

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; glass funnel; stirring paddle and chuck; geared synchronous motor; 4oz. (120ml) bottle of vinylite paint, and instructions. Meets ASTM C186.

Description	Model
Cement calorimeter. 120V. 60Hz. 1ph. AC.	H-3160
Cement calorimeter. 230V. 50Hz. 1ph. AC.	H-3160.5F

Shipping wt. 76 lbs. (34.5kg)



H-3320



H-3340



H-3341



H-3493



H-3425

Reaction Container

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. Meets ASTM C289.

Description	Model
Reaction container.	H-3320

Tube Sampler, Packaged Cement

For sampling hydraulic packaged cement, brass unit has hardwood handle. Unit is 1-1/4" (32mm) dia. x 28-3/4" (730mm) long. Meets ASTM C183; AASHTO T127.

Description	Model
Tube sampler, packaged cement.	H-3340

Tube Sampler, Bulk Cement

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.

Description	Model
Tube sampler, bulk cement.	H-3341

Shipping wt. 11 lbs. (5kg)

Cement Soundness Tester

Mold used to determine soundness of cement by measuring expansion of cement when heated in an atmosphere of steam or boiling water. Consists of brass split ring and two long parallel indicating arms. As cement expands, ring is spread and increased distance between free ends of indicating arms gives an index of soundness.

Description	Model
Cement soundness tester.	H-3350

Length Comparator

Determines expansive characteristics of carbonate rocks while immersed in room temperature sodium hydroxide (NaOH) solution. Micrometer caliper head is graduated in 0.0001" (0.0025mm) divisions and accurate within 0.0001" (0.0025mm) with 0 to 1" (25mm) total range. Micrometer is mounted on upright support attached to base plate. Includes reference bar to check measuring device regularly. Overall dimensions: 8x3x3" (203x76x76mm). Meets ASTM C586.

Description	Model
Length comparator.	H-3425

Organic Impurities Test Set

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. Meets ASTM C40; AASHTO T21.

Description	Model
Organic impurities test set.	H-3493

Shipping wt. 10 lbs. (4.5kg)

Description, Replacement Parts	Model
Graduated glass bottle for making reference standard color and test solution. Features watertight cap. 12 oz. (262ml).	H-3490A
Bottle of sodium hydroxide pellets for mixing with sand in graduated glass bottles. 1 lb. (0.5kg). One bottle.	H-3491
Reference color comparison chart used in place of reference standard color solution to eliminate necessity of making new solutions. Includes five fade-proof glass color standards mounted in plastic holder, 3-3/8x3-3/8x1-3/4" (86x86x44mm). Five color standards.	H-3492



H-3355



H-2715



H-3351, H-3371, H-3353



H-3400



H-3460

Specific Gravity Sieve #4

Designed for use in specific gravity test applications. Heavy-gage brass construction.

Description	Model
8" diameter specific gravity sieve, #4.	H-3355
12" diameter specific gravity sieve, #4.	H-3356

Hollow Tube Specific Gravity Cradle

Through this unique, yet simple stainless steel hollow tube designed, water displacement is virtually eliminated for improved accuracy in specific gravity test applications.

Description	Model
Hollow tube specific gravity cradle.	H-2715

Sample Container

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: 10x4" dia. (254x102mm) with 1/8" (3mm) round wire handle. Meets ASTM C88; AASHTO T104.

Description	Model
Sample container.	H-3351

Specific Gravity Basket

Stainless steel No. 8 wire mesh basket features reinforced construction and bail-type handle. Dimensions: 8x8" dia. Meets ASTM C127. Shipping wt. 9 lbs. (4kg)

Description	Model
Specific gravity basket.	H-3371

Utility Bucket

Heavily galvanized utility bucket has wire-reinforced top edge, bail-type handle and 14-qt. (13L) capacity. Meets ASTM C127.

Description, Replacement Parts & Accessories	Model
Utility bucket.	H-3372

Sample Container

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: 5-1/2x4" dia. (140x102mm). Meets ASTM C88; AASHTO T104.

Description	Model
Sample container.	H-3353

Shipping wt. 6 lbs. (2.7kg)

Density Flask (Le Chatelier)

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. Meets ASTM C188; AASHTO T133.

Description	Model
Density flask (Le Chatelier).	H-3400

Specific Gravity Flask (Chapman)

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. Meets ASTM C70; AASHTO T142.

Description	Model
Specific gravity flask (Chapman).	H-3460



H-3600



H-3630A

Cement Bleeding Apparatus

Used to determine bleeding rate and bleeding capacity of cement paste and mortar by direct and continuous procedure. Includes non-corrosive 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.

Description	Model
Cement bleeding apparatus.	H-3600

Shipping wt. 20 lbs. (9.0kg)

Water Retention Apparatus

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. Meets ASTM C1506, C110, C207 and E149.

Description	Model
Water retention apparatus	H-3630A

Description, Replacement Parts & Accessories	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
NBS 114 Portland calibration testing cement. 20 vials.	H-3817.20



H-2834, H-2835



H-2833

Grout Flow Cone

Cast-aluminum flow cone is used in the laboratory and field for determining flow of grout mixtures by measuring the time of efflux of a specified volume of grout from a standardized flow cone. Includes adjustable point gauge assembly. Overall dimensions: 8" dia. x 12"H (203x305mm). Meets ASTM C939.

Description	Model
Grout flow cone with interchangeable 1/2"(13mm) dia. orifice. May also be used with interchangeable 3/4"(19mm) dia. orifice, sold separately.	H-2834
Grout flow cone with interchangeable 3/4"(19mm) dia. orifice. May also be used with interchangeable 1/2"(13mm) dia. orifice, sold separately.	H-2835

Shipping wt. 9 lbs. (4.1kg)

Description, Replacement Parts & Accessories	Model
Interchangeable 1/2"(13mm) dia. orifice for use with grout flow cones H-2834 or H-2835.	H-2834.500
Interchangeable 3/4"(19mm) dia. orifice for use with grout flow cones H-2834 or H-2835.	H-2834.750
Stainless Steel Beaker. 6 liter Cap	H-2834SSB

Flow Cone Stand

Sturdy well-constructed steel stand to support flow cones so the top is level and the cone free from vibration. Overall dimensions: 21"Wx9-1/2"Dx23"H.

Description	Model
Flow cone stand.	H-2833

Shipping wt. 17 lbs. (7.7kg)

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. Meets ASTM D854; AASHTO T100.

Description, Volumetric Flasks	Model
Unstoppered volumetric flask 100ml.	H-3391
Unstoppered volumetric flask 250ml.	H-3392
Unstoppered volumetric flask 500ml.	H-3393
Stoppered volumetric flask 250ml.	H-3394
Stoppered volumetric flask 500ml.	H-3395



H-3847, H-3848

Concrete Mixer

Compact, sturdy, lightweight concrete mixer for concrete, mortar, etc., can be bolted to floor or skid for permanent installation. Counter-balanced drum has four mixing blades and tilting mechanism with adjustable lever for discharging the mix. Mixing drum may be charged or discharged from either side. Drum mixing capacity is 3 cu. ft. (85 Liters). Includes hand tow pole and wheels. Drum size: 5-1/2 cu. ft. (156 Liters). Overall dimensions: 41x26x55" (1041 x 660 x 1397mm). Meets ASTM C192. Large capacities available. Call 1-800-544-7220.

Description	Model
Concrete mixer. 1/3HP. 110V. 60Hz. 1ph. AC.	H-3847
Concrete mixer. 1/3HP. 220V. 60Hz. 1ph. AC.	H-3847.2F
Concrete mixer. 1/3HP. 220V. 50Hz. 1ph. AC.	H-3847.5F

Shipping wt. 366 lbs. (166kg)

Concrete Mixer with Tow Hitch

Same as H-3847 with 1-7/8" (48mm) ball-and-socket hitch to tow mixer by truck or auto. Includes pneumatic tires with tapered roller wheel bearings. Meets ASTM C192.

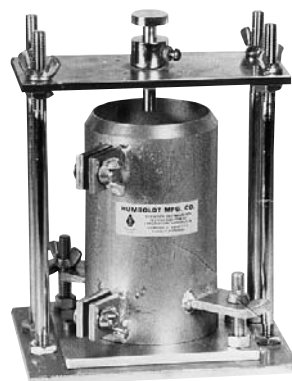
Description	Model
Concrete mixer with tow hitch. 1/3HP. 110V. 60Hz. 1ph. AC.	H-3848
Concrete mixer with tow hitch. 1/3HP. 220V. 60Hz. 1ph. AC.	H-3848.2F
Concrete mixer with tow hitch. 1/3HP. 220V. 50Hz. 1ph. AC.	H-3848.5F

Tapered Cylinder Mold

Used to determine volume change of grout, mold is constructed of steel tubing 1/4" wall x 3" dia. x 6"H (6x76x152mm). 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. Meets ASTM C1090.

Description	Model
Tapered cylinder mold.	H-2904

Shipping wt. 6 lbs. (2.7kg)



H-2904, H-2903



H-2902

Micrometer Depth Gauge

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".

Description	Model
Micrometer depth gauge.	H-2902

Micrometer Bridge Set

Set is designed to hold one cylinder mold so as to permit repeated volume change measurements without moving or disturbing the specimens.

Description	Model
Micrometer bridge set. (Contains one each of parts listed below.)	H-2903

Shipping wt. 12 lbs. (5.4kg)

Description, Replacement Parts & Accessories	Model
Micrometer bridge.	H-2901
Depth micrometer.	H-2902
Tapered cylinder mold.	H-2904
Glass plate.	H-2905.2
Weight.	H-2905.3

Tamping Rod

Round, straight steel rod is 3/8" (10mm) dia. x 12" (300mm) long. Both ends are rounded to a hemispherical tip of the same diameter as the rod. Meets ASTM C157, C192.

Description	Model
Tamping rod.	H-2905.1



Acme Penetrometer

Hydraulic reaction-type apparatus for determining the time of setting of concrete with slump greater than zero by testing mortar sieved from the concrete mixture. Unit also determines effects of variables such as temperature, cement, mixture proportions, additions and admixtures upon the time of setting and hardening of concrete.

Penetrometer's new design makes it easier to operate, 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 allow multiplication to maximum 8000 lbf. reading.

Acme penetrometer features cast aluminum base and set of stainless steel Proctor needles in a wooden block (bearing area: 1, 1/2, 1/4, 1/10, 1/20 and 1/40 in.²; (645, 323, 161, 65, 32 and 16mm²). Includes 100 laboratory test data reporting forms. Meets ASTM C403; AASHTO T197.

Description	Model
Acme penetrometer.	H-4133

Shipping wt. 60 lbs. (27kg)

Penetration Parts and Accessories

Stainless steel needles and holding block for use with H-4133 Acme Penetrometer Mortar Penetration Resistance Apparatus. Needles available as set of six, or separately.

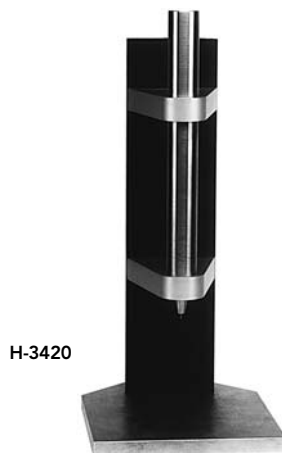
Description, Replacement Parts & Accessories	Model
Penetration needle set (six needles and block). Shipping wt. 7 lbs. (3.2kg)	H-4133N
1 sq. in. (645mm ²) end area needle.	H-4133.15
1/2 sq. in. (323mm ²) end area needle.	H-4133.16
1/4 sq. in. (161 mm ²) end area needle.	H-4133.17
1/10 sq. in. (65mm ²) end area needle.	H-4133.18
1/20 sq. in. (32 mm ²) end area needle.	H-4133.19
1/40 sq. in. (16mm ²) end area needle.	H-4133.20
Package of 100 "Time of Setting of Concrete Mixtures" data sheets for use with H-4133 and H-4137.	H-4133F



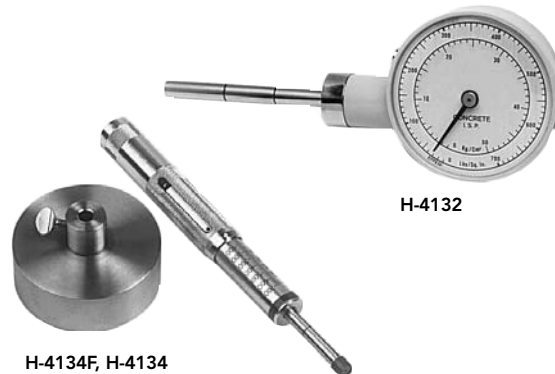
H-4133, H-4133N

HUMBOLDTAuthorized Distributor www.clarksonlab.com

H-4137



H-3420



H-4132

H-4134F, H-4134

Mortar Penetration Resistance Apparatus

Spring-reaction-type apparatus, graduated from 10 to 130lbf (45 to 580N) in increments of 2lbf (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 Proctor penetration resistance needles: 1, 1/2, 1/4, 1/10, 1/20 and 1/40 sq.in (645, 323, 161, 65, 32, 16mm²). Meets ASTM C403; AASHTO T197.

Description	Model
Mortar penetration resistance apparatus.	H-4137

Shipping wt. 20 lbs. (9kg)

Replacement Resistance Needles

Replacement needles for use with H-4137 mortar penetration resistance apparatus. Available as set or separately.

Description, Replacement Parts & Accessories	Model
Replacement resistance needle set.	H-4143
1sq. in. (645mm ²) Needle.	H-4143.1
1/2sq. in. (323mm ²) Needle.	H-4143.50
1/4sq. in. (161mm ²) Needle.	H-4143.25
1/10sq. in. (65mm ²) Needle.	H-4143.10
1/20sq. in. (32mm ²) Needle.	H-4143.05
1/40sq. in. (16mm ²) Needle.	H-4143.025

Scratch Hardness Tester

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. Meets ASTM C851.

Description	Model
Scratch hardness tester.	H-3420

Shipping wt. 9 lbs. (4kg)

Description, Replacement Parts & Accessories	Model
Brass replacement rod (needle) for H-3420. Package of 10.	H-3421

Concrete Pocket Penetrometers

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 0-700psi. 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. Meets ASTM C780.

Description	Model
Concrete pocket penetrometer.	H-4134
Concrete pocket penetrometer, dial.	H-4132

Description, Replacement Parts & Accessories	Model
Foot for pocket penetrometer. Stainless steel disk, 2.70" diam (68.58 mm).	H-4134F

Specific Gravity and Absorption of Coarse Aggregate Kit

Description	Model
Specific gravity and absorption of coarse aggregate kit. Meets ASTM C127; AASHTO T20, T85. (Kit contains one each of the parts listed below, except as noted.)	H-3370

Shipping wt. 48 lbs. (21.8kg)

Description, Replacement Parts & Accessories	Model
Balance, 8100g X 0.1g capacity.	H--4504E
Brass weight.	H-4880.2000
Brass weights. (Two in set.)	H-4880.1000
Wire basket.	H-3371
Container for immersing wire basket in water.	H-3372



H-3360



H-3381

Specific Gravity and Absorption of Fine Aggregate Kit

Description	Model
Specific gravity and absorption of fine aggregate kit. Meets ASTM C128; AASHTO T20, T84. (Kit contains one each of the parts listed below.)	H-3373

Shipping wt. 95 lbs. (43.1kg)

Description, Replacement Parts & Accessories	Model
Balance.	H-4603
Pycnometer top and 1 qt. (.95L) glass jar.	H-3381
Conical mold and tamper.	H-3360
Laboratory oven.	H-30120
3/4" (19mm) sample splitter.	H-3966

Hydrometer

For specific gravity of sodium sulfate solutions and liquids heavier than water. Range 1.150 to 1.200, subdivisions to 0.0005, length 330mm. Meets ASTM C88; AASHTO T104.

Description	Model
Hydrometer.	H-3374

Conical Mold and Tamper

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. Meets ASTM C128; AASHTO T84.

Description, Replacement Parts & Accessories	Model
Conical mold and tamper.	H-3360
Conical mold only.	H-3361
Tamper only.	H-3362



H-2712



H-2712.2

Pycnometer Top

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. Order jars separately.

Description	Model
Pycnometer top.	H-3380

Pycnometer Top and Glass Jar

Pycnometer top and 1qt. (.95L) glass jar set. Meets ASTM C128.

Description	Model
Pycnometer top and glass jar set.	H-3381

Economy Specific Gravity Tank (Bath) Assembly

This economical bath is designed for use with weigh-below balances, hooks or baskets for accurate specific gravity determinations of hardened concrete, aggregates and bituminous mixtures. The set consists of a 30 gallon polyethylene tank that measures 18"x24"x18" deep (457x609x457mm) It includes an overflow valve and bottom drain valve with hose connection for easy emptying. For maintaining a constant temperature during testing, the system includes a 30-gallon aquarium style tank heater with plastic heater guard and a circulating pump designed to maintain a bath temperature at 77°F. The pump gently circulates water to maintain even temperature distribution.

Description	Model
Economy Specific Gravity Tank Assembly, 110V, 60Hz.	H-2712

Description, Replacement Parts & Accessories	Model
30-Gallon Polyethylene Tank	H-2712.1
30-Gallon Aquarium-Style Tank Heater, Plastic Heater Guard and a Circulating Pump. 110V, 60Hz	H-2712.2
Specific Gravity Basket	H-3371
Hollow Tube Specific Gravity Cradle	H-2715
Ohaus Electronic Balance, Explorer 22,000 x 0.1g	H-4508E
Ohaus Electronic Balance, Explorer 32,000 x 0.1g	H-4510E



H-3384



SSDetect™ Bulk Specific Gravity and Absorption of Fine Aggregates Test System

The SSDetect system utilizes a "dry-to-wet" method by taking a 1000-gram sample, dried to a constant mass and then split into two 500-gram test samples. The first 500-gram sample is placed into a special test bowl that is mounted inside the unit. This sample is tested to determine the characteristic wetting curve of the material, called a Baseline Test. Once initiated, the unit will begin to inject water by way of a small injector mounted in the lid of the test bowl into the flow of material that is being mixed inside the bowl by way of the orbital mixing motion. It will continue to mix and add water until the surface of the aggregate for signs of water. Once the characteristic wetting curve has been established, the unit display will ask the user to insert the second 500-gram sample for SSD determination. The system then uses the characteristic wetting curve in the first test to determine the Saturated Surface Dry condition of the second sample.

Because this system utilizes the "dry-to-wet", materials with different absorption characteristics need to be tested differently. The software in this system has been designed to accommodate a wide range of materials.

The included software provides adaptability in two ways. 1) Soak times can be added to the SSD detection test, from 1 minute to 30 minutes, to allow materials to soak up their full potential of internal water. 2) Overall SSD detection test times can be programmed from 1 hour to 24 hours. The soak times occur within the overall test time.

Once the SSD condition is achieved, the sample can be poured into the pycnometer for the under water weight measurement. This SSD weight will also allow you to determine the absorption of the material, since you have a dry weight at the start of the test. No dry back is required.

The "dry-to-wet" provides even wetting of the material. The orbital mixing action also promotes even wetting action. All sizes of the aggregate gradation are wetted and allowed to absorb their full potential of water in an ambient environment. Unlike the "wet-to-dry" method, which will super heat the 200 material first, driving them well past the SSD condition and compromising the test results.

The SSDetect measure 14.5" (368mm) wide by 14.25" (362mm) high by 17.25" (438mm) deep. Meets ASTM C128; AASHTO T84

Description	Model
SSDetect. Supplied complete with software, two test bowls and accessories. 110-240V, 50-60Hz	H-3384

Shipping Weight 22 lbs (9.97kg)

**H-2783****H-2786****H-2786C**

Air Entrainment

Entrained air indicators quickly determine percentage of entrained air in freshly mixed concrete. Pressure-method model accuracy is not affected by barometric pressure changes. Original volume of air in the sample is determined by the principle of Boyle's Law.

Humboldt Pressure Meter

- Measures entrained air in freshly mixed concrete
- Improved clamping arrangement

Easy-to-use stainless clamping system employs four, one-piece, self-locking clamps to seal lid to base with proper tension. O-ring assures watertight seal. Easy-to-read (to nearest 1/10th of a percent) 4" diameter direct percentage gauge with calibration adjustments. All brass pump builds test pressure faster using fewer strokes. Unique pop-it valve eliminates seal failures. Complete with high-impact plastic carrying case, syringe, tamping rod, strike-off bar, calibration vessel, inside and outside calibration rubes and instructions.

Description	Model
Humboldt Pressure Meter.	H-2783

Press-Ur-Meter, Type B

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 running entrained air test, and carrying case. Overall height: 20-1/2" (521mm). Meets ASTM C231; AASHTO T152.

Description	Model
Press-Ur-Meter, Type B, with wood carrying case.	H-2786
Economy Press-Ur-Meter, Type B, with metal carrying case.	H-2786C
Press-Ur-Meter, Type B, with plastic carrying case.	H-2786P

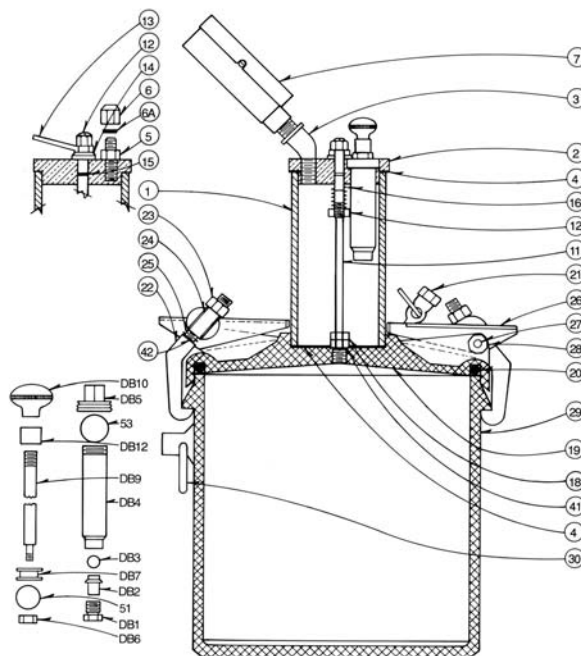
Shipping wt. 36 lbs. (16.4kg)

Description, Replacement Parts & Accessories	Model
Super Pump	H-2785DB
Gauge (complete)	H-2785.7

Press-Ur-Meter and Super Pump Replacement P arts

Pressure chamber	H-2785.1
Pressure chamber cap	H-2785.2
Pressure chamber elbow	H-2785.3
Pressure chamber gasket	H-2785.4
Pressure chmb air-release stem	H-2785.5
Pressure chamber air-release cap	H-2785.6
Release cap gasket	H-2785.6A
Gauge (complete)	H-2785.7
Needle valve stem	H-2785.11
Needle valve /Spring Ret. nut	H-2785.12
Needle valve lever	H-2785.13
Needle valve spacer	H-2785.14
Needle valve "O" ring	H-2785.15
Needle valve spring	H-2785.16
Needle valve seat assembly	H-2785.18
Cover	H-2785.19
Cover "O" ring	H-2785.20
Cover pet cock	H-2785.21
Clamp	H-2785.22
Clamp nut	H-2785.23
Clamp trunion	H-2785.24
Clamp spring	H-2785.25
Clamp toggle	H-2785.26
Clamp toggle set screw	H-2785.27
Clamp toggle lock nut	H-2785.28
Base	H-2785.29
Base handle	H-2785.30
Calibrating vessel	H-2785.31
Calibrating tube (outside)	H-2785.32
Calibrating tube (inside)	H-2785.33
Strike-off bar	H-2785.34
Tamping rod	H-2785.35
Syringe	H-2785.36
Gauge glass	H-2785.37
Wooden carrying case	H-2785.38
Plastic carrying case	H-2785.38P
Needle valve seat gasket	H-2785.41
Clamp stud for part #22	H-2785.42
"O" ring for part #54	H-2785.51*
Pump tube assembly (cmpl.)	H-2785.52*
"O" ring for part #52	H-2785.53*
Pump piston assembly (cmpl.)	H-2785.54*
Valve nut	H-2785.DB1
Valve	H-2785.DB2
Valve "O" ring	H-2785.DB3
Pump tube	H-2785.DB4
Pump cap	H-2785.DB5
Stem nut	H-2785.DB6
Pump piston	H-2785.DB7
Piston "O" ring	H-2785.51
Pump stem	H-2785.DB9
Pump handle	H-2785.DB10
Tube "O" ring	H-2785.53
Stem cap	H-2785.DB12
Meter and pump replacement gasket set	H-2785.55

*indicates parts for Watts pump





H-2785.DB, H-2789, H-2788

H-2795, H-2796

H-2795P



H-2756

Super Pump for Press-Ur-Meter, Type B

Super pump's all brass construction resists acids in cement. All parts, including valve, are replaceable.

Description	Model
Super pump.	H-2785.DB

Air Meter Calibrator

Calibrator checks 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" (102x95mm). The model H-2788 is constructed of Plastic with a weighted Ring. The more durable H-2789 is manufactured from machined Brass.

Description	Model
Air meter calibrator, plastic.	H-2788
Air meter calibrator, machined brass.	H-2789

Roll-A-Meter Air Indicator

Rolling or washout method air indicator for use with any aggregate not exceeding 2" (51mm). Capacity in base section: 130 cu. in. (2130cm³). Easy to handle in the field. Requires no special training or computation. Includes instructions and carrying case. Height: 22" (559mm). Max. O.D. 8" (203mm). Meets ASTM C173; AASHTO T196.

Description	Model
Roll-A-Meter air indicator, traditional solid bronze.	H-2795

Shipping wt. 38 lbs. (17.2kg)

Description	Model
Roll-A-Meter air indicator, lighter weight aluminum.	H-2796

Shipping wt. 25 lbs. (11.3kg)

Volumetair Air Meter

The Volumetair is used for the rolling method of measuring entrained air in any concrete. This ultra lightweight and easy-to-use instrument is supplied complete with the meter, funnel, syringe, tamper, calibration cup, mallet, strike-off bar and plastic carrying case. The plastic materials used in the construction of this unit not only make it lightweight; but also allows the user to use water for clean-up and small amounts of muratic acid for periodic cleaning. The sight tube has a range of 0 to 9% and the base volume is 134 cu. in. (2200ml). Meets ASTM C173.

Description	Model
Volumetair air meter.	H-2795P

Shipping wt. 25 lbs. (11.3kg)

Concrete Air Indicator (Isopropyl-Alcohol Method)

For quick field checks of air content of fresh concrete in about three minutes, pocket-sized unit air meter is furnished with instructions and correlation chart. Unit does not replace conventional 1/4- and 1/2-cu. ft. (.007 and .014m³) air meters. Overall dimensions: 6-1/4x1-1/8" dia. (159x29mm). Meets ASSHTO T199.

Description	Model
Concrete air indicator.	H-2755
Filter tube replacement glass vial for H-2755 concrete air indicator.	H-2755.2

Concrete Air Indicator Kit (Isopropyl-Alcohol Method)

Complete kit for measuring air content of fresh concrete includes H-2755 air indicator, instructions, cleaning brush and plastic squeeze-type bottle for alcohol. Components fit in plastic box. Meets ASSHTO T199.

Description	Model
Concrete air indicator kit in plastic box.	H-2756



H-3655



H-3655 with H-3656

Ball Penetration Apparatus (Kelly Ball)

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. Meets ASTM C360; AASHTO T183; California Test Method CTM533

Description	Model
Ball penetration apparatus.	H-3655
Ball penetration apparatus, 20 lb.	H-3655-20

Shipping wt. 40 lbs. (18kg)

Carrier for Ball Penetration Apparatus (Kelly Ball)

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.

Description	Model
Carrier for ball penetration apparatus.	H-3656

Slump Cones

Determine slump of concrete in laboratory or field use. Choice of heavy-gauge seamless spun steel or lightweight plastic, in standard or metric sizes. Steel models have plated finish to resist rust, plastic models can be cleaned with acid bath and will not dent or rust. All models fitted with handles and foot lugs. Meets ASTM C31, C143, C172, C192, C232; AASHTO T23, T119, T126, T141, T158.

Description	Model
Steel slump cone. 8" (203mm) dia. at base, 4" (102mm) dia. at top and 12" (305mm) high.	H-3640
Metric steel slump cone. 200mm dia. at base, 100mm dia. at top and 300mm high.	H-3640M

Shipping wt. 6 lbs. (2.7kg)

Description	Model
Plastic slump cone. 8" (203mm) dia. at base, 4" (102mm) dia. at top and 12" (305mm) high.	H-3640P
Plastic Metric slump cone. 200mm dia. at base, 100mm dia. at top and 300mm high.	H-3640PM



H-3640



H-3640P

Tamping (Puddling) Rod

Round, straight steel rod for use with concrete cylinder molds, slump cones and unit weight measures 5/8" (16mm) dia. x 24" (600mm) long. Both ends are rounded to a hemispherical tip with a 5/8" (16mm) dia. Plated for rust resistance. Meets ASTM C29, C31, C138, C143, C172, C192, C231, C232, C234; AASHTO T19, T23, T119, T121, T126, T141, T152, T158, T159.

Description	Model
Tamping (Puddling) rod.	H-3650

Graduated Tamping Rod

Same as H-3650 with 6" scale in 1/4" increments engraved on handle end of rod for measuring amount of slump when handle of H-3636 base is raised over specimen.

Description	Model
Graduated tamping rod.	H-3651

Slump Cone Funnel

Funnel is used all slump cone models to assist in filling the cone.

Description	Model
Slump cone funnel.	H-3638

Slump Cone Base Plate

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. Order tamping rod separately. Meets ASTM C31, C143, C172, C192, C232; AASHTO T23, T119, T126, T141, T158.

Description	Model
Slump cone base plate.	H-3636

Shipping wt. 10 lbs. (4.5kg)



H-3635



H-3645



H-3643



H-3644

Slump Cone Test Set

Slump cone test set for measuring slump of freshly mixed concrete. See chart for included components, also available separately. Meets ASTM C31, C143, C172, C192, C232; AASHTO T23, T119, T126, T141, T158.

Description	Model
Slump cone base set.	H-3635

Shipping wt. 25 lbs. (11.3kg)

Portable Slump Cone Test Set

See chart for included components, also available separately. Meets ASTM C31, C143, C172, C192, C232; AASHTO T23, T119, T126, T141, T158.

Description	Model
Portable slump cone test set.	H-3637

Shipping wt. 19 lbs. (8.6kg)

Slump Test Set

See chart for included components, also available separately. Meets ASTM C31, C143, C172, C192, C232; AASHTO T23, T119, T126, T141, T158.

Description	Model
Slump test set.	H-3645

Shipping wt. 24 lbs. (10.9kg)

Components of Slump Cone Test Sets

Description	Set H-3635	Set H-3637	Set H-3645	Item Model
Base Plate.	●	●		H-3636
Funnel.	●			H-3638
Brush.	●			H-3639
Slump Cone (standard steel).	●	●	●	H-3640
Tamping rod w/ 6" scale on handle.	●	●		H-3651
Scoop.	●			H-3731
Brush.			●	H-3800
Tamping (Puddling) rod.			●	H-3650
Cement immersion pan.			●	H-3725
Trowel.			●	H-3760

K-Slump Tester

For in-place measurements of forms and test molds. Tester indicates correlation to the slump test. Probe determines the workability of concrete and degree of compaction after being placed in the forms. Includes correlation chart and instructions.

Description	Model
K-Slump tester.	H-3643

Flowgauge

Designed in strict compliance with ASTM specifications, the Flowgauge provides a fast and economical means for establishing the flow, consistency and workability of fresh concrete. The unit is completely portable and is made of lightweight, easy-to-clean Delrin. Meets ASTM C1362.

Description	Model
Flowgauge.	H-3644

**H-4734D****H-3660.1,
H-3661.1, H-3663.1****H-3660 Series**

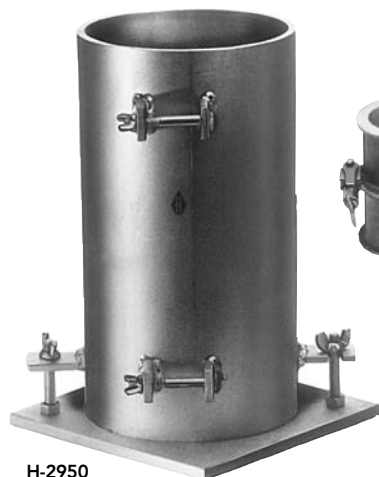
Digital Concrete Field Scale

The Digital Concrete Field Scale was developed to meet the requirements of ASTM and AASHTO specifications for unit weight, yield and gravimetric air content test applications. The battery-powered scale has a 130 lb (60 kg) capacity with an accuracy and readability of 0.02 lb (10 g). The stainless steel platform measures 17-3/4" by 13". The unit features a digital indicator with 1" high, easy-to-read digits, lb/kg selection button, taring up to full capacity with indicator, low battery indicator, adjustable leveling feet, automatic zero and a durable plastic covered wood carrying case.

Description	Model
Digital concrete field scale.	H-4734D

Unit Weight Measures						
Description	Capacity	Inside Dia.	Inside Ht.	Shipping Wt. (lbs/kg)	Meets Specs	Model
Machined aluminum cylindrical unit weight measures with handles for determining unit weight of fine, coarse or mixed aggregates. Watertight, with true and even top and bottom. Measures retain form after repeated use.	1/10 cu. ft. (2.8)	6" (152mm)	6.1" (155mm)	6 lbs. (2.7kg)	ASTM C29, C138, C192, C232; AASHTO T19, T121, T158	H-3660.1
	1/2 cu. ft. (14.1)	10" (254mm)	11" (279mm)	16 lbs. (7.2kg)		H-3661.1
	1 cu. ft. (28.3)	14" (356mm)	11.2" (285mm)	31 lbs. (13.6kg)		H-3662.1
	1/3 cu. ft. (9.3)	8" (203mm)	11.5" (292mm)	17 lbs. (7.7kg)		H-3663.1
	1/4 cu. ft. (7.1)	8" (203mm)	8.8" (224mm)	11 lbs. (4.9kg)		H-3664.1
Heavy-gauge seam-welded watertight steel unit weight measures have bail handles. Used for determining unit weight of aggregate for concrete.	1/10 cu. ft. (2.8)	6" (152mm)	6.1" (155mm)	7 lbs. (3.2kg)	Non-ASTM Models	H-3660
	1/2 cu. ft. (14.1)	10" (254mm)	11" (279mm)	22 lbs. (10kg)		H-3661
	1 cu. ft. (28.3)	14" (356mm)	11.2" (285mm)	33 lbs. (15kg)		H-3662
	1/3 cu. ft. (9.3)	8" (203mm)	11.5" (292mm)	19 lbs. (8.7kg)		H-3663
	1/4 cu. ft. (7.1)	8" (203mm)	8.8" (224mm)	15 lbs. (6.8kg)		H-3664

Strike-Off Plates		
Meets Specs	Size	Strike-Off Plate
ASTM C138; AASHTO T121	8x8" (203x203mm)	H-3669.1
	12x12" (305x305mm)	H-3669.2
	16x16" (406x406mm)	H-3669.3
	10x10" (254x254mm)	H-3669.4
	8x8" (203x203mm)	H-3669.1
	12x12" (305x305mm)	H-3669.2
	16x16" (406x406mm)	H-3669.3
	10x10" (254x254mm)	H-3669.4
	8x8" (203x203mm)	H-3669.1
	12x12" (305x305mm)	H-3669.2



H-2950



H-2920



H-3041, H-3037PML, H-3038PML, H-3041S



H-3043.6

Metal Cylinder Molds

Size	Description	Meets Specifications	Model
6x12" (152x305mm)	Wall thickness 1/8" (3mm) steel. Mold is split along one side with 2 quick-acting clamps welded to mold. When open, mold springs apart slightly to allow specimen removal. Supplied with 1/4" (6mm) detachable base plate included. Shipping wt. 18 lbs. (8.2kg)	ASTM C31, C39, C192, C470; AASHTO T22, T23, T126, T198	H-2942
	Similar to H-2942 but with 1/4" (6mm) steel wall. Furnished with detachable base plate. Shipping wt. 31 lbs. (14kg)		H-2950
4x8" (102x203mm)	Wall thickness is 1/4". Mold has detachable base plate. Shipping wt. 8 lbs. (3.6kg)	ASTM C39, C192, C470; AASHTO T22, T126, T198	H-2934
2" dia.x4"H (51mmx102mm)	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. Shipping wt. 5 lbs. (2kg)	ASTM C31, C39, C192	H-2920

Single-use Cylinder Molds

6x12"	Disposable plastic mold with flat plastic bottom; molds are easily stripped with H-3041S stripper; order separately. Carton of 36. Reinforcing rib around top opening. Lids not included.	ASTM C31, C39, C192, C470, C496; AASHTO T22, T23, T126, T198, M205	H-3041
4x8"	Disposable plastic mold with flat plastic bottom. Supplied complete with integral domed plastic lid. Carton of 36.	ASTM C39, C192, C470, C496; AASHTO T22, T126, T198	H-3037PML
3x6"	Disposable plastic mold with flat plastic bottom. Supplied complete with integral domed plastic lid. Carton of 80.		H-3038PML
6x12"	Waxed cardboard mold with flat metal bottom. Carton of 24.	ASTM C31, C39, C192, C470, C496; AASHTO T22, T23, T126, T198, M205	H-3040
4x8"	Waxed cardboard mold with flat metal bottom. Carton of 50.	ASTM C39, C192, C470, C496; AASHTO T22, T126, T198	H-3037
3x6"	Waxed cardboard mold with flat metal bottom. Carton of 50.	ASTM C39, C192, C470, C496; AASHTO T22, T126, T198	H-3038
2x4"	Waxed cardboard mold with flat metal bottom. Carton of 50.	ASTM C39, C192, C470, C496; AASHTO T22, T126, T198	H-3032P84

Single-use Cylinder Accessories

6" — —	Domed plastic lid for use with H-3041 mold. T-Handle style Mold stripper to split single-use cylinder molds longitudinally for cylinder removal. Screwdriver style Mold stripper to split single-use cylinder molds longitudinally for cylinder removal.	H-3041L H-3041S H-3041SMA
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Permamold Reusable Plastic Cylinder Molds

4x8"	Lightweight, impact resistant construction. Will not crack, rust or deform. 1/4" (6.2mm) thick walls. Can be reused up to 100 times. Meets ASTM. Sold individually.	H-3043.4
6x12"		H-3043.6



H-2943



H-2945



H-2945G



H-2914



H-2733

Sample Cart

For use in handling concrete beams and cylinders, plus soil and aggregate samples in the lab or field. 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: 24x36x32" (61x91x97cm). Ready to assemble.

Description	Model
Sample cart.	H-2944

Shipping wt. 43 lbs. (19.5kg)

Welded Sample Cart

Premium-grade all-welded cart has 800-lb. capacity. Features 5x1-1/4" casters mounted to cross-channel bolster plate for added support, convenient offset handle and 36x24" (914x609mm) tray size. Smooth finish; no rough edges. Shipped assembled.

Description	Model
Welded sample cart.	H-2943

Shipping wt. 75 lbs. (34kg)

Cylinder Carrier (Cradle Type)

Steel cylinder carrier is plated to resist rust. Used to carry 6" (152mm) dia. concrete cylinders in field or laboratory.

Description	Model
Cylinder carrier, cradle-type.	H-2945

Cylinder Carrier (Gripper Type)

Employs a hand-grip pincer action to secure standard 6" (152mm) dia. cylinders.

Description	Model
Cylinder carrier, gripper-type.	H-2945G

Master Humidifier

Unit is recommended for humidifying comparatively large areas, evaporating maximum 5 lbs. (approximately 6/10 gal) of water per hour. Reservoir is copper; unit includes adjustable brass water float for operation on variable water pressure up to 75 lbs. (334N). Humidistat controller can be wired to unit to provide automatic humidity regulation. 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 (368x267mm).

Description	Model
Master humidifier. 115V. 60Hz.	H-2914

Humidistat Controller

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.

Description	Model
Humidistat controller. 115-220V.	H-2915

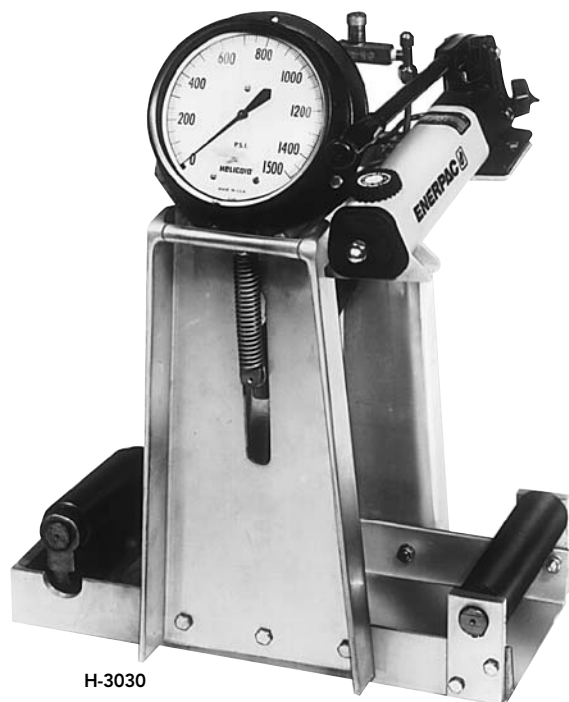
Hydrofogger 300

The hydrofogger system generates impressive clouds of smoky fog, which will add abundant cool humidity at a 2-gal. (7.5 liter) per hour and is ideal for use in cement and concrete curing storage areas up to 2000 sq. ft. (57 M³). No wiring is necessary, the unit plugs directly into a standard electrical outlet (115V/60Hz). A GFCI-protected electrical outlet is suggested. An internal float valve is incorporated to automatically fill a water reservoir. Unit connects to standard 1/4" OD tubing water supply lines. 20 feet of 1/4" tubing is included for plumbing connection. To automate the above Hydrofogger and maintain RH levels of 85%, the accessory H-2733.1 Cycle Timer is recommended. The dimensions are 14" x 14" (360mm x 360mm).

Description	Model
Hydrofogger 300. 115V, 60Hz, 0.9 Amp, 103 watts.	H-2733

Description, Replacement Parts	Model
Cycle Timer with Trippers for up to 24 On/Off cycles per day.	H-2733.1

Shipping wt. 31 lbs. (14.1kg)



H-3030

Concrete Beam Tester

Self-contained shock-proof portable concrete beam tester accurately and easily determines flexural strengths of up to 6x6" 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 10,000 lbf. and 0-4,500 kgf.

Description	Model
Beam tester, manual pump, 16" distance, single point.	H-3030
Beam tester, manual pump, 18" distance, single point.	H-3032
Beam tester, manual pump, 18" distance, 3-point loading.	H-3033

Shipping wt. 65 lbs. (29kg)

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. Meet ASTM C31, C78, C192, C293; AASHTO T23, T97.

Lightweight, Stamped, Steel Model

Hinge-free, collapsible into interchangeable parts. Fastened with wing nuts.

Description	Model
Concrete beam form, lightweight steel. 6x6x21" (152x152x533mm). Shipping weight 21 lbs. (9.5kg).	H-3007



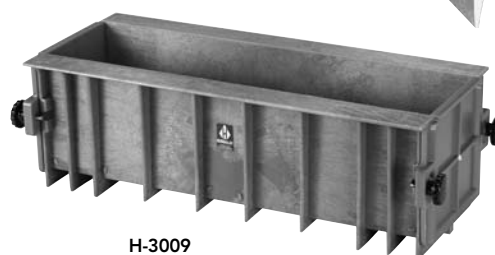
H-3005, H-3010,
H-3015, H-3020



H-3007



H-2827



H-3009

Heavyweight, Machined 3/8" Steel Models

One piece sides hinged to base, ends hinged to sides. Fastened with wing nuts.

Description	Model
Concrete beam form, heavyweight 3/8" steel. 6x6x21" (152x152x533mm). Shipping weight 59 lbs. (26.8kg).	H-3005
Concrete beam form, heavyweight 3/8" steel. 6x6x24" (152x152x610mm). Shipping weight 67 lbs. (30.4kg).	H-3010
Concrete beam form, heavyweight 3/8" steel. 6x6x30" (152x152x762mm). Shipping weight 82 lbs. (37.2kg).	H-3015
Concrete beam form, heavyweight 3/8" steel. 6x6x36" (152x152x914mm). Shipping weight 100 lbs. (45.4kg).	H-3020

Plastic Model

Weighs less than one quarter of steel molds. Requires no tools. Interlocking joints make mold virtually watertight, eliminate need to grease or seal joints. Thumb screws speed assembly, stripping & cleaning.

Description	Model
Concrete beam form, plastic model. 6x6x21" (152x152x533mm). Shipping weight 10 lbs. (4.5kg).	H-3009

Cube Mold

Single-cavity steel cube mold with base plate is 6x6x6" (152x152x152mm). Used for compression testing of concrete cubes and for mortar specimens in the Time of Initial and Final Setting of Concrete. Meets ASTM C403; AASHTO T197.

Description	Model
Cube mold, 6x6x6".	H-2827
Cube mold, metric, 150x150x150mm.	H-2827M

Shipping wt. 27 lbs. (12.3kg)



H-2967, H-2968



H-2970

H-2970.1



H-3755



H-2999

Concrete Curing Box

For curing concrete cylinders by maintaining temperature and humidity for 48 hours. Holds 22 standard 6 x 12 (152 x 305mm) test specimens. Preset 73°F temperature control maintained at $\pm 2^\circ\text{F}$ (22.2°C at $\pm 1.1^\circ\text{C}$) throughout the curing period. Lightweight, portable—weighs only 74 lbs. (33.6kg). Plastic construction is very rugged, durable, rustproof. 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. I.D. = 18x54x17" (457x1372x432mm). Meets ASTM C192, C511, C31; AASHTO M201, T126, T23.

Description	Model
Curing Box, Economy, heats only. Adjustable temperature controller, dial thermometer. 115V, 60Hz.	H-2967
220V, 50Hz model.	H-2967.5F

Shipping wt. 75 lbs. (33.5kg)

Description	Model
Concrete curing box, Deluxe, both heats and cools. Temperature set buttons, digital display for water temperature, indicator lights for heat/cool modes. 115V, 60Hz.	H-2968
220V, 50Hz model.	H-2968.5F

Shipping wt. 162 lbs. (73.4kg)

Field Curing Chest

The H-2970 series 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 and a thermostatically controlled fan-circulated heater. The unit can accept up to eight 6" x 12" concrete cylinders.

Description	Model
Field Curing Chest. 115V, 60Hz.	H-2970

Shipping wt. 15 lbs. (6.8kg)

6" Test Cylinder Transport Rack

The H-2970.1 6" Test Cylinder Transport Rack securely holds (8) 6 x 12 inch specimens in a lightweight and durable frame, which can be secured to a truck bed or used in conjunction with the Field Curing Chest listed above. Open center position is available for heater storage. Will not rot or rust.

Description	Model
6" Test Cylinder Transport Rack.	H-2970.1

Vibrating Table

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 20x20" (508x508mm). 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. Meets ASTM C31, C192.

Description	Model
Vibrating table. 115V. 60Hz. 10h. 4.5 amps. AC.	H-3755
Vibrating table. 230V. 50Hz. 10h. 2.3 amps. AC.	H-3755.5F

Shipping wt. 123 lbs. (55.8kg)

Vibration Indicator, Tachometer Type

Precision tachometer is pen size to allow accurate readings even on hard-to-reach equipment. Scale gives readings from 2,000 to 21,000

Description	Model
Vibration indicator, tachometer type	H-3753

Vibration Indicator, Visual Type

Visual indicator gives accurate reading of amplitude of vibration so vibrating table may be adjusted to ASTM specification.

See photo on page 125.

Description	Model
Vibration indicator, visual type	H-3754

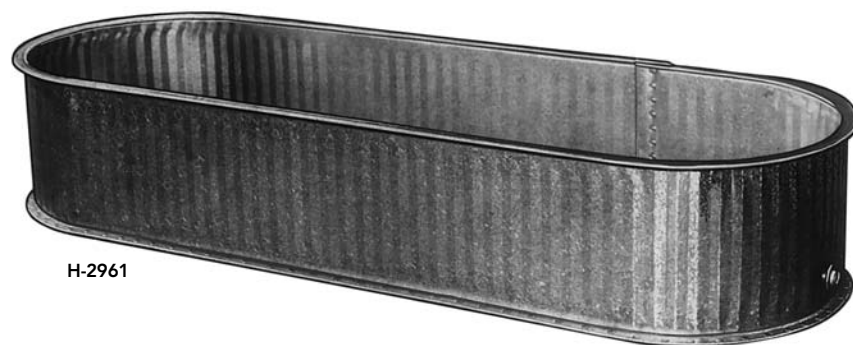
Laboratory Vibrator

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 (25x330mm) with a speed of 10,000 vpm. Meets ASTM C31, C138, C192. See photo on page 125.

Description	Model
Laboratory vibrator. 115V. 50/60Hz. 7 amps. 1ph.	H-2999
Laboratory vibrator. 230V. 50/60Hz. 3.6 amps. 1ph.	H-2999.4F

Shipping wt. 21 lbs. (9.5kg)

Note: Other lengths and tip sizes available, contact Humboldt.



H-2961



H-2986A



H-2985

Curing Tanks

Useful for curing cylinders, beams and material needing total immersion in laboratory or the field. Tanks are constructed from 20ga. galvanized steel; side walls 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. Meets ASTM C192; AASHTO T127.

Curing Tanks					
Capac. gal. (L)	Width ft. (m)	Depth ft. (m)	Length ft. (m)	Shp. Wt. lbs. (kg)	Models
95 (360L)	2 (.6m)	2 (.6m)	4 (1.2m)	55 lbs. (25kg)	H-2961
142 (538L)	2 (.6m)	2 (.6m)	6 (1.8m)	80 lbs. (36.3kg)	H-2961.1
300 (1,136L)	3 (.9m)	2 (.6m)	8 (2.4m)	120 lbs. (54.4kg)	H-2961.2
385 (1,458L)	3 (.9m)	2 (.6m)	10 (3.1m)	155 lbs. (70.3kg)	H-2961.3

Precision Tank Heater

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" (46cm).

Description	Model
Electric tank heater. 110V. 50/60Hz. AC.	H-2986A
Electric tank heater. 230V. 50/60Hz. AC.	H-2986A.4F

Shipping wt. 6 lbs. (2.7kg)

Curing Tank Circulator

Silent submersion pump is 1/160HP (30W) with 120GPH rating at 1-ft. (0.3m) 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 6-ft. (1.8m) grounded cord.

Description	Model
Curing tank circulator, 110V 60Hz.	H-2985
Curing tank circulator, 220V, 50/60Hz.	H-2985.4F



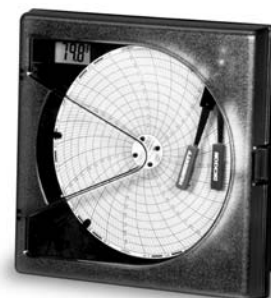
H-2983



H-2988



H-2735



H-2745

Curing Tank Heater

Curing tank heaters are recommended for H-2961 series curing tanks. Heavy-duty, vertical loop curing tank heater is designed for heating large capacity curing tanks. Thin profile along tank wall allows maximum work space inside the tank. A submersible pump circulates the curing solution through heating coils. Solution level should be a minimum 6" (15.2cm) above the heating coils at all times to prevent overheating damage. Thermostat has a range of 0° to 100°F. Heater has a capillary and bulb that serve as temperature sensing device. Pilot light indicates when heater is working. Heater attaches to side of curing tank.

Description	Model
Curing tank heater. 240V. 50/60Hz. 7.5KW.	H-2983

Shipping wt. 65 lbs. (29.48kg)

Heater/Circulator

Analog controller with proportional temperature control. Low liquid safety. 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) I.D. tubing for external circulation. Suitable for use with wide variety of fluids. 6x5x13" (152x127x330mm).

Heater/Circulator					
Temp Range	Temp Stability	Display	Pumping (liters/min)	Over-Temp Cutoff	Model
5 C above ambient to 100 C	0.2 C	H-2614 Thermometer (included)	7 or 15	Adjustable	H-2988
Heater/Circulator, 120V, 60Hz, 9 amp.					
Heater/Circulator, 220V, 50/60Hz, 5 amp.					

Shipping wt. 10 lbs (4.5kg)

Temperature Chart Recorder with Remote Probe

Used to monitor curing tank temperatures, as well as a wide range of other temperature recording applications in concrete and cement testing laboratories. The recorder has an accuracy of $\pm 0.5\%$ of full scale $\pm 1^\circ\text{C}$ (1.8°F) and can be set for either 7-day or 24-hour recording times. In the event of a power outage, the unit incorporates a 9v battery backup system. The recorder is supplied complete with 7-day recording charts (0 to 100°F/C), pen, battery and bead wire probe.

Description	Model
Temperature chart recorder with remote probe, 120V 60 Hz.	H-2735
Temperature chart recorder with remote probe, 240V 50-60 Hz.	H-2735.4F

Description, Optional Accessories	Model
6" Stainless steel probe with 4' lead (included).	H-2735.3
10' Straight extension lead for H-2735.3 (optional).	H-2735.4

Description, Replacement Parts	Model
7-Day charts, pkg. of 60.	H-2735.1
Replacement pen for H-2735.	H-2735.2

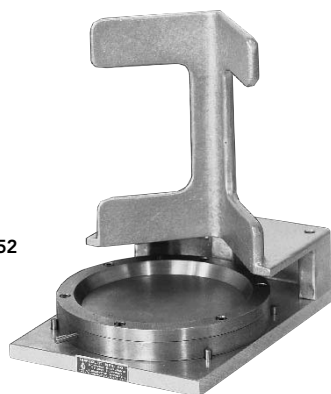
Temperature and Humidity Chart Recorder

This general-purpose chart recorder is ideally suited for basic temperature and humidity monitoring. The recorder has a user selectable temperature range of +32 to +100°F (0 to +50°C) at an accuracy of $\pm 1.8^\circ\text{F}$ ($\pm 1^\circ\text{C}$). Humidity measurements and recording can be made within the range of 0 to 95% RH (non-condensing) at an accuracy of $\pm 3\%$ from 0 to 90% at 73°F. The recorder is supplied complete with 120v AC power adapter, pens and 7-day recording charts.

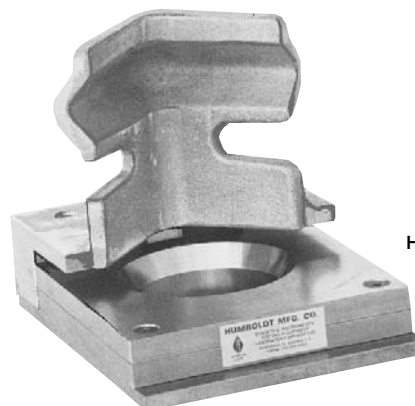
Description	Model
Temperature and humidity chart recorder, 120V 60 Hz.	H-2745
Temperature and humidity chart recorder, 240V 50-60 Hz.	H-2745.4F

Description, Replacement Parts	Model
7-Day charts, pkg. of 60.	H-2735.1
Replacement pens for H-2740.	H-2745.2

H-2952



H-2925 Series



Vertical Cylinder Capper

For capping 6" dia. x 12" high (152x305mm) 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. Meets ASTM C31, C39, C192, C617; AASHTO T22, T23, T126, T231.

Description	Model
Vertical cylinder capper.	H-2952

Shipping wt. 27 lbs. (12.3kg)

Capping Plate

Replacement ring and bottom plate for H-2952 vertical cylinder capper.

Description	Model
Capping plate.	H-2952.3

Shipping wt. 16 lbs. (7.3kg)

Vertical Cylinder Capping Kit

Kit includes one each of the following parts. See individual components for descriptions.

H-2945 cylinder carrier

H-2952 vertical cylinder capper

H-2953 compound melting pot

H-2957 capping compound

H-2958 ladle

Meets ASTM C31, C39, C192, C617; AASHTO T22, T23, T126, T231.

Description	Model
Vertical cylinder capping kit with compound melting pot, 110V, 60Hz.	H-2951
Vertical cylinder capping kit with compound melting pot, 220V, 50/60Hz.	H-2951.4F

Shipping wt. 140 lbs. (63.5kg)

Vertical Cylinder Capper—Universal

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.

Description	Model
Vertical cylinder capper for 2" dia.x 4" (51x102mm) specimens.	H-2925A
Vertical cylinder capper for 3" dia.x 6" (76x152mm) specimens.	H-2925B
Vertical cylinder capper for 4" dia.x 8" (102x203mm) specimens.	H-2925C
Vertical cylinder capper for 2.5" dia. specimens.	H-2925E

Shipping wt. 18 lbs. (7.7kg)

Capping Plates

Replacement top and bottom plates for H-2925 vertical cylinder capper.

Description	Model
Capping plate for 2" dia. x 4" (51x102mm) specimens.	H-2925A.1
Capping plate for 3" dia. x 6" (76x152mm) specimens.	H-2925B.1
Capping plate for 4" dia. x 8" (102x203mm) specimens.	H-2925C.1



H-2953, H-2954, H-2955, H-2948, H-2949



H-2958



H-2946D



H-2900.6

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. Meets ASTM C617; AASHTO T231.

Compound Melting Pots				
Capacity	Amps	Shipping Wt.	Meets Specs	Model
4qt. 110V. 60Hz. 3.8L. 220V. 50/60Hz.	6 3	13 lbs. (5.9kg)	ASTM C617; AASHTO T231	H-2953 H-2953.4F
8qt. 110V. 60Hz. 7.6L. 220V. 50/60Hz.	10 5	27 lbs. (12.3kg)		H-2954 H-2954.4F
12qt. 110V. 60Hz. 11.4L. 220V. 50/60Hz.	11 5.5	29 lbs. (13.2kg)		H-2955 H-2955.4F
20qt. 110V. 60Hz. 19L. 220V. 50/60Hz.	12 6	32 lbs. (14.5kg)		H-2948 H-2948.4F
28qt. 110V. 60Hz. 26.5L. 220V. 50/60Hz.	15 7.5	38 lbs. (17.3kg)		H-2949 H-2949.4F

Concrete Capping Compound, Powder

Cylcap pours at about 240°F (116°C); uncontaminated spillover can be remelted to eliminate loss from pouring waste. Compound does not deteriorate in any state, as dry powder, liquid or hardened cap. It maintains its strength when specimens are stored in a humidity chamber. Supplied as a dry powder in moisture-proof bag. Meets ASTM C617; AASHTO T231.

Description	Model
Powder-Style Capping Compound, 50 lb bag.	H-2957

Shipping wt. 50 lbs. (22.7kg)

Concrete Capping Compound, Flake-Style

Sauereisen No. 600 sulfur base flake-form capping compound melts and sets within minutes. Silica-filled compound has 150psi bond strength, 9000psi compressive strength and 605psi 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. Meets ASTM C307, C321, C386, C579, C617, D71.

Description	Model
Flake-style capping compound, 50 lb. bag.	H-2959

Capping Ladle

Stainless steel ladle with 4" (102mm) dia. bowl is used in transferring capping compound from melting pot to capping fixture.

Description	Model
Capping ladle.	H-2958

Econ-o-Cap

Precision-machined high-alloy steel retaining caps retain compression pads that fit over the ends of the concrete cylinder. Compression pads are made from tough elastomeric material that flows into irregularities to distribute the test load uniformly to assure consistent breaks. Meets ASTM C1231; AASHTO T22, T851.

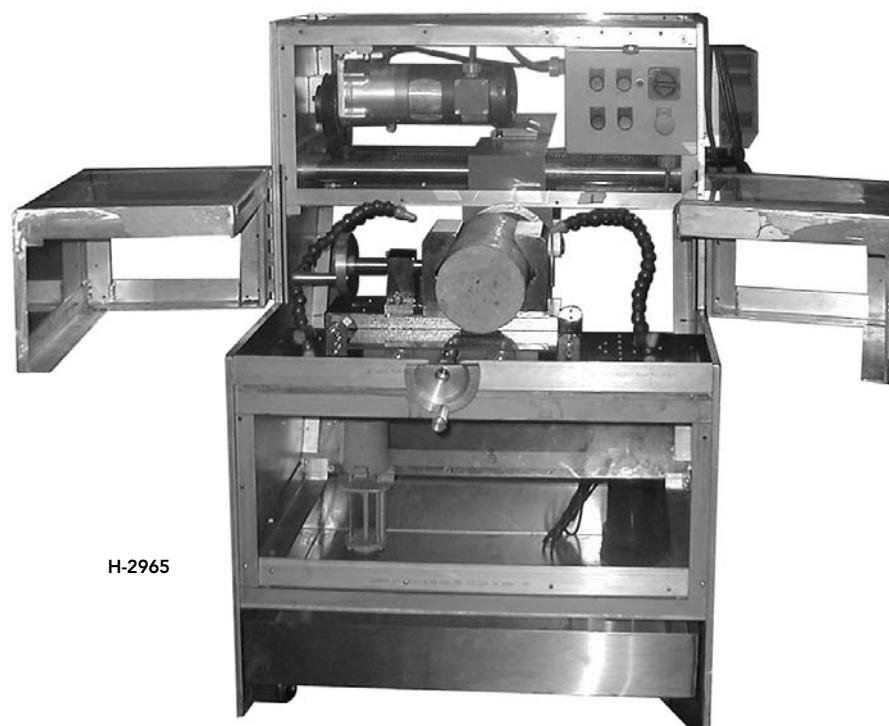
Description	Model
Econ-o-Cap set: 2 rings and two 60 durometer pads for 6" dia. x 12" specimens.	H-2946D
Econ-o-Cap set: 2 rings and two 60 durometer pads for 3" dia. x 6" specimens.	H-2946B
Econ-o-Cap set: 2 rings and two 60 durometer pads for 4" dia. x 8" specimens.	H-2946C

Description, Replacement Parts & Accessories			
	Pad Diameter		
One 6" cylinder pad for H-2946D	6-1/8"	Must specify durometer: either 50, 60, or 70.	H-2946DCP
One 6" cylinder pad (old style).	6-3/16"		H-2946DOCP
One 3" cylinder pad for H-2946B.	3-1/8"	i.e.: H-2946DCP60	H-2946BCP
One 4" cylinder pad for H-2946C	4-1/8"		H-2946CCP
One 6" dia. replacement ring.			H-2946DR
One 3" dia. replacement ring.			H-2946BR
One 4" dia. replacement ring.			H-2946CR

Concrete Cylinder Wraps

Used to minimize fragment scattering and reduce cleanup time after the compression test. Made of canvas nylon with Velcro fastening strips.

Description	Model
Cylinder Wrap for 4" dia. Samples.	H-2900.4
Cylinder Wrap for 6" dia. Samples.	H-2900.6



H-2965

Concrete Cylinder End Grinding Machine

- Grinds the faces of the concrete cylinder ends plane and parallel to within ASTM C617
- Usually one pass of the diamond wheel is sufficient
- Compression testing can commence immediately after grinding
- Eliminates fumes and waiting time associated with capping compound

The new H-2965 concrete cylinder grinding machine is ideally suited for use by commercial testing labs and producers involved in compressive strength testing of high-strength concrete and rock.

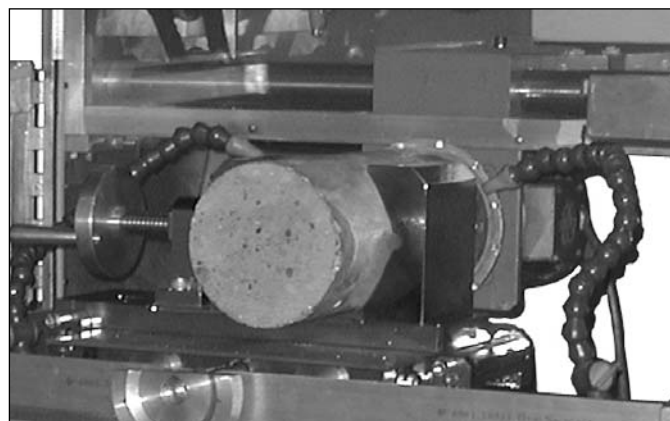
The new design incorporates plexiglass paneling and stainless steel bolts to minimize corrosion. The adjustable chuck is set to grind cylinders or cores from 4" to 6" in diameter. With the adjustment of only 2 bolts, 3" to 4" diameter specimens may also be ground.

The unit is supplied complete with a high quality, genuine diamond cutting wheel.

Rotation speed of diamond cutting wheel is variable to 6200 RPM, depending on quality of finish desired.

Specifications:

Sample Size.	Adjustable; 6x12", 4x8", 3x6" cylinders.
Cut Precision.	Plane and parallel to within 0.002".
Feed.	Removes 0.4mm of material per handwheel rotation.
Cutting Head.	Diamond wheel.
Utilities Req.	Water source required for coolant.
Dimensions.	43" L x 31" D x 42" H (1092 x 787 x 1067mm).
Shipping wt.	742 lbs. (336kg).



Description	Model
Concrete cylinder grinding machine. 120V,60Hz.	H-2965
Concrete cylinder grinding machine. 220V,50Hz.	H-2965.5F

Description, Replacement Parts	Model
Diamond cutting wheel.	H-2965.1



HCM-2500DI

HCM-2500 Series 250,000 LBF (1,112kN) Concrete Compression Testers

- Complete and ready to use—includes platens for testing 6" x 12" (152 x 305mm) cylinders using capping compound or capping pad methods.
- Wide testing range—from 2,500 to 250,000 lbf. at an accuracy of +/- 0.5% of indicated load.
- Supplied complete with safety guard doors.
- Choice of three different digital display systems to choose from to meet individual testing needs.
- Adaptable—wide range of optional accessories for testing beams, cores, cubes and block test specimens.
- Meets ASTM C39, E4; AASHTO T22.

Note: Please see page 79 for a complete listing of accessories for use on the HCM-2500 Series Concrete Compression Testers.



DI/DIR Display

These lightweight and portable compression testers are ideally suited for job site or laboratory testing applications. The unique construction of the structural steel side members and solid steel crossheads from a load frame that offers the stability needed for accurate and repeatable test results.

Testing pressure is applied to the specimen by means of a 6" (152mm) diameter power piston with a working stroke of 2-1/2" (63.5mm). The 6-1/2" (165mm) diameter, spherically seated upper platen is precision ground and hardened and incorporates concentric circles for easy specimen centering.

Pressure is applied to the system by means of two-stage hydraulic pump assembly with controls for controlled advance, rapid advance, hold and retract functions.

Three different digital display systems are available to meet your exact testing needs and budget. These include:

The economical DI and DIR Series for basic compressive strength testing, with both models featuring user-selectable engineering units of Lb, N, kN and kg, on any easy-to-read transfective display with 3/8" (9.5mm) high digits. The DIR Series has the added feature of displaying both rate of load and load simultaneously.

The mid range SD series that combines a 32 bit microprocessor with an auto-ranging data acquisition processor to produce accurate digital measurements of load, specimen stress and rate of load monitoring. The user can select lb, kN, N or Kg load units, in, mm or cm dimensional values, PSI, mPa, kPa or Kg/cm² stress values, as well as rate of load display in lbs, kN, N or Kg units of time in minutes or seconds. All of which selectable by the operator. The indicator consists of a 2-line 16 character alphanumeric backlit LCD and keypad functions. Up to 150 tests with specimen ID information can be stored in memory for output to a PC or printer.

For the ultimate in digital load indication, the top-of-the-line LX series might be the choice for you. This system utilizes a 20-character alphanumeric blue fluorescent display system and keypad. In addition to all of the capabilities of the SD series, the LX series offers the user with cylinder correction factor and beam test functions, load vs. time (X-Y) plotting to printers, supervisor lock out functions as well as data storage for up to 1,000 tests.

Description							
Display Type	Design Type	Inside Dimensions W x D x X	Outside Dimensions W x D x X	Voltage	Shipping Wt.	Model	
DI Series	Single Unit with digital and pump on right side of frame	9.25" x 19.5" (235 x 495mm) (Less Upper Platen)	27" x 12.5" x 34" (686 x 318 x 864mm)	115V, 60HZ	780 lbs. (354kg)	HCM-2600DI	
				220V, 60HZ		HCM-2600DI.2F	
				220V, 50HZ		HCM-2600DI.5F	
DIR Series			27" x 12.5" x 34" (686 x 318 x 864mm)	115V, 60HZ		HCM-2600DIR	
				220V, 60HZ		HCM-2600DIR.2F	
				220V, 50HZ		HCM-2600DIR.5F	
SD Series			30" x 12" x 34" (762 x 305 x 864mm)	115V, 60HZ		HCM-2500SD	
				220V, 60HZ		HCM-2500SD.2F	
				220V, 50HZ		HCM-2500SD.5F	
LX Series				115V, 60HZ		HCM-2500DB	
						220V, 60HZ	HCM-2500DB.2F
						220V, 50HZ	HCM-2500DB.5F

Note: HCM0020 Series, 20,000 lb. capacity, motorized beam tester is available, contact Humboldt for details.



HCM-3000SD

HCM-3000 Series 300,000 LBF (1,334kN) Concrete Compression Testers

- Complete and ready to use—includes platens for testing 6" x 12" (152 x 305mm) cylinders using capping compound or capping pad methods.
- Wide testing range—from 3,000 to 300,000 lbf. at an accuracy of +/- 0.5% of indicated load.
- Rigid Frame—with 10.5M lbs/in frame stiffness.
- Supplied complete with safety guard doors.
- Choice of three different digital display systems to choose from to meet individual testing needs.
- Adaptable—wide range of optional accessories for testing beams, cores, cubes and block test specimens.
- Meets ASTM C39, E4; AASHTO T22; ACI.

Note: Please see page 79 for a complete listing of accessories for use on the HCM-3000 Series Concrete Compression Testers.

The HCM-3000 Series Compression tester combines a rigid compact frame design with digital accuracy all at an affordable price. The rigid frame features a unique wrap around welded box design that anchors all four corners of the frame together, resulting in a solid one-piece unit that exceeds ACI frame rigidity requirements.

Testing pressure is applied to the specimen by means of a 7" (178mm) diameter power piston with a working stroke of 3" (76.2mm). The 6-1/2" (165mm) diameter, spherically seated upper platen is precision ground and hardened and incorporates concentric circles for easy specimen centering.

Pressure is applied to the system by means of two-stage hydraulic pump assembly with controls for controlled advance, rapid advance, hold and retract functions.

Two different digital display systems are available to meet your exact testing needs and budget. These include:

The SD series combines a 32 bit microprocessor with an auto-ranging data acquisition processor to produce accurate digital measurements of load, specimen stress and rate of load monitoring. The user can select lb, kN, N or Kg load units, in, mm or cm dimensional values, PSI, mPa, kPa or Kg/cm² stress values as well as rate of load display in lbs, kN, N or Kg units of time in minutes or seconds. All of which selectable by the operator.

The indicator consists of a 2-line 16 character alphanumeric backlit LCD and keypad functions. Up to 150 tests with specimen ID information can be stored in memory for output to a PC or printer.

For the ultimate in digital load indication, the top-of-the-line LX series might be the choice for you. This system utilizes a 20-character alphanumeric blue fluorescent display system and keypad. In addition to all of the capabilities of the SD series, the LX series offers the user with cylinder correction factor and beam test functions, load vs. time (X-Y) plotting to printers, supervisor lock out functions, as well as data storage for up to 1,000 tests.

Description						
Display Type	Design Type	Inside Dimensions W x D x X	Outside Dimensions W x D x X	Voltage	Shipping Wt.	Model
SD Series	Single Unit with digital and pump on right side of frame	9.5" x 18.5" (241 x 470mm) (Less Upper Platen)	29" x 11.75" x 34.375" (737 x 298 x 873mm)	115V, 60HZ	975 lbs. (442kg)	HCM-3000SD
				220V, 60HZ		HCM-3000SD.2F
				220V, 50HZ		HCM-3000SD.5F
LX Series				115V, 60HZ		HCM-3000DB
				220V, 60HZ		HCM-3000DB.2F
				220V, 50HZ		HCM-3000DB.5F

**HCM-4000SD**

HCM-4000 Series 400,000 LBF (1,780kN) Concrete Compression Testers

- Two model styles—separate console or single unit design.
- Complete and ready to use—includes platens for testing 6" x 12" (152 x 305mm) cylinders using capping compound or capping pad methods.
- Wide testing range—from 4,000 to 400,000 lbf. at an accuracy of +/- 0.5% of indicated load.
- Supplied complete with safety guard doors.
- Choice of three different digital display systems to choose from to meet individual testing needs.
- Adaptable—wide range of optional accessories for testing beams, cores, cubes and block test specimens.
- Meets ASTM C39, E4; AASHTO T22; ACI-363; BS 1610 and 1810.

Note: Please see page 79 for a complete listing of accessories for use on the HCM-4000 Series Concrete Compression Testers.

The HCM-4000 series frame uses four structural steel side members welded to solid steel crossheads. This wrap around box construction anchors all four corners of the load frame together, creating a stiff distortion resistant frame the exceeds ACI-363 stiffness requirements.

The wide opening of the frame allows users to test blocks up to 12" (305mm) wide using the block platen accessory.

Testing pressure is applied to the specimen by means of a 8" (203mm) diameter power piston with a working stroke of 2-1/2" (63.5mm). The 6-1/2" (165mm) diameter, spherically seated upper platen is precision ground and hardened and incorporates concentric circles for easy specimen centering.

Pressure is applied to the system by means of two-stage hydraulic pump assembly with controls for controlled advance, rapid advance, hold and retract functions.

Two different digital display systems are available to meet your exact testing needs and budget. These include:

The SD series that combines a 32 bit microprocessor with an auto-ranging data acquisition processor to produce accurate digital measurements of load, specimen stress and rate of load monitoring. The user can select lb, kN, N or Kg load units, in, mm or cm dimensional values, PSI, mPa, kPa or Kg/cm² stress values as well as rate of load display in lbs, kN, N or Kg units of time in minutes or seconds. All of which selectable by the operator. The indicator consists of a 2-line 16 character alphanumeric backlit LCD and keypad functions. Up to 150 tests with specimen ID information can be stored in memory for output to a PC or printer.

For the ultimate in digital load indication, the top-of-the-line LX series might be the choice for you. This system utilizes a 20-character alphanumeric blue fluorescent display system and keypad. In addition to all of the capabilities of the SD series, the LX series offers the user with cylinder correction factor and beam test functions, load vs. time (X-Y) plotting to printers, supervisor lock out functions, as well as data storage for up to 1,000 tests.

Description						
Display Type	Design Type	Inside Dimensions W x D x X	Outside Dimensions W x D x X	Voltage	Shipping Wt.	Model
SD Series	Single Unit with digital and pump on right side of frame	13.25" x 18.375" (336 x 467mm) (Less Upper Platen)	40" x 20" x 60.5" (1016 x 508 x 1537mm) (on frame stand)	115V, 60HZ	1,625 lbs. (737kg)	HCM-4000SD
				220V, 60HZ		HCM-4000SD.2F
				220V, 50HZ		HCM-4000SD.5F
LX Series				115V, 60HZ		HCM-4000DB
				220V, 60HZ		HCM-4000DB.2F
				220V, 50HZ		HCM-4000DB.5F
LX Series	Separate console and load frame		Frame: 33" x 20" x 60.5" (838 x 508 x 1537mm) (on frame stand) Console: 18" x 18" x 44.5" (457 x 457 x 1130mm)	115V, 60HZ	1,825 lbs. (828kg)	HCM-4000D
				220V, 60HZ		HCM-4000D.2F
				220V, 50HZ		HCM-4000D.5F



HCM-5000DB

HCM-5000 Series 500,000 LBF (2,224kN) Concrete Compression Testers

- Two model styles—separate console or single unit design.
- Complete and ready to use—includes platens for testing 6" x 12" (152 x 305mm) cylinders using capping compound or capping pad methods.
- Wide testing range—from 5,000 to 500,000 lbf. at an accuracy of +/- 0.5% of indicated load.
- Supplied complete with safety guard doors.
- Choice of three different digital display systems to choose from to meet individual testing needs.
- Adaptable—wide range of optional accessories for testing beams, cores, cubes and block test specimens.
- Meets ASTM C39, E4; AASHTO T22; ACI-363; BS 1610 and 1810.

The HCM-5000 series concrete compression testers were developed to meet the needs of today's modern laboratories seeking a high capacity, rigid frame compression tester for use in high volume test applications.

The load frame is manufactured from solid steel plate and completely welded. The two vertical side members are 2" (50.8mm) thick by 18" (457mm) deep with 6" (152mm) thick top and bottom crossheads.

Testing pressure is applied to the specimen by means of a 9" (229mm) diameter power piston with a working stroke of 2-1/2" (63.5mm). The 6-1/2" (165mm) diameter, spherically seated upper platen is precision ground and hardened and incorporates concentric circles for easy specimen centering.

Pressure is applied to the system by means of two-stage hydraulic pump assembly with controls for controlled advance, rapid advance, hold and retract functions.

Two different digital display systems are available to meet your exact testing needs and budget. These include:

The SD series that combines a 32 bit microprocessor with an auto-ranging data acquisition processor to produce accurate digital measurements of load, specimen stress and rate of load monitoring. The user can select lb, kN, N or Kg load units, in, mm or cm dimensional values, PSI, mPa, kPa or Kg/cm² stress values as well as rate of load display in lbs, kN, N or Kg units of time in minutes or seconds. All of which selectable by the operator. The indicator consists of a 2-line 16 character alphanumeric backlit LCD and keypad functions. Up to 150 tests with specimen ID information can be stored in memory for output to a PC or printer.

For the ultimate in digital load indication, the top-of-the-line LX series might be the choice for you. This system utilizes a 20-character alphanumeric blue fluorescent display system and keypad. In addition to all of the capabilities of the SD series, the LX series offers the user with cylinder correction factor and beam test functions, load vs. time (X-Y) plotting to printers, supervisor lock out functions as well as data storage for up to 1,000 tests.

Note: Please see page 79 for a complete listing of accessories for use on the HCM-5000 Series Concrete Compression Testers.

Description						
Display Type	Design Type	Inside Dimensions W x D x X	Outside Dimensions W x D x X	Voltage	Shipping Wt.	Model
SD Series	Single Unit with digital and pump on right side of frame	14" x 18.375" (356 x 467mm) (Less Upper Platen)	23.5" x 24" x 60.5" (597 x 610 x 1537mm) (on frame stand)	115V, 60HZ	2,500 lbs. (1,134kg)	HCM-5000SD
				220V, 60HZ		HCM-5000SD.2F
				220V, 50HZ		HCM-5000SD.5F
LX Series				115V, 60HZ		HCM-5000DB
				220V, 60HZ		HCM-5000DB.2F
				220V, 50HZ		HCM-5000DB.5F
LX Series	Separate console and load frame		Frame: 23.5" x 24" x 60.5" (597 x 610 x 1537mm) (on frame stand) Console: 18" x 18" x 44.5" (457 x 457 x 1130mm)	115V, 60HZ	2,675 lbs. (1,213kg)	HCM-5000D
				220V, 60HZ		HCM-5000D.2F
				220V, 50HZ		HCM-5000D.5F



2" (50mm) Cube Platen Sets

Used for testing 2" (50mm) cubes and 3" (76mm) diameter cylinders or cores. Platen surfaces are ground and hardened. Set consists of a spherically seated upper compression platen and a lower pedestal. Meets ASTM C109, BS812, BS1881.

Description	Model
2" (50mm) Cube test set for HCM-2500 series compression testers.	HCM-0112
2" (50mm) Cube test set for HCM-3000 series compression testers.	HCM-0114
2" (50mm) Cube test set for HCM-4000 and HCM 5000 series compression testers.	HCM-0115

Shipping wt. 56 lbs. (25kg)

6" (152mm) Cube Platen Set

Used for testing 6" (152mm) concrete cubes. Set consists of a spherically seated upper platen/spacer assembly and lower platen. Platen surfaces are ground and hardened. Meets ASTM C39.

Description	Model
6" (152mm) Cube test set for HCM-2500 series compression testers.	HCM-0113
6" (152mm) Cube test set for HCM-3000, HCM-4000 and HCM-5000 series compression testers.	HCM-0116

Shipping wt. 129 lbs. (58kg)

Masonry Block Platens

Used for testing concrete block and other masonry products up to 12" (305mm) wide. The spherical disk is precision machined to assure that the maximum amount of contact surface is used for stability under load pressure. The load bearing plate is connected to the main body by four bolts that allow for adjustment compensation for out of parallel test specimens. Meets ASTM C140, E447.

Description	Model
Block platen for use with HCM-2500 and HCM-3000 series compression testers.	HCM-0106
Block platen for use with HCM-4000 and HCM-5000 series compression testers.	HCM-0107P

Block Platen Carrier Brackets

Enables user to easily install and remove heavy upper block platen without lifting.

Description	Model
Carrier Bracket For 400,000 lb Machines.	HCM-0190SP
Carrier Bracket For 500,000 lb Machines.	HCM-0190P

Flexural Beam Test Set

Used for either center or third point beam tests for modulus of rupture determinations. The upper head assembly has drilled and tapped mounting holes for the adjustment of the bearing blocks for center or third point testing configurations. Meets ASTM C78, C293.

Description	Model
Universal flexural beam testing attachment. For use on 250,000; 400,000 and 500,000 lb machines.	HCM-0119
Universal flexural beam testing attachment. For use on 300,000 lb machines.	HCM-0117

Shipping wt. 200 lbs. (91kg)

Machine Mounting Stands

Used to raise the height of the compression machine to a more convenient height for sample placement. Please note that machine stands are supplied as standard on all machines that have a separate control console.

Description	Model
Machine mounting stand for HCM-2500 series machines	HCM-0200



H-2790

High-Low Detector (Rolling Straight Edge)

Used to measure planeness of pavement surface of highway, airport runway, bridge, etc. Requires only one operator to detect, register, and dye mark high and low areas which need to be ground 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.

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. Wheel stands for calibration, transport, and storage.
Dye.	Bright orange, 12-oz. (340 g) 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, range: 0 to 1/4" 6.4mm), high or low.

Description	Model
High-low detector, 10 ft. (3m) span. Shipping wt. 140 lbs. (64kg).	H-2790
High-low detector, 12 ft. (3.7m) span. Shipping wt. 160 lbs. (73kg).	H-2791
High-low detector, 16 ft. (4.9m) span, with reinforcing aluminum riveted to either side of frame. Shipping wt. 200 lbs. (91kg).	H-2792

Description, Replacement Parts & Accessories	Model
Bell/buzzer indicator, sounds simultaneously visual indicator, 9vDC battery powered.	H-2790B
Aerosol dye, carton of 12, 16-oz. (454g) cans.	H-2790D



H-3220

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.

- 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.

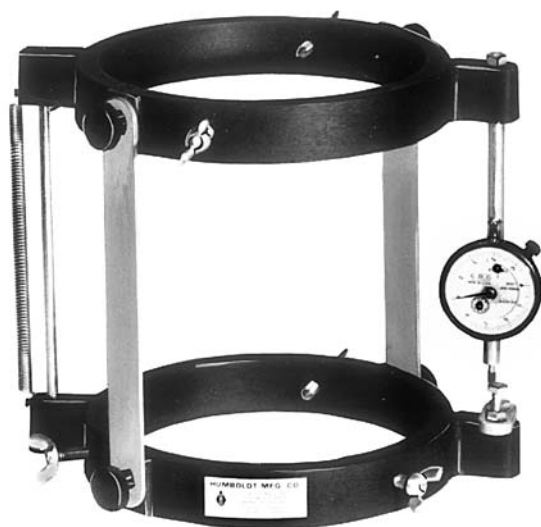
Specifications:

Main Body.	Aluminum with black finish 55" (1,397mm).
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).

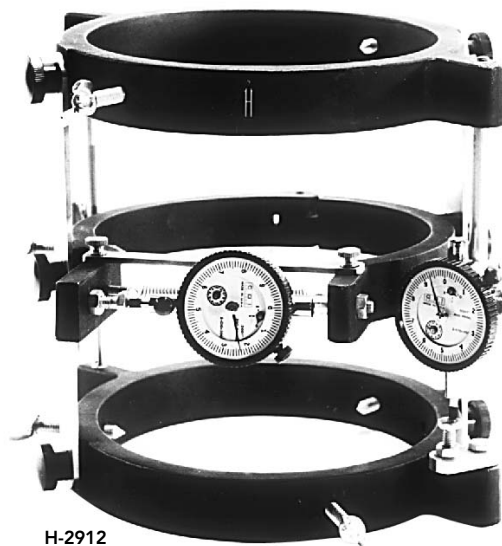
Description	Model
Benkelman Beam.	H-3220

Shipping wt. 40 lbs. (18.1kg)

Description, Replacement Parts & Accessories	Model
Dial indicator, horizontal, 0.4" range x 0.002" divisions.	H-3221H
Dial indicator, vertical, 1" range x 0.002" divisions.	H-3222
Dial indicator, vertical, 25mm range x 0.02mm divisions.	H-3222M



H-2911



H-2912

Compressometer

Apparatus is used for evaluating deformation and strain characteristics of 6" dia. x 12" L (152x305mm) concrete cylinders while undergoing compression testing. Compressometer includes two cast-aluminum alloy yokes, mounting points and central points, stainless steel control rods and a dial indicator. Indicator has a range of 0.2" (5.08mm) and minimum graduations of .0001 (.0025mm). All H-2900 Series Compressometers may be ordered with digital dial indicators, which are switchable to read in either inches or metric, and may be incorporated into data acquisition systems. Meets ASTM C469.

Description	Analog Model	Digital Model
Compressometer for use with 6" dia. x 12"L (152x305mm) concrete cylinders.	H-2911	H-2911D
Compressometer for use with 4" dia. x 8"L (101x203mm) concrete cylinders.	H-2916	H-2916D
Compressometer for use with 3" dia. x 6"L (76x152mm) concrete cylinders.	H-2918	H-2918D

Shipping wt. 22 lbs. (10kg)

Compressometer-Extensometer

Combined compressometer and extensometer for 6" dia. x 12"L (152x305mm) 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. Dial indicator gives readings of deformation. Second dial indicator is furnished for compressometer section. Unit measures change in length and in diameter. All H-2900 Series Compress-ometers may be ordered with digital dial indicators, which are switchable to read in either inches or metric, and may be incorporated into data acquisition systems. To do so, add the letter "D" after model number when ordering, i.e., H-2912D. Meets ASTM C469.

Description	Analog Model	Digital Model
Compressometer-extensometer for use with 6" dia. x 12"L (152x305mm) concrete cylinders.	H-2912	H-2912D

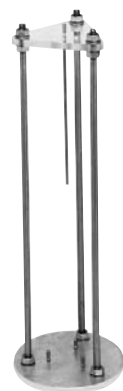
Shipping wt. 26 lbs. (1.8kg)

Description	Analog Model	Digital Model
Compressometer-extensometer for use with 4" dia. x 8"L (102x203mm) concrete cylinders.	H-2917	H-2917D
Compressometer-extensometer for use with 3" dia. x 6"L (76x152mm) concrete cylinders.	H-2919	H-2919D

Shipping wt. 17 lbs. (7.7kg)

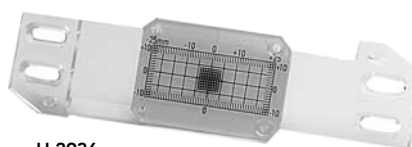


H-2938

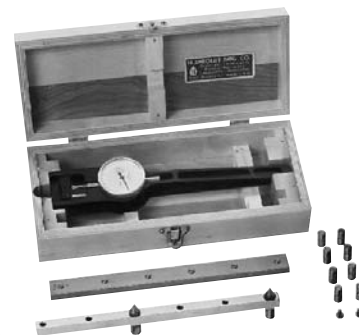


H-2939

H-2937, H-2937M



H-2936



H-3230 & H-3231

Concrete Micrometer

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.

Description	Model
Concrete micrometer.	H-2938

Core Length Measuring Device

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. Meets ASTM C174.

Description	Model
Core length measuring device.	H-2939

Shipping wt. 19 lbs. (8.6kg)

Pi Tape

Manufactured with the precise accuracy as a micrometer, periphery or Pi tape is a fast, reliable method for measuring diameter of concrete, soil and asphalt cores and cylinders. One reading provides round and out-of-round diameters within accuracy of .001" (.03mm on metric model) by means of special graduations and vernier scale. Tape is spring steel; graduations and numerals are engraved and acid etched on a ground surface. Tape has diameter range of 2 to 12" (50 to 300mm on metric model). Includes certificate of calibration.

Description	Model
Pi tape.	H-2937
Pi tape, Metric.	H-2937M

Crack Monitor Gauge

Simple and accurate device for monitoring & charting movement of cracks & joints in concrete and masonry structures. Any movement is indicated by crosshairs on a grid. Movement may be recorded by periodically copying the crosshair positions on an accompanying chart.

Description	Model
Crack monitor gauge.	H-2936

Multi-Length Strain Gauge Set

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. Meets ASTM C426.

Description	Analog Model	Digital Model
Multi-length strain gauge set.	H-3230	H-3230D
Metric multi-length strain gauge.	H-3231	H-3231D

Description, Replacement Parts & Accessories	Model
Contact points for replacement mounting in H-3230 or H-3231 gauge. Hardened tool steel; 45° angle included.	H-3230.2
Brass inserts for mounting specimen or material being measured. 3/8" (10mm) hexagon x 7/8" (22mm) long. 8-32 N.C. thread. Package of 100.	H-3230.3
Contact seats used to screw into brass inserts as a measurement position. Stainless steel, hex head, 8-32 N.C. thread	H-3230.4
Invar steel master bar with stainless steel seat inserts. For checking 2, 4, 6, 8 and 10" settings of H-3230 strain gauge.	H-3230.5
Strain gauge punch bar used to accurately locate H-3230.3 brass inserts in material. Has one stationary point and moveable point for settings of 2, 4, 6, 8 and 10 inches.	H-3230.6
Invar steel master bar with stainless steel seat inserts. For use with H-3231 metric strain gauge.	H-3230.5M
Strain gauge punch bar for use with H-3231 metric strain gauge.	H-3230.6M



H-2975



H-2975NR



H-2972

Concrete Test Hammers (Original Schmidt Test Hammers)

The Original Schmidt Concrete Test Hammer is the most frequently used device and method for non-destructive strength testing of concrete and structural components. The spring-driven hammer is also useful in determining when forms may be removed as well as assessing the damage done to a structure from freezing or fire.

In operation, the hammer hits the concrete at a defined energy. Its rebound is dependent on the hardness of the concrete. Through the use of the included conversion table, the rebound value can be converted to compressive strength.

The standard mechanical hammers are available in three different versions depending on your testing requirements.

The standard (Type N) hammer that displays rebound values on a mechanical sliding scale or the standard (Type NR) hammer with rebound values recorded on a strip chart. Both models are designed for testing concrete within the range of 1,500 to 8,000 psi (100 to 600 kg/cm²). Both models meet ASTM C805 specifications.

For testing thin-walled structural components with a thickness of less than 4" (100mm) or rock cores, the standard (Type L) hammer may be used. This hammer features an impact energy three times smaller than the Type N hammers.

All models include a rubbing stone, carrying case and instruction booklet with conversion charts.

Description		Model
Type N	Standard Concrete Test Hammer	H-2975
Type NR	Standard Concrete Test Hammer with chart recorder. Includes one roll of paper for recording up to 4000 impacts.	H-2975NR
Type L	Lightweight Test Hammer	H-2975L

Note: See the following page for the new Digi-Schmidt 2000 electronic concrete test hammer.

Concrete Test Hammer Replacement Parts

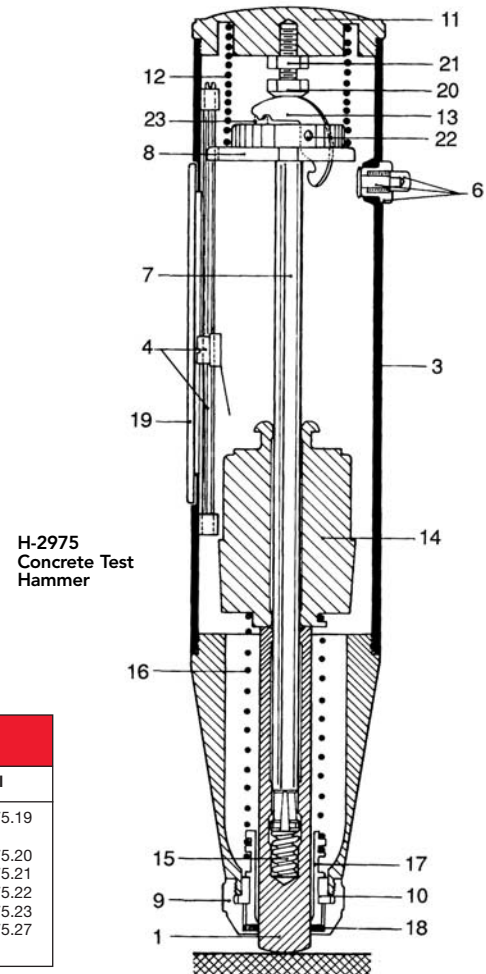
Description	Model	Description	Model	Description	Model
Impact plunger	H-2975.1	Rear cover	H-2975.11	Plexiglass window scale, printed on window	H-2975.19
Housing, complete	H-2975.3	Compression spring	H-2975.12	Trip screw	H-2975.20
Rider with guide rod	H-2975.4	Pawl	H-2975.13	Lock nut	H-2975.21
Pushbutton, complete	H-2975.6	Hammer mass	H-2975.14	Pin	H-2975.22
Hammer guide bar	H-2975.7	Retaining spring	H-2975.15	Pawl spring	H-2975.23
Disk	H-2975.8	Impact spring	H-2975.16	Replacement rubbing stone	H-2975.27
Cap	H-2975.9	Guide sleeve	H-2975.17		
Two-part ring	H-2975.10	Felt washer	H-2975.18		

Calibration Anvil

Hardened steel anvil for calibration of H-2975 test hammer. Includes hammer guide; calibration instructions are furnished with hammers. Meets ASTM C805.

Description	Model
Calibration Anvil.	H-2972

Shipping wt. 40 lbs. (18.2kg)

H-2975
Concrete Test
Hammer



H-2976



H-2670A



H-2682

Digi-Schmidt Concrete Test Hammer

The new Digi-Schmidt Concrete Test Hammer couples the original Schmidt Hammer with rebound measuring sensors and microprocessor technology to provide an instrument designed for today's busy user. 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 128x128 pixel graphic LCD. Mean value and standard deviation for a preset number of measurements are computed and displayed. Via a menu display, the user can select hammer impact direction (up, down, horizontal, etc.) and desired engineering units (psi, MPa, kg/cm², or N/mm²) and indicates the specimen size and type (cylinders, cubes, etc.) for which strength data are to be predicted.

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 PC in Microsoft Excel format under Microsoft Windows using the included cable and software. Direct printing is possible.

Instrument measuring range is 1,450 to 10,150 psi (10-70 N/mm²) using 2.207 Nm impact energy. Accuracy is $\pm 0.2R$ with 0.5R reproducibility.

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 Meets ASTM C805 standards.

Description	Model
Digi-Schmidt Concrete Test Hammer.	H-2976
Printer Cable (Optional).	H-2976C

See Page 176 for more meters with thermocouple capabilities.

Single-Channel Maturity Meter Set

Brighter back-lit display, impact and water resistant too. Simultaneously displays concrete temperature and maturity number via inexpensive, quick-connecting type "T" thermocouple wire. Operating temperature, -20° to 60°C. Temperature readout $\pm 1^\circ\text{C}$. Rechargeable battery allows up to 2-1/2 month continuous operation. Includes thermocouple wire, spare plug and battery charger. Meets ASTM C-1074.

Description	Model
Single channel maturity meter.	H-2670A

Multi-Channel Maturity Meter Set

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°C to +60°C. Communications port allows information transfer from meter to meter, printer or computer. Includes four type "T" thermocouple wire, connectors, RS-232 communications cable and plastic carrying case. Dimensions: 8x4-3/4x3" (203x121x76mm). Meets ASTM C1074.

Description	Model
Multi-channel maturity meter set.	H-2680

Shipping wt. 7.6 lbs. (3.44kg)

Rechargeable Multi-Channel Maturity Meter

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. Meets ASTM C1074.

Description	Model
Rechargeable multi-channel maturity meter.	H-2682

Replacement Parts	Model
Thermocouple wire, 24 gauge, sold per foot.	H-2670.1
Plug for thermocouple wire.	H-2680.P
Printer.	H-2684



H-2978



H-3422



H-2995

Windsor HP Probe System

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 a new electronic measuring device for improved 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. The silver probes can be used for high performance concrete with a strength up to 17,000 psi (110 MPa) and the 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. Probes are not included and must be ordered separately. Meets ASTM C-803 and BS-1881.

Description	Model
Windsor HP Probe System.	H-2978

Probe Kits

Each certified probe kit includes 3 probes and 3 matched nickel-plated power loads. Use Silver probe kit for natural stone coarse aggregate (density greater than 125 lbs/cu ft). Order Gold probe kit for lightweight aggregate (less than 125 lbs/cu ft density), such as porous man-made aggregate and shale.

Description	Model
Silver probe kit.	H-2978.01
Gold probe kit.	H-2978.03

Moh's Scale of Hardness of Minerals

Set includes 9 specimens, from talc to Carborundum, to determine mineral hardness by scratch test. Numbered specimens are keyed to descriptions inside box cover.

Description	Model
Moh's scale of hardness of minerals.	H-3422

Moisture Measurement System (MMS)

The Moisture Measurement System (MMS) is a powerful and versatile instrument for measuring concrete floor moisture, as well as a wide range of other dampness conditions in buildings. With the included probes, the user can switch between hygrometer and moisture meter modes to gain a thorough understanding of the extent of moisture or dampness related problems within the structure. Uses of the system include:

- Identification of moisture on and below surfaces.
- Measurement of the relative humidity and temperature of air.
- Quantify wood moisture equivalent levels of materials.
- Confirm the occurrence of condensation on surfaces.

The complete system consists of the MMS instrument, a hygrometer probe, extension lead, pin-type moisture probe, two deep wall probes, direct-contact surface temperature sensor, calibration check device, carrying case, batteries and detailed instruction manual. For users who desire to imbed sensors in the floor or use the sleeve method for concrete floor moisture test applications, optional five-pack hygrometer probes and humidity sleeves are available. Meets ASTM E1907.

Description	Model
Moisture Measurement System (MMS).	H-2995

Description, Replacement Parts & Accessories	Model
Hygrometer probes. Pkg. of 5.	H-2995.1
Humidity sleeves. Pkg. of 20	H-2995.2
Extension lead for hygrometer probe.	H-2995.3
Moisture probe.	H-2995.4
Deep wall probes.	H-2995.5
Surface temperature sensor.	H-2995.6



H-2990



H-2993A



H-2980A



H-2977

Moisture Encounters Electronic Hygrometers

Non-destructive moisture detector. Portable, battery-powered unit immediately identifies moisture without scratching or drilling on relatively smooth surfaces. Unit transmits low-frequency signals calibrated to give average moisture content to 100mm depth, in 0–6% H₂O range, on clear analog dial. Powered by 9-volt battery.

Description	Model
Moisture Encounter for Concrete 5.9 x 3 x 1.3" (150x75x33mm).	H-2990
Moisture Encounter for Rising Damp, Timber, Felt Roofing, Plaster, Brick, Tiles, Paint, Varnish, Wallpaper. 6 x 3.2 x 1.2" (150 x80x30mm).	H-2991

Vapor Emission Test Kit

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. Meets ASTM E1907 and F1869 specifications.

Description	Model
Vapor emission test kit. Pack of 3 kits. For surveying areas up to 1,000 sq. ft.	H-2993A
Vapor emission test kit. Pack of 12 kits. For surveying areas up to 10,000 sq. ft.	H-2993B

Description, Accessories	Model
Portable electronic balance. 200 x 0.1g capacity.	H-4720

Micro Covermeter

The Micro Covermeter accurately determines the position and direction of reinforcement bars and the precise measurement of the concrete coverage. Two different probes are available for use with the instrument. The Maxi-Probe, which enables the instrument to measure large size bars to depths of up to 14" (360mm) and the Mini-Probe, which offers better resolution of dense bars, intersecting bars and mesh to depths of 4.7" (120mm). Accuracy of all readings is to within ± 2 mm or $\pm 5\%$ up to 75% of the maximum range. When used by an experienced operator, the sizing of bar diameters to ± 1 bar size is typical. In cases of extreme material abnormalities, errors of ± 2 bar size may occur. The instrument is powered by four "AA" size batteries and incorporates an LCD display with user selectable, English or Metric measurement modes. Probes are not included and must be ordered separately.

Description	Model
Micro Covermeter, less probes. Calibrated for English bar sizes ranging from No.2 to No. 14.	H-2980A
Micro Covermeter, less probes. Calibrated for Metric bar sizes ranging from 5mm to 40mm	H-2980B

Description, Accessories	Model
Mini-Probe. 4.7" (120mm) depth range.	H-2980.1
Maxi-Probe. 14" (360mm) depth range.	H-2980.2

Economy Rebar Locator

Rebar locator detects exact position and orientation of rebars, pre- or post-tensioned concrete cables and lost tendon splices quickly and accurately. Unit measures bar size with $\pm 1/8$ " accuracy and concrete cover with $\pm 1/8$ " accuracy. Concrete thickness may be measured in tanks, pipes and other structures where inner lining is steel and within 10" of the surface. Locates ferrous base materials embedded in concrete, masonry or wood to a depth of 10". Includes rechargeable storage battery. Operating temperature range: 23° to 113°F (-5° to 45°C). Unit weighs less than 3-1/2 lbs. (1.6kg)

Description	Model
Rebar locator. 110V. 50/60Hz.	H-2977
Rebar locator. 240V. 50/60Hz.	H-2977.4F



H-2853A

Pundit Pulse Velocity Test System

The Pundit system is primarily used for quality control testing and inspection of concrete structures. The system is ideal for checking concrete uniformity, cavities, cracks, fire or frost defects, as well as strength determinations.

In operation, the instrument measures the speed of which an ultrasonic pulse passes through the material. By taking a series of readings, the operator can then determine if any imperfections are present.

The system can be operated from both AC and battery power and is supplied complete with two 54 kHz transducers with two 12 ft. (3.6m) cables, calibration bar, contact paste, manual and carrying case. Meets ASTM C597, AASHTO TP37 and BS 1881, Part 203. Transducers with other frequencies and longer length cables are available for special test applications. Contact Humboldt for details.

Specifications:

Display:	4-digit LCD.
Ranges:	0.1 to 999.9 microseconds and 1 to 9999 microseconds.
Accuracy:	±0.1 microsecond.
Pulse Repetition Rate:	10 or 100 pulses per second, switch selectable.
Power:	110-240V AC and rechargeable NiCad battery.
Meter Dimensions:	7.3 x 6.3 x 5.1" (186x160x130mm).
Shipping wt.:	17 lbs. (7.8kg).

Description	Model
Pundit pulse velocity test system, 110V.	H-2853A
Pundit pulse velocity test system, 240V.	H-2853A.4F



H-2853B

Pundit Plus Ultrasonic Pulse Velocity Test System

The Pundit Plus is the new generation, pulse velocity test system that features the latest in microprocessor technology for today's increasing demands for accuracy, reliability and ease of operation. For added convenience, the new system incorporates a transducer-mounted switch for ease in recording of readings and built-in memory to store up to 100 readings.

A standard RS-232C port allows the user to download the stored information using Windows '95 or '98' HyperTerminal for exporting into compatible spreadsheet applications. Menu-driven options permit the user to display transit time, velocity, limits or elastic modulus in either English or Metric units.

The complete kit includes the instrument in a nylon holder, AC power supply and power cord, two 54 kHz transducers, two 12 ft. (3.7m) cables, coupling agent, operating manual and heavy-duty aluminum carrying case. Meets ASTM C597, AASHTO TP37 and BS 1881, Part 203. Transducers with other frequencies and longer length cables are available for special test applications. Contact Humboldt for details.

Specifications:

Display:	128x128 dot backlit LCD.
Velocity Measurements:	1 to 9999 ft/s or m/s at a accuracy of ±1 ft/s or m/s.
Transit Time Measurements:	1 to 9999 microseconds using either 0.1 or 1 microsecond range at an accuracy of ±1 microsecond.
Elastic Modulus Measurements:	up to 999.9 GN/m ² at an accuracy of ±0.1 GN/m ² .
Outputs:	RS-232C and Scope.
Power:	110-240V AC and rechargeable NiMH battery.
Meter Dimensions:	9.8 x 6.3 x 3.9" (250x160x100mm).
Shipping wt.:	18 lbs. (8.2kg).

Description	Model
Pundit Plus ultrasonic pulse velocity test system, 110V.	H-2853B
Pundit Plus ultrasonic pulse velocity test system, 240V.	H-2853B.4F



H-2870



H-2872

H-2874,
H-2874T

Vu-Con Impact Echo System

The Vu-Con system provides the engineer with the sturdiest, most reliable system available for impact echo analysis.

The system incorporates the latest in microcomputer technology and features an easy-to-view 3.5" by 4.5" (90 x 115mm) graphic display screen that is engineered for easy viewing in bright daylight conditions.

Test data can be analyzed directly on the job site or stored in memory with date and time stamps for analysis later. All stored test data can be easily uploaded to a PC via the RS-232 communications port and Windows compatible OC software.

The built-in menu system has the provisions for determining all the parameters for the material under test. The thickness menu allows rapid display of the frequency spectra of an impact. Peaks are automatically found and highlighted for a given test. The velocity menu, for use with the dual transducer set, facilitates determination of the stress wave speed in a given material. This allows the user to gather and analyze data quickly and easily in the field. Users can also select from multiple gain settings for various material dimensions, multiple sampling rates and an adjustment for different trigger levels to help the user produce accurate and reliable results.

The system is supplied complete with broad band active transducers, impactor set, transducer spacer, and PC software and battery charger. Meets ASTM C1383.

Description	Model
Vu-Con Impact Echo System.	H-2870

CorMap Rebar Corrosion Mapping System

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 sulphate reservoir, copper sulphate, 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. Meets ASTM C876.

Description	Model
CorMap Rebar Corrosion Mapping System.	H-2872

Description	Model
Copper Sulphate, 8.5oz. (400ml) Container.	H-2872.1

IQT Temperature Logging System

The IQT Temperature Logger is a flexible and economical temperature monitoring system. The logger can store over eight thousand temperature readings at user selectable intervals from one minute to twenty-four hours between readings. The system uses a standard K-type thermocouple with 3 ft. (1m) length. The economical IQT software allows the user to upload the temperature data from the logger via the serial port to a PC working under the Windows environment. The data then can be imported into any spreadsheet or word processing file.

Description	Model
IQT Temperature logger, 9V battery powered.	H-2874
IQT K-Thermocouple, 3ft. (1m).	H-2874T
IQT Windows Software	H-2874S



H-3185

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 seventeen 3x4x16" (76x102x406cm) concrete specimens plus one sample simultaneously. 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 six 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 to 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, 84x34x11" (213x86x30cm) cabinet construction with 3" (76mm) insulation on all sides. The internal test compartment measures 6x26x74" (15x66x188cm). A 30-amp circuit is required for operation. Meets ASTM C666, procedure A; and AASHTO T161, procedure A. Order H3195 freeze-thaw molds separately. Includes 1 package of 60 charts and 2 pens.

Description	Model
Rapid freeze-thaw cabinet. 115V. 60 Hz. 1ph.	H-3185
Rapid freeze-thaw cabinet. 230V. 60 Hz. 1ph.	H-3185.2F
Rapid freeze-thaw cabinet. 230V. 50 Hz. 1ph.	H-3185.5F

Shipping wt. 1200 lbs. (544kg); 101 cu. ft.

Description, Replacement Parts	Model
Heating Element. Specify desired voltage, either 115V or 230V.	H-3185SH
Stainless steel sample positioning tray.	H-3185T



H-3195



H-3175

Chart Paper for Recording Thermometer

Recording chart covers 24 hours, 7-day week, with a temperature range of -20 to + 80°F in 2 div. Hours are numbered; days are marked. Easily changed charts are self-centering.

Description	Model
Recording thermometer chart paper. (please specify recorder type)	H-3185.1 Series
Pen arm replacement kit. Two per kit. (please specify recorder type)	H-3185.3 Series

Freeze-Thaw Specimen Mold

For 3x4x16" (76x102x406mm) specimens exposed to rapidly repeated freeze-thaw cycles in water or air. Mold is cold-rolled steel with detachable base plate. Meets ASTM C233, C666; AASHTO T157, T161.

Description	Model
Freeze-thaw specimen mold.	H-3195

Shipping wt. 37 lbs. (16.8kg)

Sonometer

Used to perform freeze-thaw tests in the lab for such purposes as:

- dynamic testing of concrete specimens
- assessing uniformity of field concrete
- evaluating expansion, bending and twisting of: wood, metal, plastic, ceramic and other materials
- measuring changes in relative frequency that occur as concrete deteriorates after freezing and thawing cycles.

Solid-state unit consists of 30W portable driver and pickup circuits. Amplitude and frequency of vibrations can be controlled in ranges of 0-25 watts; 400-12,000 cps frequency is displayed to ±2%. Built-in counter displays frequency to ±1 digit.

Pick-up circuit has cartridge mounted on adjustable metal stand with amplifier, oscilloscope and voltmeter. Driver has 6' (1.8m) plug-in shielded cables. Pick-up has 4' (1.2m) plug-in shielded cables. Chassis dimensions: 17x14x11" (432x356x279mm). Meets ASTM C215, C666.

Description	Model
Sonometer. 115V. 60Hz.	H-3175
Sonometer. 230V. 50Hz.	H-3175.5F

Shipping wt. 51 lbs. (23kg)



Moisture/Density Gauge
with Accessories



Radiation Safety Training Courses
Available On-Site, or in Scheduled Cities.
Call Humboldt: 1-800-537-4183

Note: Prior to shipment of radioactive equipment, a copy of your Radioactive or By-product Material License must be forwarded to Humboldt.

Humboldt is happy to assist you in obtaining or amending a license. For assistance with your application, call: 1-800-537-4183

Moisture/Density Gauges

Ideal for Compaction

Uses advanced microprocessor based technology to provide highly accurate measurements of moisture content and density of construction materials such as soil, aggregate and asphaltic concrete.

Automatically computes a variety of parameters, including direct readouts of wet density, dry density, moisture content, percent of moisture, percent of compaction (Proctor or Marshall), void ratio, and air voids. Reads in either English or S.I. units.

Principle of Operation

Density Measurement—Is based on the attenuation of gamma radiation due to Compton scattering and photoelectric absorption directly related to the electron density of materials. This indicates the mass density of materials with a chemical composition similar to the crust of the earth.

Moisture Content Measurement—is based on the thermalization (or slowing down) of fast neutron radiation, a function of the hydrogen content of the materials. This calibration can be altered by the user to correct for other materials containing hydrogen.

HS-5001 Series Moisture/Density Gauges

State-of-the-art design for precision accuracy and great reliability in day-to-day field conditions.

- Choice of three model series
- Choice of two measuring depth/increments

Models offer choice of either 8-inch (200mm) or 12-inch (300mm) rod lengths for measuring depth; choice of either 1-inch (25mm) or 2-inch (50mm) increments.

Unique indexing mechanism provides positive and accurate positioning of the source, yet eliminates the wear and potential damage common with most trigger-type mechanisms. Induction hardened stainless steel source rods minimize wear and deflection.

Modular design is easily serviced in the field (except the sealed radioactive source) without special tools or equipment. Designed for use in direct transmission and backscatter modes. Power supplied by 6 AA-size alkaline batteries having a life up to 2,000 hours.

Includes: transit case that meets USDOT specifications, reference standard, instruction and radiation safety manual, source and case certification, zippered accessory case, rod guide/scrapper plate, drill rod, 4-lb. hammer for driving drill rod, and rod extraction tool. Meets ASTM D2922, D3017, D2950; BS 1377, 1924, AASHTO T-310-02.

Note: See page 91 for specific models and accessories.

Radiation Safety Training Courses Available On-Site, or in Selected Cities

"Radiation Safety & Proper Gauge Operation Procedures for Users of Portable Moisture/Density Gauges" is the subject of a one-day course taught by Humboldt technical experts. The class satisfies the USNRC and Agreement-State requirements for gauges. A training certificate will be issued to students who successfully complete this course. For Schedule/Enrollment Information, Call: 1-800-537-4183

Radioactive Material Data 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



H-5001C

Moisture/Density Gauges, HS-5001B, “B” Series

“B” Series, has the ability to do thin-layer asphalt measurements, plus automatic indexing

- Direct readings in engineering units
- Inexpensive, easy-to-replace 2,000-hour batteries
- Totally contained automatic indexing
- Built-in test routines
- Special SHIFT/TRNCH key
- Thin layer asphalt measurements

Description	Model
Moisture/density gauge, measures to 8" (200mm) depth, 1" (25mm) increments.	HS-5001B081
Moisture/density gauge, measures to 8" (200mm) depth, 2" (50mm) increments.	HS-5001B082
Moisture/density gauge, measures to 12" (300mm) depth, 1" (25mm) increments.	HS-5001B121
Moisture/density gauge, measures to 12" (300mm) depth, 2" (50mm) increments.	HS-5001B122

Moisture/Density Gauge, HS-5001C, “C” Series

“C” Series has all the features of the “B” Series, plus infrared RS232 port for computer or printer connection

- Direct readings in engineering units
- Inexpensive, easy-to-replace 2,000-hour batteries
- Totally contained automatic indexing
- Built-in test routines
- Special SHIFT/TRNCH key
- Thin layer asphalt measurements
- Storage capability of up to 320 measurements
- Computer or printer interface via infrared RS232 port

Description	Model
Moisture/density gauge, measures to 8" (200mm) depth, 1" (25mm) increments.	HS-5001C081
Moisture/density gauge, measures to 8" (200mm) depth, 2" (50mm) increments.	HS-5001C082
Moisture/density gauge, measures to 12" (300mm) depth, 1" (25mm) increments.	HS-5001C121
Moisture/density gauge, measures to 12" (300mm) depth, 2" (50mm) increments.	HS-5001C122

Moisture/Density Gauges, HS-5001EZ, “EZ” Series

“EZ” Series, our top-of-the-line, has all the features of “B”, and “C” Series, plus easy-to-use, built-in test routines and auto features

- Menu driven
- Built-in test routines
- 4 lines x 20 alphanumeric character backlit liquid crystal display
- Real time clock and self-calibration
- Direct readings in engineering units
- Inexpensive, easy-to-replace 1,600-hour batteries
- Totally contained automatic indexing
- Thin layer asphalt measurements & trench correction
- Computer or printer interface via infrared RS232 port

Description	Model
Moisture/density gauge, measures to 8" (200mm) depth, 1" (25mm) increments.	HS-5001EZ081
Moisture/density gauge, measures to 8" (200mm) depth, 2" (50mm) increments.	HS-5001EZ082
Moisture/density gauge, measures to 12" (300mm) depth, 1" (25mm) increments.	HS-5001EZ121
Moisture/density gauge, measures to 12" (300mm) depth, 2" (50mm) increments.	HS-5001EZ122

Dimensions and Shipping Weights				
Description	inches	(mm)	lbs.	(kg)
Gauge (excluding handle).	15.75x8.66x5.5	(400x220x140)	30	(13.6)
Height (including handle), 8" (200mm) models.	18	(450)	—	—
Height (including handle), 12" (300mm) models	21.6	(550)	—	—
Reference Standard	14x7.5x3	(350x200x75)	10	(4.5)
Transit Case	31x14.5x19	(790x370x490)	28	(12.7)
Accessory Bag (weight includes contents)	19.7x9.8x4.9	(500x250x125)	18	(8.2)
Total shipping wt.			89	(40.5)

Description, Replacement Parts & Accessories	Model
Computer or printer connection via infrared RS232 port for use with HS-5001EZ and HS-5001C series.	HS-200313
Leak test kit, pkg/10.	HS-200177
Scraper Plate/Rod Guide.	HS-200127
Hammer 4 lb.; Double Faced.	HS-000176
Drill Rod.	HS-200130
Extractor Tool.	HS-200145
Tool Set (Complete).	HS-200112
Caution Radioactive Material Sign.	HS-001057
Moisture/density gauge verification of calibration device. Verifies calibration at single or multiple density points. Gauge reading may be checked by PC software for the entire construction range from 90 to 170 lb/ft ³ (1,4009 to 2,723 kg/m ³)	HS-200700
Calibrator™ PC software upgrades HS-200700 for recalibration of Moisture/Density Gauges to the required accuracy range.	HS-200702
Survey Meter for Gamma Radiation Monitoring with traceable to NIST certificate of calibration.	HS-130512C



H-4140

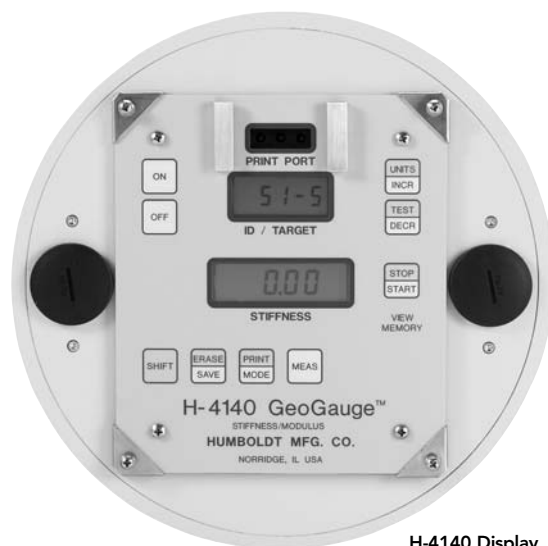
GeoGauge™ In-Place Soil Stiffness & Modulus Gauge For Compaction Evaluation

- Ensures optimum compaction quality
- In-place QC/QA of compaction & construction materials
- In-place monitoring of stabilized material's strength
- Enables Performance Specifications via in-place mechanical & material properties
- Measures in-place the layer's stiffness and material's Young's modulus
- Ensures higher quality construction for longer pavement service life
- Improves uniformity to enhance stress distribution & reduce maintenance cost
- Speeds & facilitates the compaction process: up to 20 measurements per hour
- Unaffected by construction vibration, wind or slope
- Reliable, robust, repeatable & easy to learn & use
- No special operator training required
- Alternative to CBR and other strength, deflection & index measurements
- Winner of Construction Innovation Forum's prestigious Nova Award
- Meets ASTM Standard D6758

The Humboldt GeoGauge™ is a hand portable compaction QC/QA tool. The GeoGauge™ evaluates the quality of each compacted layer without delaying or interfering with construction. Evaluates compaction non-destructively, safely and quickly even near vibrating equipment for immediate results. Enables quick correction of problem areas while equipment is still on-site. GeoGauge™ allows contractors to control the compaction process to minimize over-compaction and damage of materials. Data can be downloaded to a PC for documenting, archiving and additional analysis. GeoGauge™ is ideal for avoiding premature failures and to develop specifications directly relevant to performance.

GeoGauge™ evaluates the level of compaction via key and relevant in-place mechanical and material properties. Its dynamic operation principle simulates cyclic traffic loadings; accurately measures the material's reaction under conditions representative of actual loadings. Measuring the deflection, GeoGauge™ displays the layer's structural stiffness and the material's Young's/elastic modulus from the surface to a depth of 9 to 12" (230 to 310 mm). Stiffness (a structure's resistance to deflection) and Young's modulus (a material's resistance to deformation) are basic properties indicating how the engineered structure and material will perform. Measuring in-place directly links compaction with Performance Specifications. Patent Pending.

Note: For additional information and to download reports, go to the GeoGauge web page link on Humboldt's website at: www.humboldtmg.com



H-4140 Display

Along with in-process QC/QA for subgrade and base compaction, key applications include:

- Monitor and quantify the strength of lime, cement, fly-ash and polymer stabilized materials as the material cures to facilitate construction.
- Control and improve uniformity within each layer for lower maintenance cost and longer life.
- Duplicate stiffness properties of trench and utility backfills with surrounding undisturbed materials to improve durability.
- Assess and confirm the quality and uniformity of bases to reduce asphalt surface failures.
- Monitor for peak stiffness of the asphalt layer to reduce damage and wasteful effort.

Specifications:

Display Panel:	LCD display with membrane function keypad and infrared communication port.
Stiffness Range:	17 to 400 klbf/in (3 to 70 MN/m).
Young's Modulus Range:	4 to 90 kpsi (26 to 610 MPa).
Measurement Depth Range:	9 to 12" (230 to 310 mm) from surface.
Operating Temperature:	0°C to 58°C (ambient).
Power Source:	(6) Alkaline "D" cell 1.5-volt batteries. Sufficient for 1000 to 1,500 measurements.
Gauge Dimensions:	11" (280 mm) diameter by 10.5" (270 mm) height (less handle).
Gauge Weight:	22 lbs. (10 kg).
Shipping Weight (domestic):	Gauge with Case; 39 lbs. (17.7kg).

Description	Model
GeoGauge™, Stiffness/Modulus Gauge. With carrying case, batteries and manual.	H-4140

Description, Accessories	Model
Infrared (IR) serial interface adapter cable with spreadsheet software template, 3.5" disk (Microsoft Windows HyperTerminal required)	H-4140.12
Verifier Mass, 10kg	H-4140.20



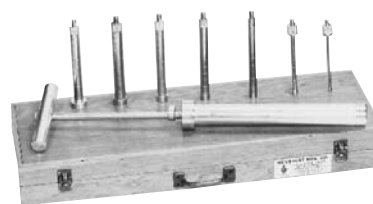
H-4200



H-4200F



H-4205



H-4139



H-4212M

Soil Penetrometer, Pocket Type

Superior to others:

- Easy-to-read as a tire gauge
- No little parts to come off & get lost
- Won't plug-up with soil & moisture to invalidate reading or rust spring

For use by field personnel to check visual classification of soils. Verifies whether excavation side walls require shoring, based on OSHA cohesive soils classifications (see chart). 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. Optional adapter foot. Should not replace laboratory testing or field analysis, or be used to produce foundation design data.

Description	Model
Pocket penetrometer.	H-4200

Penetrometer Adapter Foot

Adapter foot is recommended when testing extremely low strength cohesive soils. Foot is 1" (25mm) dia., compared to the 1/4" (6.35mm) penetrometer piston so the effective area of the piston is increased 16 times with the adapter foot. Divide by 16 to obtain correct unconfined compressive strength of material being tested when the reading in tons per square foot or kilograms per square centimeter is on the low-load side.

Description	Model
Penetrometer adapter foot.	H-4200F

Dial Pocket Penetrometer

A sophisticated pocket penetrometer offering greater capacity and sensitivity than others. Maximum value is retained on the dial until released via pushbutton. 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 tsf and kg/cm². 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 clayey soil types. 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.

Description	Model
Dial pocket penetrometer kit.	H-4205

Proctor Penetrometer Set

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. Meets ASTM D1558.

Description	Model
Proctor Penetrometer Set.	H-4139

Shipping wt. 17 lbs. (7.7kg).

Penetration Resistance Needles

Replacement interchangeable needles for H-4139 Proctor Penetrometer. Available as set or separately. Meet ASTM D1558.

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

Torvane Shear Tester Set, Metal

Torvane rapidly measures approximate shear strength of cohesive soils in the field or laboratory. May be used for place testing of test pits or trenches, ends of thin-walled tube samples or with undisturbed samples with a flat 2" (51mm) dia. surface available. Dial range of 0-1.0x0.05kg/cm² is read directly when using standard vane. Multiply readings by 0.2 and 2.5 ratiis when using large (sensitive) and small (high-capacity) vanes. Set includes driver, three vanes (standard, large and small) of different shear strength ranges and lightweight carrying case.

Description	Model
Torvane shear tester set.	H-4212M



H-4221



H-4204



H-4210



H-4211



H-4120

Geovane Soil Shear Strength Tester

The Geovane Soil Shear Strength Tester has been developed after extensive research, field-testing and trials. The Geovane is a hand-held instrument used for determination of solid shear strength and gives a result to the user in kPa, through a calibration chart.

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. A pointer stays in place when failure occurs so all you have to do is look up the reading from the face 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 40kPa. Extension rods are available to increase the depth measurement capabilities of the unit.

The Geovane is supplied complete with a 19mm vane blade, wrenches and a carrying case.

Description	Model
Geovane Soil Shear Strength Tester.	H-4221

Description, Accessories	Model
Vane, 33mm.	H-4221.1
Extension Rod, 12" (300mm) with adapter.	H-4221.2
Extension Rod, 19.7" (500mm) with adapter.	H-4221.3

Proving Ring Penetrometer

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 cms) 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.

Description	Model
Proving ring penetrometer.	H-4204

Shipping wt. 15 lbs, (6.8kg)

Static Cone Penetrometer

Used in fine-grained, soft soils at shallow foundation and pavement subgrades to depths of 30 feet (9.14m) to evaluate for:

- consistency
- level of compaction,
- bearing capacity

Unmatched for accuracy, reliability & 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 models include a 60° cone with area of 1.5 cm. max., a starter rod assembly rated at 250 lbf axial force max., and a pressure gauge.

Description	Model
Static cone penetrometer, with 2.5 ft. (.76m) starter rod.	H-4210
Static cone penetrometer, with 4 ft. (1.22m) starter rod.	H-4211

Shipping wt. 8 lb. (3.63kg)

Description, Replacement Parts & Accessories	Model
60° Cone with 3 cm ² max area.	H-4210.3
Extension rod, 4 ft. (1.22m).	H-4210E.4
Extension rod, 2.5 ft. (.76m).	H-4210E.2
60° Cone with 1.5 cm ² max area.	H-4210.1
Starter rod, 4 ft. (1.22m).	H-4210.4
Starter rod, 2.5 ft. (.76m).	H-4210.2
Replacement "O" Ring.	H-4210.9

Corps of Engineers Cone Penetrometer

- The principal instrument for evaluating soil trafficability
 - Factory calibrated dial indicator reads directly in psi
 - Manufactured to Corps of Engineers specifications
- 30 degree cone with 1/2 sq. in. base area, 150 lb capacity proving ring, dial indicator calibrated direct 0-300psi in 5psi increments, extension rod 5/8", (15.8mm) dia x 19" (483mm), plus handle.

Description	Model
Corps of Engineers cone penetrometer.	H-4120

Shipping wt. 15 lbs. (6.8kg)



H-4218A

Dual-Mass Dynamic Cone Penetrometer

The Dual-Mass, Dynamic Cone Penetrometer (DCP) provides fast, economical, accurate, in-place soil shear strength in mm/blow and an indication of different strength layers. Patented by the U.S. Army Corps of Engineers, this instrument can penetrate soils to depths of 37.5" (953mm) or up to 6ft. (1.8,) with an extension. Correlations of the rate of penetration to CBR (California Bearing Ratio) are in the User's Manual. Software included in the kit will graph depth vs. CBR and bearing values in lbs/sq. ft. The system consists of an 8 kg stainless steel two-part hammer assembly, stainless steel upper rod, stainless anvil, new segmented lower rod with flats (wrenches replace channel locks and loctite), stainless steel lower rod, reusable hardened point, disposable cone adapter, 25 disposable cones, vertical scale, hand tools, users manual with spreadsheet software template and a heavy-duty carrying case with wheels. A sliding attachment facilitates one-person operation. Meets ASTM D6951.

Description	Model
Dual-Mass dynamic cone penetrometer set.	H-4218A

Shipping wt. 57.5 lbs. (26.1kg)

Description, Replacement Parts	Model
Stainless steel top rod and handle.	H-4218.1
Stainless steel two-part hammer.	H-4218.2
Stainless steel lower rod, 34.75".	H-4218.13-34
Vertical scale, 44". Graduated in inches and centimeters.	H-4218.5
Hardened point with wrench flats.	H-4218.7
Cone adapter with wrench flats.	H-4218.8
Disposable cones. Pkg. of 25.	H-4218.9
Owners manual/diskette.	H-4218.11
Aluminum carrying case.	H-4218.12
Stainless steel lower rod and anvil, 37.5".	H-4218.13

NEW Semi-Automatic, Portable Penetrometer Electronic Recorder (SAPPER)

The SAPPER is a fast, rugged and accurate device that automates DCP with an 8 kg hammer at a rate of about one blow every two seconds. It records the in-place soil shear strength and displays penetration, blows, mm/blow and correlations to CBR and lbs/sq ft. Data is stored so that it can be uploaded to a PC at the end of the day. The DCP fits into a carriage mounted to a collapsible two-wheeled chassis made of aluminum and stainless steel. An onboard battery powers two 12-volt motors that advance and extract the DCP, as well as the controls and data recorder. Meets ASTM D6951.

Description	Model
SAPPER.	H-4217



H-4219

Heavy-Duty Dual-Mass Dynamic Cone Penetrometer

The new Humboldt Heavy-Duty, Dual-Mass Dynamic Cone Penetrometer has been engineered to improve assembly, performance and extend the service life. Designed in full compliance with the U.S. Army Corps of Engineers specifications, key design improvements include:

- Welded top shaft to anvil construction avoids thread stripping or breakage as in standard versions.
- Wrench flats machined into extension shafts, anvil and cone tips for easy assembly
- Modified hammer set screw hole design eliminates screw loosening during use or thread damage
- Engineered using a superior grade of stainless steel than original design specifications call for.
- All parts 100% inspected with hammer weights verified using a certified weighing system.
- Heavy-duty plastic carrying case with wheels and die-cut foam inserts.

The complete set consists of the dual-mass slide hammer assembly, extension shaft with hardened tip, extension shaft with disposable cone tip adapter, 100 disposable tips, vertical scale, go-no go gauge, all necessary wrenches, user manual with spreadsheet software template and carrying case.

Description	Model
Heavy-Duty, Dual-Mass Dynamic Cone Penetrometer Set.	H-4219

Description, Replacement Parts	Model
Top rod with welded anvil and handle assembly.	H-4219.1
Vertical Scale.	H-4219.2
Go-no go gauge.	H-4219.3
Hardened cone tip with wrench flats.	H-4219.4
Disposable cone tip adapter with wrench flats.	H-4219.5
Disposable cone tip, pack of 25.	H-4219.25
Disposable cone tip, pack of 50.	H-4219.50
Disposable cone tip, pack of 100.	H-4219.100



H-4202

Dynamic Cone Penetrometer Test Set

For use in nearly all types of soils. The H-4202 set for 10 ft. includes; one sliding drive hammer assembly (H-4202.1), one heat treated 60 cone penetrometer point with 1 ft. adapter rod (H-4202.3), four 2.5 ft. E drill rod extensions (H-4202.225), one auger head (H-4202.6), one auger T-handle (H-4202.4), four 36" auger extensions (H-4202.5), and one ASTM special technical publication #399 (H-4202.10).

Description	Model
Dynamic cone penetrometer test set.	H-4202

Shipping wt. 76 lbs. (36kg)

Description, Component/Replacement Parts for H-4202	Model
Sliding drive hammer assembly.	H-4202.1
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.	H-4202.3
Drive point only.	H-4202.3DP
Auger assembly. Includes auger head, two connector pins, tee handle and one extension.	H-4202.6A
Auger Tee handle.	H4202.4
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 (heat treated carbon steel). 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".	H4202.6WSS
Drive tube assembly, zinc plated steel. 3x10".	H-4202.7
Drive tube assembly, stainless steel. 3x10".	H-4202.7SS
Replacement connector pin.	H-4202.8
Replacement connector pin, stainless steel.	H-4202.8SS
ASTM special technical publication.	H-4202.9



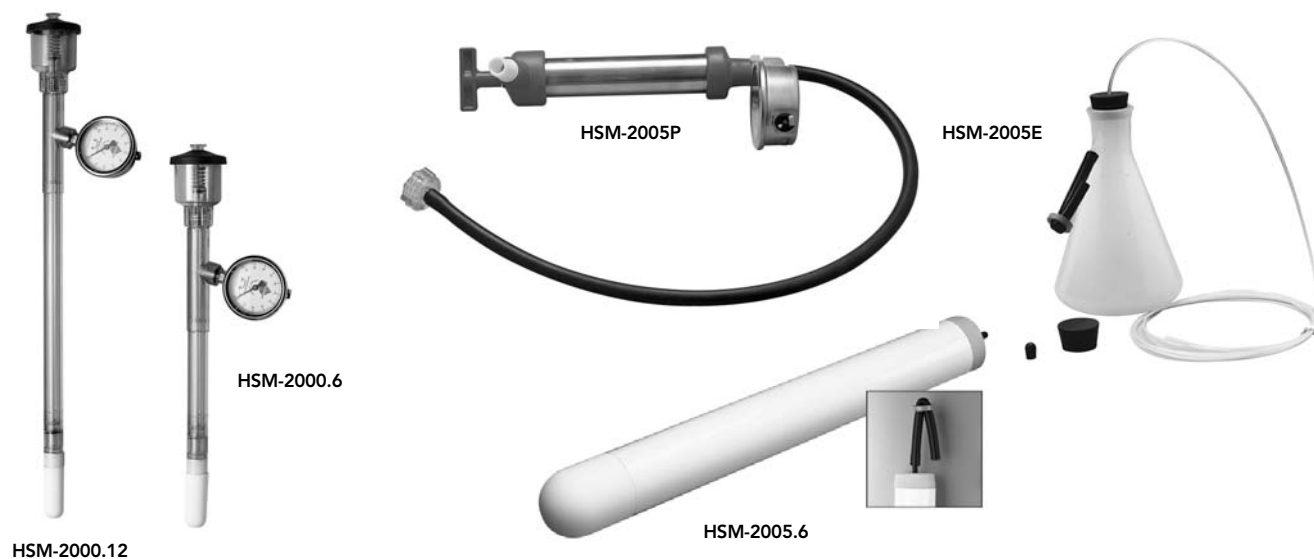
H-4223

Heavy-Duty Dynamic Cone Penetrometer

The new H-4223 series Heavy-Duty Dynamic Cone Penetrometer was developed for users requiring a more rugged and longer lasting design, yet portable for easy transport to the field. This new version consist of a 10-pound slide hammer assembly with a 24" drop, two 36" extension shafts with 6" increment markings, wrenches and a hardened-steel 60-degree cone tip. All components packed in a heavy-duty carrying case with wheels for easy transport to the job site. Through the use of higher-grade materials and manufacturing techniques, failures of shaft couplings, threads or other techniques, commonly associated with lower cost versions are virtually eliminated.

Description	Model
Heavy-duty dynamic cone penetrometer set.	H-4223

Description, Accessories and Replacement Parts	Model
Sliding hammer assembly.	H-4223.1
Extension shaft, 36" long.	H-4223.2
Hardened steel 60 degree cone tip.	H-4223.3
Auger assembly. Includes auger head, two connector pins, tee handle and one extension (Optional).	H-4202.6A



Jet Fill Tensiometers

The Jet Fill Tensiometer measures the force with which water is held in the soil by the soil particles. This force, referred to as soil suction, tension, or potential, indicates how tightly the water is bound in the soil, and how much energy must be exerted by plant roots to remove and use the water.

The Jet Fill Tensiometer features the patented Jet Fill reservoir for pushbutton convenience and minimization of soil disturbance when servicing is required. Unique modular construction allows for easy replacement of the porous ceramic cup and dial gauge and adaptation of extensions for flexibility and variety in use. The Model HSM-2000SK Service Kit, available separately, is used to refill and maintain the Tensiometer. The optional Insertion Tools are used to make a 7/8" (2.2 cm) diameter hole, which ensures good hydraulic contact between the Tensiometer and the soil.

Description	Model
Jet Fill Tensiometer, 6" (15cm) length.	HSM-2000.6
Jet Fill Tensiometer, 12" (30cm) length.	HSM-2000.12
Jet Fill Tensiometer, 18" (46cm) length.	HSM-2000.18
Jet Fill Tensiometer, 24" (61cm) length.	HSM-2000.24
Jet Fill Tensiometer, 36" (91cm) length.	HSM-2000.36
Jet Fill Tensiometer, 48" (122cm) length.	HSM-2000.48
Jet Fill Tensiometer, 60" (152cm) length.	HSM-2000.60

Description, Accessories	Model
Service Kit, available separately, is used to refill and maintain the tensiometer. Includes a vacuum hand pump without gauge; blue fluid concentrate, for improved viewing of fluid level and algae buildup; tensiometer service cap; neoprene tubing, and a special filler bottle.	HSM-2000SK
Insertion Tool, 30" (76cm) length.	HSM-2002.30
Insertion Tool, 54" (30cm) length.	HSM-2002.54
Insertion Tool, 78" (61cm) length.	HSM-2002.78

Soil Water Samplers (Lysimeters)

The Soil Water Sampler is a large-volume sampler designed for near-surface installation at depths ranging from 6 inches (15 cm) to 6 feet (1.8 m). The unit consists of a 1.9" (4.8 cm) outside diameter PVC tube, a porous ceramic cup with a 2 bar (200 kPa) air-entry value, and a stopper. Neoprene tubing is used as an access port for sample extraction and evacuation. Clamping rings slip over the folded Neoprene tubing to seal the sampler after evacuation. An extraction kit is required for sample retrieval and a vacuum pump is required to evacuate the sampler. A Model HSM-2005P Vacuum Hand Pump and Model HSM-2005E, 1000 ml Extraction Kit is recommended for routine operation.

Description	Model
Soil Water Sampler, 6" (15cm) length.	HSM-2005.6
Soil Water Sampler, 12" (30cm) length.	HSM-2005.12
Soil Water Sampler, 24" (61cm) length.	HSM-2005.24
Soil Water Sampler, 36" (91cm) length.	HSM-2005.36
Soil Water Sampler, 48" (122cm) length.	HSM-2005.48
JSoil Water Sampler, 60" (152cm) length.	HSM-2005.60
Soil Water Sampler, 72" (183cm) length.	HSM-2005.72

Description, Accessories	Model
Vacuum Test Hand Pump with Gauge.	HSM-2005P
Extraction Kit, 1000ml.	HSM-2005E



HSM-2010



HSM-2015, HSM-2016



HSM-2050

5-Bar Pressure Plate Extractor

The HSM-2010 series Pressure Plate Extractor allows analysis of the water-holding characteristics of soil samples in the 0 to 5 bar pressure range. The pressure vessel is 9" (22 cm) deep and has an inside diameter of 12" (30 cm). Up to 4 ceramic plates can be accommodated at one time, allowing for approximately 48 each 2-1/4" (5.7 cm) diameter samples to be analyzed simultaneously. The unit consists of a pressure vessel and lid, clamping bolts, O-ring seals, and outflow tube assemblies. (Note: when used with the low-pressure manifold, range only goes up to 4 bars).

Description	Model
5-bar pressure plate extractor less cells.	HSM-2010

Description, Accessories	Model
1-bar pressure plate cell.	HSM-2010.1
3-bar pressure plate cell.	HSM-2010.3
5-bar pressure plate cell.	HSM-2010.5
Soil sample retaining rings, pack of 12.	HSM-2020
Manifold, low pressure.	HSM-2025
Manifold, low to high pressure.	HSM-2030
Connecting hose, extractor to manifold.	HSM-2035
PM air compressor, 110V, 50/60HZ.	HSM-2050
PM air compressor, 230V, 50/60HZ.	HSM-2050.4F
Connecting hose, compressor to manifold.	HSM-2055

PM Air Compressor

The PM Air Compressor is used as a pressure supply for the Pressure Plate Extractor. The compressor is designed for sustained, continuous operation, and provides 295 psi operating pressure. The compressor is fully assembled and tested at the factory. The oil is then removed prior to shipment. Approximately 300 ml of SAE 75-90 gear oil (ISO 220 weight) is required (not supplied) prior to operation.

Description	Model
PM air compressor, 110V, 50/60Hz.	HSM-2050
PM air compressor, 110V, 50/60Hz.	HSM-2050.4F

Special Note: Pressure Plate Cells, Manifolds, PM Air Compressor and Connecting Hoses are required for system operation; not included, must be order separately.

15-Bar Pressure Plate Extractor

The HSM-2015 series 15-Bar Pressure Plate Extractor is used to analyze the water-holding characteristics of soil samples throughout the pressure range of interest in most agricultural as well as other research applications. The pressure vessel is 4" (10 cm) deep and has an inside diameter of 12" (30 cm). Up to 3 ceramic plates can be accommodated at one time, allowing approximately 36 2-1/4" samples to be analyzed simultaneously. The unit consists of a pressure vessel and lid, clamping bolts, O-ring seals, and outflow tube assemblies.

Description	Model
15-bar pressure plate extractor less cells.	HSM-2015

Description, Accessories	Model
PM hinge with adapter plate	HSM-2016
1-bar pressure plate cell.	HSM-2010.1
3-bar pressure plate cell.	HSM-2010.3
5-bar pressure plate cell.	HSM-2010.5
Soil sample retaining rings, pack of 12.	HSM-2020
Manifold, low to high pressure.	HSM-2030
Connecting hose, extractor to manifold.	HSM-2035
PM air compressor, 110V, 50/60HZ.	HSM-2050
PM air compressor, 230V, 50/60HZ.	HSM-2050.4F
Connecting hose, compressor to manifold.	HSM-2055

Pressure Control Manifolds

The HSM-2025 series Low-Pressure Control Manifold designed for use with the Model HSM-2010 5-Bar Pressure Plate Extractor. Output pressure can be regulated from 3 to 60 psi (0.2 to 4 bars). Double regulation is provided. Readout pressure test gauge is graduated from 0 to 60 psi (0 to 4 bars) in 0.2 psi and 0.02 bar intervals. The HSM-2030 series Manifold allows operation of the 15-Bar Pressure Plate Extractor and the 5-Bar Pressure Plate Extractor. Output pressure can be regulated from 10 to 250 psi (0.7 to 16 bars) and from 3 to 60 psi range (0.2 to 4 bars). Double regulation is provided. The 300 psi readout test gauge is graduated from 0 to 300 psi (0 to 20 bars), in 2 psi and 0.1 bar intervals. The 60-psi readout test gauge is graduated from 0.2 psi and .02 bar intervals.

Description	Model
Manifold, low pressure.	HSM-2025
Manifold, low to high pressure.	HSM-2030



HSM-2060

MiniTrase Portable TDR Kit

The MiniTrase has proven reliability around the world in harsh environments, such as tropical and arid climates under constant use. "Plug and play" STD BUS architecture, plus a wide selection of waveguides and standard or customizable lookup tables. Aluminum waterproof case, indicator lights, "quick change" batteries and optional multiplexing; this CE device is ready for work!

The MiniTrase features significantly reduced weight, size and cost. MiniTrase provides the largest signal pulse of any standard commercial TDR instrumentation used in soils or dielectric measurements. This means you get a return reflection from waveguide end points buried deep in wet, salty conditions. MiniTrase uses the proven step pulse methodology that is the expected standard for TDR measurements, a fact that is appreciated and acknowledged by discerning scientists worldwide.

With 1,200 point sampling resolution, 5,000 reading capacity and user-friendly operations, there is simply no better piece of equipment on the market than the MiniTrase. With the largest selection of inexpensive waveguides available, the user can measure large areas at multiple sites and multiple depths at the lowest possible cost per site or area covered.

The MiniTrase Kit consists of the MiniTrase, a standard waveguide connector, Palm IIIc terminal, backpack for easy portability, Makita battery plus all the necessary cables, chargers, and software to use and download data to your PC. Optional accessory items are expanded memory card, multiplexing card and multiplexing accessories, plus a variety of different waveguides.

Specifications

Measuring Range:	0-100% volumetric moisture content
Measuring Accuracy:	±2% full scale or better with the standard waveguide connector
Operating Temp:	0 to +45°C
Power Supply:	One each NiCad battery, supplied. Total capacity: 1.2-amp hr. Auxiliary power input 18 volt, 2.2 Amp AC Power Adapter for independent operation. Recharge time, 30-45 minutes. External battery input, 12 volts, for independent operation.

Connecting Ports:	BNC port —For waveguide connection RS-232 serial port— For data transfer Power Port— 8-pin DIN
MiniTrase Memory:	* Standard 256 Kb memory with storage capacity greater than 180 graphs/ 5,610 readings. * Optional 4 Mb memory board increases storage to greater than 3,900 graphs 122,880 readings. * Automatic data tagging with time and date plus user definable Tag field.
MiniTrase Electronic Particulars:	Measuring pulse amplitude 1.5 volt peak Sampling resolution, 10 picoseconds Hardware – 5-slot card cage, 3 system boards, 2 optional slots (for optional expanded memory and multiplexing)

Description	Model
MiniTrase portable TDR kit.	HSM-2060

Description, Replacement, Accessories	Model
Standard Waveguide Connector, supplied in the MiniTrase Kit, attaches to 1/4-inch diameter stainless steel waveguides that can be left in place in the soil or used as a portable probe system. Use of waveguides of different lengths from 15 to 70 cm gives an estimate of how soil water content changes with depth. If bulk soil electrical conductivity exceeds 3 dS/m, coated waveguides can be used to determine water content from the surface to 70 cm.	HSM-2062
Coated waveguides, 15cm (set of 2)	HSM-2062C.15
Coated waveguides, 30cm (set of 2)	HSM-2062C.30
Coated waveguides, 45cm (set of 2)	HSM-2062C.45
Coated waveguides, 60cm (set of 2)	HSM-2062C.60
Coated waveguides, 75cm (set of 2)	HSM-2062C.75
Waveguides, 15cm (set of 2)	HSM-2062C.15
Waveguides, 30cm (set of 2)	HSM-2062C.30
Waveguides, 45cm (set of 2)	HSM-2062C.45
Waveguides, 60cm (set of 2)	HSM-2062C.60
Waveguides, 75cm (set of 2)	HSM-2062C.75



HSM-2075.3, HSM-2070



H-4040 Series

Digital Soil Moisture Meter

Used to measure the resistance of the soil moisture block in ohms. The obtained reading is converted to a corresponding reading between 0 and 100 on an empirical scale and displayed on the meter. This empirical range covers the soil suction range of 0.2 to 10 bars. The moisture content for different types of soils corresponding to the meter reading can be determined using the calibration graphs provided.

The meter is operated by means of a standard 9v battery (not included) and has Set, Read buttons, and a thumb wheel adjustment knob on the instrument panel. The optional moisture block is connected to the meter by means of simple spring type terminals. Soil moisture blocks are not included and must be ordered separately. See below for details.

Description	Model
Digital soil moisture meter (less blocks).	HSM-2070

Soil Moisture G-Blocks

The Soil Moisture G-Blocks are an evolution in design. They provide quick response and true sensitivity to conditions where moisture remains relatively high. All Soil Moisture G-Blocks are wetted and checked for speed of response and ability to maintain overall consistency from block to block prior to shipping. The new design of electrode spacing ensures a sensitive response to changing moisture conditions below 2 bars of matric suction with overall operation range to 10 bars of matric suction. The Soil Moisture G-Blocks should provide significant improvements over any competitive blocks.

Description	Model
Soil moisture G-block, 3 ft. (0.9m) lead.	HSM-2075.3
Soil moisture G-block, 6 ft. (1.8m) lead.	HSM-2075.6
Soil moisture G-block, 15 ft. (4.6m) lead.	HSM-2075.15
Soil moisture G-block, 50 ft. (15.2m) lead.	HSM-2075.50

Water Level Indicators

- Easily accesses small openings, holes & shafts that are not always straight

Instruments for determining water levels in drainage operations, dams, reservoirs, embankments, wells, bore holes, underground cavities, or any hydrological/geological work.

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. Available in three lengths.

Water Level Indicators				
Description	Dimensions inches (mm)	Weight lbs. (kg)	Standard Model (feet)	Metric Model (centimeters)
150' (50 meters)	5Wx7.5Hx5D (127x191x127)	3 (1.36)	H-4040.150	H-4040.50M
300' (100 meters)	6.25Wx9.25Hx6D (159x235x152)	5 (2.27)	H-4040.300	H-4040.100M
500' (150 meters)	6.25Wx9.25Hx6D (159x235x152)	6 (2.72)	H-4040.500	H-4040.150M



H-4963, H-4966



H-4967

Speedy® Moisture Tester

Gives fast, accurate measurements of moisture content in powders, mixes, pastes—of soil, sand, clay or any granular material. Portable for field use. Pressure gauge is calibrated for direct reading of percentage of moisture in specimen. Includes pressure gauge, tared balance, measuring scoop, cleaning cloth, brushes and oak carrying case. Meets ASTM D4944; AASHTO T217. Separate calibration kit assures continued accuracy every time.

Speedy® Moisture Testure			
Capacity	% Range	Shipping Weight	Model
6g	0-20	14 lbs (6.4 kg)	H-4964
20g	0-20	18 lb (7.3 kg)	H-4963

Calibration Kit

Includes calibration unit, instructions, wooden carrying case.

Description	Model
Calibration kit.	H-4965

Moisture Tester Reagent

Calcium carbide reagent for Speedy® Moisture Testers. Carton of 24-1 lb. (0.5kg) cans. Shipped via motor freight only.

Description	Model
Moisture tester reagent.	H-4966

Shipping wt. 26 lbs. (11.7kg)

Speedy® 2000 Moisture Tester

The Speedy® 2000 is a new moisture testing kit that combines the original Speedy tester with an electronic balance and a new, heavy-duty plastic carrying case. The new case offers the highest level of protection in the most demanding on-site conditions. The case incorporates tailor made foam insets that secure the contents and protect them from shock damage. The case itself is very durable. The electronic balance is used to weigh the sample before placing it into the Speedy tester. It is very simple to use, accurate and repeatable. The tester is supplied complete with electronic balance, beaker, cleaning cloth, cap, washer, scoop, steel pulverizing balls and cleaning brushes. Meets ASTM D4944 and AASHTO T217.

Specifications:

Capacity.	H-4967: 20g, H-4968: 6g
Gauge.	Calibrated from 0-20% moisture based on wet weight
Accuracy.	Within 0.5% on most materials
Test Speed.	45 sec. to 3 min., depending on material being tested
Carrying Case.	Heavy-duty plastic
Balance.	Electronic; 0-7 oz (0-200g) range; battery operated
Shipping Wt.	13 lbs. (5.9kg)

Description	Model
Speedy® 2000 moisture tester, 20g capacity	H-4967
Speedy® 2000 moisture tester, 6g capacity	H-4968

HAZARDOUS WARNING:

Danger of explosion/fire may result if allowed to contact with moisture. Calcium carbide forms flammable acetylene gas when wet so must be kept sealed and dry. Provide adequate ventilation and use away from sparks and flame. U.S. shipping regulations require shipment by approved carriers. Contact Humboldt for international shipping regulations.

HM-4000 Erosion Function Apparatus

The HM-4000 Erosion Function Apparatus (EFA) was designed and built to measure the erodibility of soils and soft rocks. Applications include 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. This effective new apparatus offers several advantages over previous tests methods:

- Minimum sample disturbance;
- Measurement of erosion rate vs. shear stress;
- Measurement of critical shear stress, and Incorporation of the test results in a scour prediction method SRICOS.

The HM-4000 Erosion Function Apparatus helps prevent bridge failures by measuring soil erodibility. Used in conjunction with the new SRICOS scour prediction method, the HM-4000 can provide more accurate erodibility measurements and scour predictions.

The New SRICOS Method improves the accuracy of Pier Scour Predictions.

The HM-4000 EFA is designed for use in conjunction with the new SRICOS Method of scour prediction. In comparison with the HEC-18 equation (a standard for calculating scour predictions), SRICOS generally led to smaller calculated scour depths and compared more favorably to measured scour depths than HEC-18.

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



Specifications

Flow Rate:	0-6 meters per second
Specimen Size:	Accepts 3.0" OD x 2.875" ID (76.2 x 73 mm) Shelby tubes
Dimensions (w x d x h):	96" x 40" x 96" (2,438 x 1,016 x 2438 mm) (excluding wheels and PC)
Supplied complete with PC, SRICOS Analysis Software and Flow/Temperature Sensors.	

Description	Model
HM-4000 Erosion Function Apparatus, supplied complete with PC, SRICOS analysis software and flow/temperature sensors.	HM-4000

H-4157B



H-4203 Series



H-4188



Motorized Hydraulic Sample Ejector

Provides a very efficient and easy means for rapid ejection of samples from standard 3" (76.2mm) thin wall sample tubes. When operated in the standard vertical position, the ejector requires only a maximum height of 76" (1,930mm) when extruding samples from a 36" (914mm) long tube.

In operation, two electrically driven cylinders, working in tandem, are used to pull the tube down in 20" (508mm) increments. The tube gripper assembly was specifically designed to securely hold the thin wall tube in place and quickly release when the ejection process has completed without damaging the tube.

Through the use of optional accessories, the sample ejector can be used to extrude samples from 2" (50.8mm) or 2.5" (63.5mm) O.D. tubes. For laboratories that desire to eject samples horizontally, an optional V-shaped trough is available.

Description	Model
Motorized hydraulic sample ejector for 3" (76.2 mm) O.D. sample tubes. 115V, 60 Hz.	H-4157B
Motorized hydraulic sample ejector for 3" (76.2mm) O.D. sample tubes. 230V, 60 HZ.	H-4157B.2F
Motorized hydraulic sample ejector for 3" (76.2mm) O.D. sample tubes. 230V, 50 HZ.	H-4157B.5F

Shipping wt. 177 lbs (80kg)

Description, Replacement Parts & Accessories	Model
Trough for horizontal ejector use.	H-4157B.1
2" (50.8 mm) O.D. sample tube conversion accessories	H-4157B.2
2.5" (63.5 mm) O.D. sample tube conversion accessories	H-4157B.3

Shelby Tubes

Description, Shelby Tubes	Model
Galvanized Shelby tubes, 3" diam x 10" long	H-4210.10
Galvanized Shelby tubes, 3" diam x 18" long	H-4210.18
Galvanized Shelby tubes, 3" diam x 30" long	H-4210.30
Galvanized Shelby tubes, 3" diam x 36" long	H-4210.36

Density Drive Sampler

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. Drive head and sliding weight hammer used with separately ordered drive tubes. Drive head has shock reducing spring to guard against fatigue failure. Drive tubes have machined outside cutting edge. Essential components are zinc-plated steel. Meets ASTM D2937.

Description	Model
Density drive sampler, 3" (76.2mm) drive head. Shipping wt. 22 lbs. (10.0kg)	H-4203.3
Density drive sampler, 4" (101.6mm) drive head. Shipping wt. 23 lbs. (10.5kg)	H-4203.4

Description, Replacement Parts & Accessories	Model
Drive tube for use with H-4203 series, 3" (76.2mm) diam x 0.01 ft ³ .	H-4203DT.3
Drive tube for use with H-4203 series, 4" (101.6mm) diam x 1/30 ft ³ .	H-4203DT.4
Sample ejector for use with H-4203 series. Shipping wt. 65 lbs (29.2kg).	H-4155A

Probe Rods

Convenient hand-held tool for locating soft zones in and under compacted areas in sub-grades, footing excavations, etc. Zinc-plated shaft 36" (914mm) long x 1/2" (12.7mm) diameter.

Description	Model
Probe rod, steel	H-4188
Probe rod, fiberglass	H-4188F

Shipping wt. 5 lbs. (2.2 kg)



H-4199

Soil Grinder

Prepares soil samples to proper particle size for accurate, repeatable test results. Grinds one-pint sample in 15 seconds. Stainless steel construction. Includes a No. 10 perforated stainless plate.

Description	Model
Soil grinder. 110V, 60Hz, 1 ph AC.	H-4199
Soil grinder. 230V, 50Hz, 1ph AC.	H-4199.5F

Shipping wt. 25 lbs. (11.25kg)

Description, Replacement Parts & Accessories	Model
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

Exploded view of replacement parts is available. Call 1-800-544-7220.

Auger, Spiral Type

For use in sampling soils, auger has 1-1/2" dia. x 4" long (38mm x 152mm) spiral-type auger bit. Features graduation marks every 6" (152mm). Overall length 36" (915mm), including handle. Removable handle permits attachment of H-4251 extension for sampling beyond 36" depths. Meets ASTM D420, D1452; AASHTO T86, T202.

Description	Model
Soil Auger.	H-4250

Shipping wt. 6 lbs. (2.7kg).



H-4250

H-4251

H-4252 Series

Extension for Auger, Spiral Type

For use with H-4250 auger, 36" long (914mm) extension allows sampling at greater depths.

Description	Model
Soil Auger extension.	H-4251

Augers, Iwan-Type

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). Meets ASTM D420, D1452; AASHTO

Description	Model
2" dia. (51mm) T-handle auger.	H-4252.2
3" dia. (76mm) T-handle auger.	H-4252.3
4" dia. (102mm) T-handle auger.	H-4252.4

T86, T202.

Shipping wt. 7 lbs. (3.2kg).

Description	Model
6" dia. (152mm) T-handle auger.	H-4252.6

Shipping wt. 9 lbs. (4.1kg).

Extension for 2" Auger, Iwan-Type

For use with H-4252.2 T-handle auger only, extension is 36" (914.4mm) long and includes end coupling.

Description	Model
T-handle auger extension for 2" T-handle.	H-4252.2E

Extension for 3", 4" and 6" Auger, Iwan-Type

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.

Description	Model
Auger extension for 3", 4" and 6" T-handle.	H-4252E



H-4268



H-4362



H-4269

Soil Sampling Auger Tube Set

Soil sampling auger tube sets are helpful and functional for agricultural and other soil-testing procedures. Components are steel and plated to resist abrasive action of soil. Parts have graduation marks every 6" (152mm) to indicate sampling depth. Includes 1-1/4" (25mm) dia. by 12-1/2" (318mm) long auger, 1" (approx. 25mm) O.D. by 12-1/2" (318mm) long sampling tube, two 12" (305mm) extension rods, handle and a 13" (330mm) long carrying case.

Description	Model
Auger tube set.	H-4268

Shipping wt. 7 lbs. (3.2kg).

Soil Sampling Tube

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.

Description	Model
Soil sampling tube.	H-4362

Soil Sampling Tube Set

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) I.D. sampling tube, handle and carrying case.

Description	Model
Auger tube set.	H-4269

Auger Extensions, Quick-Connect

Description	Model
2' (609.6mm) extension. Molybdenum seamless tubing.	H-4442QC
3' (914.4mm) extension. Molybdenum seamless tubing.	H-4443QC
4' (1219mm) extension. Molybdenum seamless tubing.	H-4444QC
5' (1524mm) extension. Molybdenum seamless tubing.	H-4445QC



Regular Augers



Mud Augers



Sand Augers



Cross handle, extension, and auger sold separately (shown fully assembled)

Augers, Quick Connect, Bucket-Type

Bucket augers offer outstanding durability, allow deeper depths. Regular auger bit is designed for ordinary soil sampling. 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 stainless steel cylinder, topped with carbon steel ball.

Augers, Quick-Connect Bucket-Type					
Type	2"	2-1/4"	2-3/4"	3-1/4"	4"
Regular	H-4410QC	H-4411QC	H-4412QC	H-4413QC	H-4414QC
Mud	H-4420QC	H-4421QC	H-4422QC	H-4423QC	H-4424QC
Sand	H-4430QC	H-4431QC	H-4432QC	H-4433QC	H-4434QC

Auger Cross Handle, Padded

Description	Model
Padded chrome cross handle.	H-4447QC

Auger Cross Handle

Description	Model
Cross handle. Molybdenum seamless tubing.	H-4448QC



H-4050, H-4051

Power Soil Augers/Samplers

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).

Description	Model
5HP Power soil auger/sampler. Shipping wt. 99 lbs. (45.0kg).	H-4050
8HP Power soil auger/sampler. Shipping wt. 113 lbs. (51.3kg).	H-4051



H-4052.4



H-4053.4



H-4052.2



H-4053.2

Power Soil Sampler Augers and Extensions

Full-flighted 42" (106.7mm) long augers are marked at 6" (152mm) intervals to indicate sampling depth. Snap-on extensions provide fast, secure connection. Initial auger flights are continuous, with cutting head assembled at one end. H-4054 adapter required to adapt screw-on extensions to earth drill. See chart for details on models.

Replacement Point

For H-4052.4 and H-4052.6 augers. Specify diameter.

Description	Model
Replacement point.	H-4055

Replacement Blade

For H-4052.4 and H-4052.6 augers. Specify diameter.

Description	Model
Replacement blade.	H-4056

42" Length Augers

Diameter		Type Auger	Ship. Wt.		Model
in.	mm.		lbs.	kg.	
1-1/2	38	Screw on; requires H-4054 adapter for earth drill extension	6-1/2	3.0	H-4052.1
2	51	Screw on; requires H-4054 adapter for earth drill extension	8-1/2	3.9	H-4052.2
3	76	Screw on; requires H-4054 adapter	13	5.9	H-4052.3
4	102	Snap on	18	8.2	H-4052.4
6	152	Snap on	22	10	H-4052.6

36" Length Extensions

Diameter		Type Extension	Ship. Wt.		Model
in.	mm.		lbs.	kg.	
1-1/2	38	Screw on	6	2.3	H-4053.1
2	51	Screw on	8	3.6	H-4053.2
3	76	Screw on	12	5.4	H-4053.3
4	102	Snap on	16	7.2	H-4053.4
6	152	Snap on	21	9.1	H-4053.6

Adapter required to connect screw-on augers and/or screw-on extensions to power auger. Order separately.

H-4054



H-4382

Microprocessor-Based Portable pH Meter

The easy-to-use H-4382 series portable pH meter offers much of the same features found in many costly top-of-the-line bench-type meters. With high speed and accuracy, the meter measures pH, ORP, ISE and temperature. pH is measured from 0.00 to 14.00 with an accuracy of ± 0.01 pH units. With the temperature probe attached, all readings are automatically compensated for temperature variations and displayed from 0.0 to 100.0°C with an accuracy of $\pm 0.4^\circ\text{C}$. The meter also features automatic two-point calibration to three memorized buffers (pH 4.01, 7.01 and 10.1). The pH meter is supplied complete with a double junction pH electrode, temperature probe and a 9v battery. For users requiring a more rugged instrument for on-site applications, the H-4384 series meter offers all of the same features as the H-4382, plus the addition of a more rugged, waterproof casing. The meter is supplied complete with a double-junction pH electrode, temperature probe, four 1.5 "AA" batteries, and a rugged carrying case.

Description	Model
Microprocessor-based portable pH meter with carrying case.	H-4382
Microprocessor-based portable pH meter with waterproof casing and rugged carrying case.	H-4384

Description, Replacement Parts & Accessories	Model
Double-junction pH electrode.	H-4382.1
Temperature probe for H-4382.	H-4382.2
Temperature probe for H-4384.	H-4384.2
Soil preparation solution. Used to moisten soil to facilitate a chemical reaction for accurate pH measurements. 460ml.	H-4360A.1
pH 4.01 buffer solution. 460ml.	H-4360A.4
pH 7.01 buffer solution. 460ml.	H-4360A.7
pH 10.01 buffer solution. 460ml.	H-4360A.10



H-4380A



H-4381

Pocket pH/Temperature Tester

This pocket pH tester not only displays both pH and temperature simultaneously on one multi-level display, but also features automatic calibration, stability indicator and battery level at start up. The tester is completely waterproof and will actually float if dropped into the sample that is being tested. The meter has an easily replaceable pH sensor that incorporates an extractable cloth junction for longer service life. All readings are automatically compensated for temperature variations and have an accuracy of ± 0.1 for pH and $\pm 1.0^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$) for temperature.

Description	Model
Pocket pH/temperature tester.	H-4380A

Description, Replacement Parts	Model
Replacement electrode.	H-4380A.1

Checker pH Tester

At the cost of a few rolls of pH litmus paper, the Checker series pH Tester offers users with fast and accurate readings on a large LCD display. The meter will measure pH from 0.00 to 14.00 with an accuracy of ± 0.2 pH units. The tester features manual two-point calibration through trimmers and has an easily replaceable electrode. The meter uses two 1.4V watch-type batteries and will last for approximately 3000 hours of continuous use.

Description	Model
Checker pH tester.	H-4381

Description, Replacement Parts & Accessories	Model
Replacement electrode with screw connector.	H-4381.1
pH 4.01 buffer solution. 460ml.	H-4360A.4
pH 7.01 buffer solution. 460ml.	H-4360A.7
pH 10.01 buffer solution. 460ml.	H-4360A.10



Plastic Limit Set

Includes all apparatus recommended to perform plastic limit test in accordance with specifications. Set includes one each (except as noted) of items in chart below. All components are also available as replacement parts. Meets ASTM D4318; AASHTO T90.

Description	Model
Plastic limit set.	H-4253

Shipping wt. 11 lbs. (5kg).

Description, Replacement Parts & Accessories	Model
Plastic plate, 12x12x3/8" thick.	H-4253.1
Mixing dish.	H-4930.250
Spatula.	H-4906
Graduated cylinder (25ml).	H-4915.025
Sample cans, (48 in set).	H-1350.3A

Plastic Limit Plate

12x12x3/8"-thick (305x305x9.5mm) glass plate with ground finish on one side and seamed edges. Meets ASTM D4318; AASHTO T90.

Description	Model
Plastic limit plate.	H-4253.1

Plastic Limit Roller

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). Meets ASTM D4318; AASHTO T90, TX DOT 105-E.

Description	Model
Plastic limit roller.	H-4262
Extra adhesive paper for contact surfaces, pad of 50 sheets.	H-4262P



Liquid Limit Test Set

Apparatus recommended to perform liquid limit test in accordance with specifications. Set includes one each (except as noted) of items in chart below. All components are also available as replacement parts. Meets ASTM D4318; AASHTO T89.

Description	Model
Liquid limit test set.	H-4234

Shipping wt. 13 lbs. (28.6kg)

Description, Replacement Parts & Accessories	Model
ASTM Liquid limit machine.	H-4230
Mixing dish.	H-4930.250
Spatula.	H-4906
Graduated cylinder (25ml).	H-4915.025
Sample cans, 2.5oz., 48 in set.	H-1350.3A

Shrinkage Limit Set

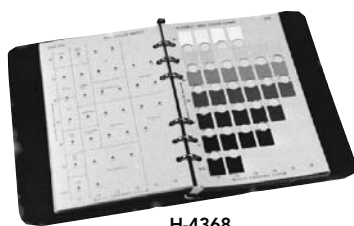
Apparatus recommended to perform shrinkage limit test in accordance with specifications. Set includes one each of items in chart below. All components are also available as replacement parts. Meets ASTM D427; AASHTO T92.

Description	Model
Shrinkage limit set.	H-4254

Description, Replacement Parts & Accessories	Model
Mixing dish.	H-4930.250
Monel shrinkage dish.	H-4256
Crystallizing dish.	H-4254C
Shrinkage prong plate.	H-4255
Graduated cylinder (25ml).	H-4915.025

Optional Equipment for Shrinkage Limit Test

Description, Optional Accessories	Model
Instrument grade mercury, 1 lb. (0.5kg) bottle.	H-3632
Ground steel straightedge with beveled edge.	H-4144
Triple beam balance, 2610g total capacity.	H-4603
Spatula.	H-4904



H-4368



H-4180 Series



H-4186 Series



H-4228

Soil Color Charts

Soil color is measured by comparing with color chart. Set includes nine hue charts displaying 322 colors on a neutral gray chart stock. Apertures are cut between the adjacent color chips so sample may be evaluated directly against the standard colors. Charts, diagrams and interleaves fit into a six-ring looseleaf binder. Charts are 7-1/4x4-1/4" (184x108mm), small enough for field use.

Description	Model
Standard Soil color charts with binder.	H-4368

Special Use Soil Color Charts

Tropical Soil Charts. For use with H-4368. Special charts for reddish tropical soils. Recommended for regions such as South and Central America, Africa, India, Malaysia, and similar tropical areas. Includes two charts that fit into H-4368 binder.

Sand Grading Chart. Unique chart useful to engineers, geologists, contractors, and soil scientists for uniform classification of sands.

Description	Model
Tropical soil color charts for use with H-4368.	H-4368T
Sand grading chart.	H-4369

125 lbf, 250 lbf and 350 lbf Soil Strength Classifiers

Hand-lever operated soil strength classifiers for field or lab use provide fast manual approximations of unconfined compressive strength on many soil types. 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 $\pm 1\%$ of dial capacity as held with second maximum-reading pointer.

Dial has 1 lbf divisions on outer scale, 1 kgf divisions on inner scale. Unit has cast aluminum housing. Base dimensions: 5-3/4x10-1/4" (146x260mm), drilled for optional bench mounting. Available in 125, 250 or 350 lbf capacity. Calibration spring confirms proper operation; order separately.

Description	Model
Soil strength classifier, 125 lbf/55 kgf capacity.	H-4180.125
Soil strength classifier, 250 lbf/110 kgf capacity.	H-4180.250
Soil strength classifier, 350 lbf/160 kgf capacity.	H-4180.350
Calibration spring 350 lbf/160 kgf capacity. (Shipping wt. < 5lbs.)	H-4180S

Shipping wt. 18 lbs. (8.2kg)

125 lbf, 250 lbf and 350 lbf Soil Strength Classifiers with Hand-Wheel Loading

The new H4186 Series Classifiers are identical in specification to the H-4180 Series, except for the loading mechanism. This new unit features a geared hand-wheel loading system. This unique system provides a more uniform rate of loading capabilities and easier loading and recording of the peak value by a single operator.

Description	Model
Soil strength classifier with hand-wheel, 125 lbf/55 kgf capacity.	H-4186.125
Soil strength classifier with hand-wheel, 250 lbf/110 kgf capacity.	H-4186.250
Soil strength classifier with hand-wheel, 350 lbf/160 kgf capacity.	H-4186.350
Calibration spring 350 lbf/160 kgf capacity. (Shipping wt. < 5lbs.)	H-4180S

ASTM Liquid Limit Machine

For determining liquid limit of soil. 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. Meets ASTM D4318; AASHTO T89.

Description, Replacement Parts & Accessories	Model
ASTM Liquid limit machine.	H-4230

Shipping wt. 8 lbs. (3.6kg)

Liquid Limit Machine with Counter

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. Meets ASTM D4318; AASHTO T89.

Description	Model
Liquid limit machine with counter.	H-4228

Shipping wt. 9 lbs. (4.1kg)



H-4226



H-4232, H-4229



H-4233



H-4236



H-4237

Motorized Liquid Limit Machine

Motorized liquid limit machine gives uniform testing with greater degree of accuracy. Unit includes H-4230 liquid limit machine, 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. Meets ASTM D4318; AASHTO T89.

Description	Model
Motorized liquid limit machine. 110V, 60Hz, 0.65amps, 1ph AC.	H-4226
Motorized liquid limit machine with H-1042 transformer. 220V, 50Hz.	H-4226.5F

Shipping wt. 14 lbs. (6.4kg)

Liquid Limit Grooving Tools

Description	Model
Grooving tool (metal).	H-4232
ASTM Grooving tool (metal) and gauge block.	H-4229
ASTM Plastic Grooving tools. Pkg. of 10.	H-4229P

Replacement Liquid Limit Cups

Brass cup with screws, as furnished with H-4226, H-4228 and H-4230.

Description	Model
Brass cup.	H-4231
Brass cup mounted on cam follower.	H-4231.1
Stainless steel liquid limit cup.	H-4231.2

Resiliency Tester

Use to test resiliency of hard rubber base of liquid limit machines, which should be done at 90-day intervals to insure base is in compliance with ASTM standard. Device consists of a clear acrylic plastic 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. Meets ASTM D4318.

Description	Model
Resiliency tester for hard rubber base of liquid limit machines.	H-4233
Replacement base for all Humboldt liquid limit machines, hard rubber. Meets ASTM D4318	H-4230.1

Cone Penetrometer/Method for Measuring Liquid Limit

The Cone Penetrometer test method for Liquid Limit is based on the relationship between the moisture content and the penetration of the cone into the soil sample. The apparatus consists of a cast aluminum base, 150mm diameter dial with 0.1mm subdivisions, calibrated cursor, automatic zeroing device, release button, micrometric displacement device, penetration test cone and two sample brass cups. The optional semi-automatic version incorporates a built-in 5 second timer for greater uniformity in test results.

Description	Model
Cone penetrometer.	H-4236
Semi-automatic cone penetrometer, 110V, 60Hz.	H-4237
Semi-automatic cone penetrometer, 220-240V, 50Hz.	H-4237.5F

Description, Replacement Parts & Accessories	Model
Penetration test cone, 35mm long, 30° angle.	H-4236.1
Brass sample cup.	H-4236.2
Test gauge. Checks condition of tip.	H-4236G
Mirror. Aids in height adjustment of cone.	H-4236M



H-4257, H-4258



H-4260

H-4265,
(Items not shown to scale)

H-4266



H-4239

Soil Mortar

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 5" (127mm) dia. x 2-1/2" H (64mm). Meets ASTM D421; AASHTO T87.

Description	Model
Soil mortar.	H-4257

Soil Pestle

Rubber-tipped 8" (203mm) long pestle, made for gently grinding soils without breaking individual particles.

Description	Model
Soil pestle.	H-4258

Soil Dispersion Mixer

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: 20x6-1/2x7" (508x165x178mm). Meets ASTM D422; AASHTO T88.

Description	Model
Soil dispersion mixer. 120V. 60Hz. 1ph. AC. 125W.	H-4260
Soil dispersion mixer. 230V. 50/60Hz. 1ph. AC.	H-4260.4F

Shipping wt. 15 lbs. (6.8kg)

Description, Replacement Parts & Accessories	Model
Chrome-plated dispersion cup for H-4260 mixer.	H-4265
Stirring paddle for H-4260 mixer. Shaft threads into mixer. 3 blades, 3/4" (19mm) dia.	H-4266

Hydrometer Analysis Set

Set includes all apparatus recommended to perform hydrometer analysis test in accordance with specifications. Set consists of one each (except as noted) of items in component chart below. Meets ASTM D422; AASHTO T88.

Description	Model
Hydrometer analysis set. 115V. 60Hz. 1ph. AC.	H-4263
Hydrometer analysis set. 230V. 50/60Hz. 1ph. AC.	H-4263.4F

Shipping wt. 175 lbs. (79.4kg)

Description, Set Component Parts	Model
Soil dispersion mixer.	H-4260
Hydrometer jar bath.	H-4239
Hydrometer A, -5 to 60g.	H-4241
Hydrometer B, 0.995 to 1.038 specific gravity.	H-4242
Sodium hexametaphosphate.	H-4247
Hydrometer jars (six in set).	H-4244

Hydrometer Jar Bath

Designed to maintain a constant temperature of 20°C ±0.2°C (68°F) for particle size distribution test in accordance with ASTM and AASHTO specifications. Up to eight hydrometer jars can be stored in the bath at the same time. The bath features a stainless steel interior and shelf for corrosion resistance and long service life. The automatic high temperature safety cut-off circuit incorporated into the design prevents damage to the heater and pump system. Inside dimensions are 37-3/4"x7-3/4"x16-1/2" deep (959x197x419mm). The overall outside dimensions are 40"x10"x23" high (1,016x254x584mm). Meets ASTM D422; AASHTO T88.

Description	Model
Hydrometer jar bath. 110V. 50/60 Hz, 1ph.	H-4239
Hydrometer jar bath. 220V. 50/60 Hz, 1ph.	H-4239.4F

Shipping wt. 155 lbs. (70kg)

H-4241, H-4242, H-4244



H-3386, H-3387, H-3385

Soil Hydrometer A

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. Calibrated for use at 68°F (20°C). Graduated in grams of soil per liter from -5 to 60g in 1° divisions. Has ASTM/AASHTO scale 152 H. Total length: 11" (280mm). Meets ASTM D422; AASHTO T88.

Description	Model
Hydrometer A.	H-4241

Soil Hydrometer B

Same as H-4241 with graduations 0.995 to 1.038 specific gravity by 0.001° divisions. Has ASTM/AASHTO scale 151 H.

Description	Model
Hydrometer B.	H-4242

Hydrometer Jar

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" O.D. (64mm). Base is 4-1/3" (107mm).

Description	Model
Hydrometer jar.	H-4244

Description, Accessories	Model
Rubber stopper.	H-4244RS

Specific Gravity Bottles (Pycnometer)

Adjusted bottle for commercial routine 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. Meets ASTM D854; AASHTO T100.

Description	Model
25ml Specific gravity bottles (pycnometer).	H-3385
50ml Specific gravity bottles (pycnometer).	H-3386
100ml Specific gravity bottles (pycnometer).	H-3387

Sodium Hexametaphosphate

Dispersing agent used in combination with gradation analysis of soils. Meets ASTM D422; AASHTO T88.

Description	Model
Sodium hexametaphosphate, 1 lb. (0.5kg) package.	H-4247
Sodium hexametaphosphate, 10 lb. (4.5kg) package.	H-4247.10

Thermometers

Description	Model
Thermometer for use with H-4239 bath jar, -30 to 120°F, 1° div.	H-2611
Thermometer for use with H-4239 bath jar, -20 to 110°C, 1° div.	H-2614



H-4374



H-4378



H-4340

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 Shaker with Dual Electronic Timer

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 operations delivers an 8" (203mm) stroke at a speed of 175 ± 2 strokes per minute. Dimensions: 12x24x24"H (31x61x61cm). Meets ASTM D2419; AASHTO T176.

Description	Model
Sand equivalent shaker with dual electronic timer. 115V, 60Hz, 6.8amps, 1ph AC.	H-4374
Sand equivalent shaker with dual electronic timer. 230V, 50Hz, 3.6amps, 1ph AC.	H-4374.5F

Shipping wt. 80 lbs. (36.3kg)

Manually Operated Sand Equivalent Shaker

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: 21x6-1/2x26-3/8" (53x17x67cm). Meets ASTM D2419; AASHTO T176.

Description	Model
Manually operated sand equivalent shaker.	H-4378

Shipping wt. 49 lbs. (22.3kg)

Sand Equivalent Test Set

Individual components may be ordered as replacement parts. Set includes one each (except as noted) of parts in list below and carrying case. Set meets ASTM D2419; AASHTO T176.

Description	Model
Sand equivalent test set, with case.	H-4340
Sand equivalent test set, without case.	H-4341

Shipping wt. 21 lbs (9.5kg)

Description, Replacement Parts & Accessories	Model
Graduated plastic measuring cylinder.	H-4340.1
Solid rubber stopper.	H-4340.5
Irrigator tube.	H-4340.2.6
Weighted foot assembly.	H-4340.3
Standard stock solution in 8 oz.(240ml) plastic bottle.	H-4342
Siphon assembly (siphon tube and hose, blow tube and hose, stopper).	H-4340.2
Clamp.	H-8630
Wide-mouth funnel.	H-3810.4
Measuring can, 2.5 oz.	H-1350.3A

Sand Equivalent Stock Solution

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.

Description	Model
8 oz. (.24L) plastic bottle of sand equivalent stock solution.	H-4342
1 gal. (3.8L) plastic jug of sand equivalent stock solution.	H-4342.2

**H-4215**

Rapid Soil Processor

Compact all-metal soil processor produces five-point moisture density relationship test results in about 5 hours. Processor also handles samples for rapid compaction or 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: 32x36x53" (813x915x1346mm).

Description	Model
Rapid soil processor. 115V. 60Hz.	H-4215
Rapid soil processor. 220V. 50/60Hz.	H-4215.4F

Shipping wt. 408 lbs. (184kg)

Description, Replacement Parts & Accessories	Model
Replacement screen for H-4215 sold before March, 1995. 13"h (330mm).	H-4215.26
Replacement screen for H-4215 sold after March, 1995. 11-7/8"h (302mm).	H-4215.32

Shipping wt. 20 lbs. (9.07kg)

**H-4165**

Harvard Miniature Compaction Apparatus

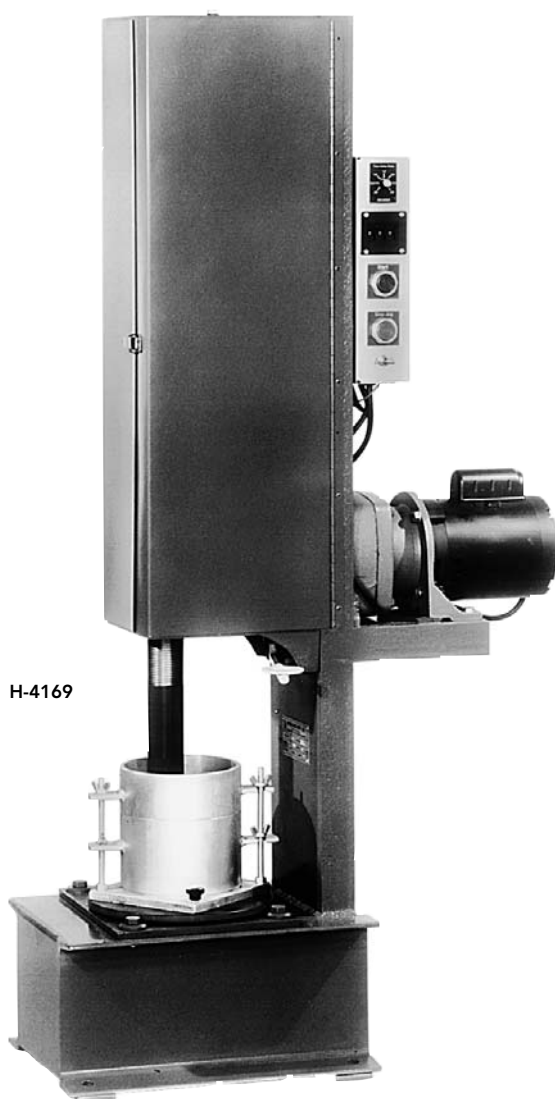
Used for moisture density tests using small samples, its compaction type duplicates the kneading action of a sheep's foot roller. Mold is 1-5/16" (33mm) I.D. by 2.816" (71mm)H. Unit is designed so collar remover and specimen ejector are consolidated into one piece.

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.

Description	Model
Harvard miniature compaction apparatus.	H-4165

Shipping wt. 28 lbs. (12.6kg).

Description, Replacement Parts & Accessories	Model
Mold assembly for H-4165.	H-4165.15
Tamper assembly for H-4165.	H-4165.16
20 lb. spring for H-4165.	H-4165.20
37.5 lb. spring for H-4165.	H-4165.375
40 lb. spring for H-4165.	H-4165.40



H-4169

Automatic Mechanical Compactor

Unit is designed to automatically compact soil samples rapidly and to produce the accuracy of hand compaction. For standard or modified compaction tests with 5.5 lb. hammer with 12" (305mm) height of drop or 10 lb. hammer with 18" (457mm) drop.

Compactor accommodates 4" (102mm) or 6" (152mm) I.D. molds. 4" (102mm) round hammer, or 6" (152mm) pie-shaped hammer compensate for sample drop during compaction. The weight is concentrated at the foot, allowing free fall of the rammer. Hammer changes are made from in front of the compactor.

Automatic counter registers number of blows per compaction and can be preset to stop the machine. A start-stop switch controls the operation independently from the counter control. Compaction mold is mounted on the round base; the circular base indexes automatically with each blow to ensure uniform sample compaction. A pie-shaped compactor foot is used with 6" (152mm) dia. molds to completely cover the soil surface.

Includes 5.5 lb (2.5kg), 10 lb. (4.5kg) circular-faced and pie-shaped hammers and 4" (102mm) and 6" (152mm) molds. Overall dimensions: 56"Hx16-1/2"Wx30"D (1422x419x762mm). Max. height in operation: 66" (1677mm). Meets ASTM D558, D559, D560, D698, D1557; AASHTO T99, T134, T135, T180.

Description	Model
Automatic mechanical compactor. 115V, 60Hz, 1ph AC.	H-4169
Automatic mechanical compactor. 230V, 50/60Hz, 1ph AC.	H-4169.4F
California type modified automatic mechanical compactor 115V, 60Hz, 1ph. Contact Humboldt for details.	H-4169.CA

Shipping wt. 432 lbs. (196.0kg)

Calibration Kit

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

Description	Model
Calibration kit.	H-4169CK
Replacement lead calibration cylinders, pkg. 100	H-4169LC

Mechanical Compaction Hammers, Kits and Replacement Parts

Type	Hammer Weight lbs. (kg)	Hammer Fall in. (mm)	Description	Meets Specifications	Shp. Wt. lbs. (kg)	Model
Mechanical Compaction Hammer Set	5.5 (2.5kg) and 10 (4.5kg)	12" (305mm) or 18" (457mm)	Set includes one 2" round 5.5-lb. hammer, one 10-lb. pie-section hammer, hammer safety device, 4" mold, 6" mold and surcharge weight to make hammers 10 lbs. 120V. 60Hz.	ASTM D558, D559, D560, D698, D1557, AASHTO T99, T134, T135, T136, T180	432 (196kg)	H-4169
			Same as H-4169 with 220V, 50/60Hz.			H-4169.4F
Mold 4" diam	N/A	N/A	4" replacement mold for H-4169 and H-4169.4F.		16 (7.25)	H-4169.4
Mold 6" diam			6" replacement mold for H-4169 and H-4169.4F.		22 (9.97)	H-4169.6
Round Hammer 4"	5.5 (2.5kg)	12"	Round replacement hammer for H-4169 and H-4169.4F.		7 (3.17)	H-4169.2415
Pie-Section Hammer 6"	10 (4.5kg)	12"	Pie-shaped replacement hammer for H-4169 and H-4169.4F.			H-4169.2416

H-4160,
H-4170

H-4173

H-4190,
H-4192,
H-4194,
H-4196

Hand Compaction Hammers

Type	Hammer Weight lbs. (kg)	Hammer Fall in. (mm)	Description	Meets Specifications	Shp. Wt. lbs. (kg)	Model
Moisture Density Hammer	5.5 (2.5kg)	12" (305mm)	Manually operated, 2" dia. circular 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.	ASTM D558, D698; AASHTO T99	12 (5.4kg)	H-4160
	10 (4.5kg)	18" (457mm)		AASHTO T180	18 (8.3kg)	H-4170
U.S. Army Corps of Engineers Compaction Hammer	5.5 (2.5kg)	12" (305mm)	With 2" dia. tamping face, hammer is guided on shaft instead of a sleeve. Length of drop is slightly adjustable. Foot assembly has recoil mechanism to reduce impact fatigue on parts. Tamping face is removable and replaceable.	EM1110-2-1907	15 (6.8kg)	H-4173
Moisture Density Hammer	4.0 (1.78kg)	12" (305mm)	Manually operated. Use with 2.8" mold H-4142 for remolded samples in permeability tests. 1.4" diam face. Guide sleeve has four vent holes in each end to release built up air pressure. Machined steel, plated for rust resistance. Resilient rubber ball bearings.	—	10 (4.5kg)	H-4181

Clegg Impact Soil Testers

An in-situ impact soil testing device used to measure "stiffness" of natural or constructed soil conditions. Easily carried and operated by one person, it offers low cost, efficiency in field or laboratory. Direct readout is given of the strength parameter.

The strength of a layer of soil up to 6" (150mm) thick (and by inference) the compaction condition of this layer is measured. A known mass, the Clegg hammer, is dropped from a fixed distance and its deceleration is measured on impacting the soil surface. Four successive trials are used to obtain the IV (impact value) which correlates directly with ASTM California Bearing Ratio, Texas Class Number, and Elastic Modulus.

Can be used to test the full range of soils and soft rocks typically encountered on flexible pavement and earthworks construction sites. Ideal for measuring peak strength, because no weighing and drying is required. Easy and quick to use, each test can be completed in less than 30 seconds by site personnel with minimal training. Offers the convenience of rapidly scanning the strength variation over a large area with as many as 250 to 500 test points in a single day.

Description	Model
Clegg impact soil tester, "Standard", 4.5kg hammer. Tests full range of soils encountered in road base surfaces, soil compaction, flexible pavements, and earthworks. Ideal for quick checking and determining variations during construction, especially when quality assurance procedures are used.	H-4190

Shipping wt. 21 lbs. (9.5kg)

Description	Model
Clegg impact soil tester, "Light", 0.5kg hammer. Tests same medium as the "Standard" H-4190, except greater sensitivity in softer conditions, or fragile materials. Meets ASTM D5874.	H-4192

Shipping wt. 12 lbs. (5.4kg)

Description	Model
Clegg impact soil tester, "Heavy", 20kg hammer. Tests lightly sealed and unsealed gravel surfaces, or pavements. Includes built-in, two-wheel cart.	H-4194

Shipping wt. 55 lbs. (24.9kg)

Description	Model
Clegg impact soil tester, "Sports Turf", 2.25kg hammer. Tests the shock attenuation characteristics, or cushioning properties of natural and man-made sports turf and recreational playing surfaces. Can also be used where soil conditions fall between "Standard" and "Light", Meets ASTM F1702.	H-4196

Shipping wt. 16 lbs. (7.3kg)



H-4141



H-4161



H-4225



H-4145, H-4146

Soil Molds

Compaction Molds and Permeameters	Layers Soil/Blows Per Layer	Dimensions (in.)	Mold Volume cu. ft.	Description	Meets Specs	Shpg. Wt. lbs. (kg)	Model No.
Standard 4" Proctor/CBR Mold	3/25	4"I.D. x 4.584"H with 2-1/2" detachable collar	1/30	Cold-rolled steel tubing, plated for rust resistance. Includes detachable base plate, studs and wing nuts.	ASTM D558; AASHTO T99	16 (7.3kg)	H-4141
CBR Solid Base Mold	3/56	6"I.D. x 7"H with 2" detachable collar	.1145	Cold-rolled steel tubing, plated for rust resistance. Collar extension and solid base plate can be clamped on either end of cylinder	—	22 (10kg)	H-4149
CBR Test Mold	5/56	6"I.D. x 7"H with 2" collar	.1145	Same as H-4149 with perforated base plate.	ASTM D1883; AASHTO T193	22 (10kg)	H-4151
Compaction Mold	5/56	6"I.D. x 6.1"H plus 2"H collar	1/10	Cold-rolled steel tubing, plated for rust resistance. Steel base plate is 8x8x1/2" thick.	—	22 (10kg)	H-4159
LBR Test Mold	5/56	6"I.D. x 6"H plus 2-1/2" detachable collar	1/13.33	Cold-rolled steel tubing, plated for rust resistance. Collar extension and perforated base plate can be clamped on either end of cylinder. LBR requires spacer, sold separately. See H-4147.	—	22 (10kg)	H-4163
Modified 6" Proctor Mold	3/56	6"I.D. x 4.584"H plus 2-3/8" H collar	1/13.33	Mold has longitudinal split and 2 quick-acting clamps. Base is 8x8x1/2". Cold-rolled steel tubing plated for rust resistance.	ASTM D698, D1557; AASHTO T99, T180	16 (7.3kg)	H-4161
Standard 6" Proctor/CBR Mold	5/56	6"I.D. x 4.584"H plus 2-3/8" H collar	1/13.33	Like H-4161 without split and clamps	—	15 (6.8kg)	H-4162
Split Moisture Density Mold	3/25	4"I.D. x 4.584"H plus 2-1/2"H detachable collar assembly	1/30	Like H-4141 with longitudinal split and clamps. Cold-rolled steel tubing plated for rust resistance.	ASTM D558; AASHTO T99	17 (7.7kg)	H-4225
2.8" Split Compaction Mold	N/A	2.8"I.D. x 4.0"H plus 2"H detachable collar	.0214	For 2.8" remolded samples for permeability testing with 2" detachable collar, with longitudinal split and clamp.	—	10 (5.5kg)	H-4142
Soil Permeameter	N/A	4"I.D. x 4.584" H	1/30	Includes 2-1/2" H collar.	—	18 (8.2kg)	H-4145
	N/A	6"I.D. x 4.584" H	1/13.33	Includes 2-3/8" H collar.	—	24 (10.9kg)	H-4146



Hand-Operated Sample Ejector

Designed for lab and field use to extract soil samples from either 4" or 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. Overall dimensions 13"Wx6"Dx27"H. (330x152x686mm).

Description	Model
Hand-operated sample ejector.	H-4155A

Shipping wt. 65 lbs. (29.5kg).

Motorized Sample Ejector

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 both standard 4" or 6" compaction molds, as well as 2" and 2.8" sample tubes. Overall dimensions excluding pump 13"Wx6"Dx29"H. (330x152x737mm).

Description	Model
Motorized sample ejector. 110-115V, 50/60 Hz.	H-4150
Motorized sample ejector. 220-230V, 50/60 Hz.	H-4150.4F

Shipping wt. 80 lbs. (36kg).

Straightedge

For striking-off samples in containers, measures or molds. Ground steel with beveled edge. Meets ASTM C185, D558, D559, D560, D698; AASHTO T137.

Description	Model
Straightedge, 8". 1/8x1-1/4x8" (3x32x203mm)	H-4144.8
Straightedge, 12". 1/8x1-1/4x12" (3x32x305mm)	H-4144
Straightedge, 16". 1/8x1-1/4x16" (3x32x406mm)	H-4144.16
Straightedge, 24". 1/8x1-1/4x24" (3x32x610mm)	H-4144.24

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 Master Loader Multi-Use Compression Tester, and/or a wide variety of other instrumentation as well—such as using load rings together with digital indicators, or using with load cells for data acquisition.

Our high quality tensile steel rings have spherical seatings suitable for all shear boxes and load frames. Each load ring shipped with a fitted dial gauge and calibration certificate, and supplied with tables listing all measurement units. 8-1/4" (210mm) high, 3/4-16UNF thread female mounting. When using linear strain devices in automated systems, linearity is a factor, but does not apply when used with tables or equations.

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). Meets ASTM E74.

Load Rings					
Description	Range and Measurement Units			Meets Spec.	Model (Analog Gauge) (Digital Gauge)
	lbf	kN	kgf		
Tensile steel load rings, 0.75% FS linearity, 0.15 % FS error, 8.20" high, 3/4-16 female mounting.	110	0.5	50	ASTM E74	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



HM-2000A

Master-Loader

Handles a variety of tests with one load frame (Marshall, CBR, Unconfined, Unconsolidated undrained triaxial). Bench-mounted unit features pre-set speed selections and accessories. Variable speed setting allows stepless adjustment from 0.002" to 2.000" per minute. Order load ring separately. Meets ASTM D1633, D1883, D2166, D1559; AASHTO T193, T208, T245; BS 1377.

Description	Model
Master Loader, 120V, 60 Hz, 1 ph AC.	HM-2000A
Master Loader, 240V, 50/60 Hz, 1 ph AC.	HM-2000A.4F

Shipping wt. 300 lbs. (660kg)

Master Loader Pre-Set Speeds

Test	Speed inches/minute	Speed mm/minute
CBR/LBR, Hveem and Soil-Cement	0.050	1.27
UC and UU for material having plasticity, on 1.4" (35.56mm) diam sample	0.028	0.71
UC and UU for material having plasticity, on 2.8" (71.12mm) diam sample	0.056	1.42
CBR (B.S.)	0.039	1.00
UU quick triaxial on 1.4" (35.56mm) diam sample for brittle material, only.	0.0085	0.22
UU quick triaxial on 2.8" (71.12mm) diam sample for brittle material, only.	0.017	0.43
Marshall stability and flow test / TSR	2.000	50.8
Variable Speed	Stepless Adjustment Range	
Other Tests	0.008–2.000"	0.20 mm–50.8 mm

Master-Loader Accessories



H-4454.100, H-1344, H-1342

H-4454.100, HM-4178,
H-4158.1, HM-2001HM-4199B, H-4454.100,
H-4158.1H-4454.100, HM-2002,
H-4158.1, HM-2001

H-4454.100, HM-2003

Marshall Test Accessories

Description	Meets ASTM Specifications	Shipping Wt. lbs.	Model
Breaking head stability mold.	D1559	22	H-1342
Flowmeter dial gauge, 1" travel, 0.0001" divisions.	D1559	—	H-1344
Load ring, 10,000lbf (50kN)	D698	5	H-4454.100

CBR/LBR, Hveem Test Accessories

Load ring, 10,000lbf (50kN)	D698	5	H-4454.100
Dial gauge, 1" travel, 0.001" divisions.	D1559	—	H-4158.1
Base Platen and strain rod for CBR and unconfined compression tests.	—	10	HM-2001
Piston for CBR test, 3" square.	D1883	8	H-4178

UU Quick Triaxial Test Accessories

Triaxial cell.	D4767	—	HM-4199B
Load rings, see page 109 for complete description.	D2850	6	H-4454 Series
Dial gauge, 1" travel, 0.0001" divisions.	D1559	—	H-4158.1

Unconfined Compression Test Accessories

Unconfined upper platen.	D2850	—	HM-2002
Base platen and strain rod for unconfined compression and CBR tests.	D2850	10	HM-2001
Dial gauge, 1" travel, 0.001" divisions.	—	—	H-4158.1
Load rings, see page 109 for complete description.	D698	6	H-4454 Series

Soil Cement Test Accessories

Upper swivel platen and lower platen	—	5	HM-2003
Load ring, 10,000lbf (50kN).	D698	5	H-4454.100

Instrumentation Test Accessories

Single-channel display.	—	5	HM-2350
Four-channel display.	—	10	HM-2320
Twin-channel display.	—	9	HM-2340
S-type load cell, 500 lbf.	E74	—	HM-2300.005
S-type load cell, 10,000 lbf.	E74	—	HM-2300.100
Strain transducer, 0.4" (10mm).	—	—	HM-2310.04
Strain transducer, 1.0" (25mm).	—	—	HM-2310.10

Other instrumentation and sizes are available. Call 1-800-537-4183 for details.



H-4156



H-4156SB



H-4172

CBR Apparatus

California Bearing Ratio (CBR) apparatus, developed from specifications of the California State Highway Department, the laboratory apparatus used in this method determines the bearing ratio of soil when it is compacted and tested in the laboratory by comparing the penetration load of the soil to that of a standard material. The method covers the evaluation of the relative quality of subgrade soils but is applicable to subbase and some base course materials. Meets ASTM D1883; AASHTO T193.

Mechanical Loading Press

A two-speed mechanical jack is used, applying a steady rate of penetration load. Press has 10,000 lbf (44.4kN). Complete apparatus includes penetration piston mounted on a calibrated proving ring with dial holder and penetration dial attached to front upright. Overall dimensions: 18x12x34" (45.8x30.5x86.4cm). Meets ASTM D1883; AASHTO T193.

Description	Model
Mechanical loading press. Shipping wt. 120 lbs. (54.4kg)	H-4156

Description, Replacement Parts & Accessories	Model
Two-speed mechanical replacement jack. Shipping wt. 40 lbs. (18kg)	H-4156J
Swivel base for mechanical jack. Shipping wt. 6 lbs. (2.7kg)	H-4156SB

Penetration Piston

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, which are used to apply penetration surcharge loads.

Description	Model
Penetration piston.	H-4178

Shipping wt. 8 lbs. (3.6kg)

CBR Set

Set includes all component parts in chart below. Components may be ordered as replacement parts. Meets ASTM D1883; AASHTO T193.

Description	Model
California bearing ratio set.	H-4152

Shipping wt. 247 lbs. (112kg)

Description, Replacement Parts	Qty. in Set	Model
Mechanical loading press.	one	H-4156
Mold.	four	H-4151
Spacer disc.	one	H-4153
Filter screens.	four	H-4154
Swell plates.	two	H-4172
Tripod attachment.	one	H-4158
Dial indicator.	one	H-4158.1
Surcharge weights.	four	H-4175
Slotted surcharge weights.	four	H-4176
Density hammer.	one	H-4170
Straight edge.	one	H-4144
Cutting edge.	one	H-4174

Swell Plates

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

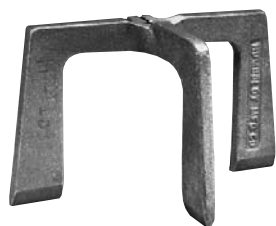
Description	Model
Swell plates.	H-4172

Shipping wt. 5 lbs. (2.3kg)

Field CBR Test Set

Used for determining CBR values in the field. Set consists of a two-speed mechanical jack, swivel base, penetration piston, extension and connector sets, bridge support with dial holder, penetration dial indicator, 2,000 lb and 5,000 lb capacity proving rings and surcharge weights. Meets ASTM D4429 specifications.

Description	Model
Field CBR test set.	H-4152F

**H-4158****H-4174****H-4175****H-4176**

Tripod Attachment

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.

Description	Model
Tripod attachment.	H-4158

Dial Indicator

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.

Description	Model
Dial indicator.	H-4158.1

Cutting Edge

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) I.D. 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.

Description	Model
Cutting edge.	H-4174

Filter Screen

100 mesh brass screen is 5-15/16" (1521mm) dia.

Description	Model
Filter screens.	H-4154

Filter Paper

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.

Description	Model
Filter Paper.	H-4154FP

Surcharge Weights

Used in the application of surcharged loads on the soils surface during soaking and penetration. Rust-resistant plated annular disc weighs 5 lbs. (2.3kg), 5-7/8" (149mm) O.D. with a 2-1/8" (54mm) I.D. hole in center.

Description	Model
Surcharge weight.	H-4175
Same except with 2-1/8" (54mm) slot.	H-4176

Shipping wt. 6 lbs. (2.7kg)

10 Lb. Field Surcharge Weight

Field surcharge weight is 10 lbs. (4.5kg). Model H-4177 is made in two parts; 5-7/8" (149mm) O.D.; 2-1/8" (54mm) I.D. and model H-4179 is a single piece, slotted design.

Description	Model
10 Lb. field surcharge weight.	H-4177
Same except slotted and 8-1/2" (216mm) dia.	H-4179

Shipping wt. 11 lbs. (5.0kg)

Spacer Disc

Disc is used as a false bottom in a cylinder mold during compaction process. Plated rust-resistant steel disc is 5-15/16" (150.8mm) dia.

Description	Model
Spacer disc, 2.416"H (61.4mm)	H-4153

Shipping wt. 18 lbs. (8.2kg)

Description	Model
Spacer disc, LBR, 1.416"H (35.96mm).	H-4147

Shipping wt. 11 lbs. (5.0kg)



H-4245



H-4246



H-4248



H-4166, H-4167

Density Apparatus

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 6-1/2" (165mm) dia. flanged opening fits the opening of the H-4246 field density plate (order separately). Meets ASTM D1556; AASHTO T191.

Description	Model
Density apparatus.	H-4245

Shipping wt. 10 lbs. (4.5kg)

2-Quart Density Apparatus

Similar to H-4245, but features 2 qt (1.89L) threaded jar and bottom cone flanged to 4-1/2" (114mm) dia. to fit opening of H-4249A field density plate (order separately).

Description	Model
2-Qt. density apparatus.	H-4249

Shipping wt. 8 lbs. (3.6kg)

Field Density Plate

Used with H-4245 density apparatus to simplify removal of soil from test mold and to act as template to control hole diameter. Cast aluminum alloy. Size 12x12" (305x305mm). Meets ASTM D1556; AASHTO T191.

Description	Model
Field density plate for H-4245 density apparatus.	H-4246
Field density plate for H-4249 density apparatus.	H-4249A

Replacement Jars

1-gal (4L) capacity threaded plastic replacement jar is same as furnished with H-4245. 2-qt. (2.0L) capacity threaded glass replacement jar is same as furnished with H-4249

Description	Model
1-gal. plastic replacement jar.	H-4238
2-qt. glass replacement jar.	H-4249B

Sand Density Cone

For the sand method of determining in-place density of gravel and coarse soils. Features two identical cones (top cone is clear plastic) with large valve in middle and circular density plate. Flange that fits the lower cone allows apparatus to be used on holes up to 12" (305mm) dia. Meets U.S. Army Corps of Engineers specifications.

Description	Model
Sand density cone.	H-4248

Shipping wt. 50 lbs. (22.7kg)

Density Sand

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 heavy reinforced bag. Meets ASTM D1556; AASHTO T191.

Description	Model
Density sand.	H-3821

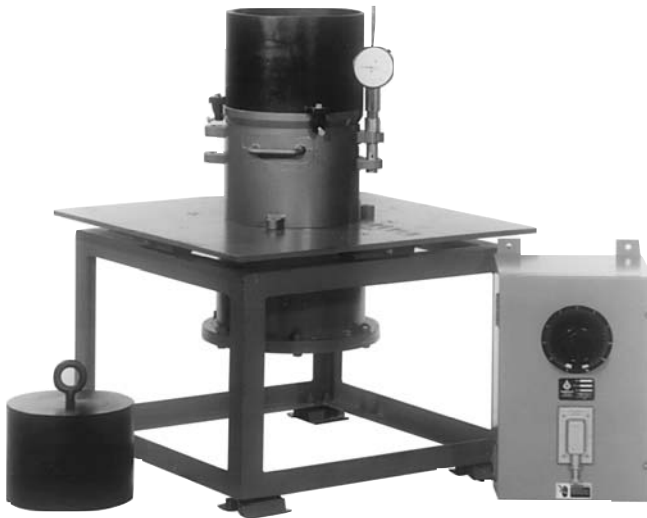
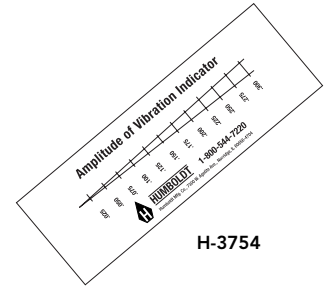
Shipping wt. 50 lbs. (22.7kg)

Voluvelles

Voluvelles provides definite method of determining density of in-place compacted or firmly bonded soils using rubber balloon apparatus. It is not suitable for very soft soil that will deform under slight pressure or in which the volume of the hole cannot be maintained at a constant value. A simple operated device measuring in-place density with rapid determinations through graduated direct-reading clear plastic cylinder. The cylinder is high-strength plastic, threaded and open on both ends. Each cylinder is double graduated in cubic feet and cubic meters, minimum graduation is .00025 cu. ft. (7cm³). Features a pressure-vacuum pump assembly, pressure gauge, quick coupler valve, double-graduated cylinder, 10 balloons and a density plate. Meets ASTM D2167; AASHTO T205.

Description	Model
Voluvelles. 1/20 cu. ft. (1600ml) capacity. Shipping wt. 13 lbs. (95.9kg)	H-4166
Voluvelles. 1/13 cu. ft. (2230ml) capacity. Shipping wt. 14 lbs. (6.4kg)	H-4167
Pump assembly, double-acting type.	H-4166.10
Replacement balloons; 10 pack.	H-4168
Saddle weight, 5.5 lbs.	H-4166S

Exploded view of H-4166 with replacement parts is available.

**H-3750 Set****H-3753****H-3754**

Relative Density of Cohesionless Soils

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 cohesionless 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. Meets ASTM D4253, D4254.

Description	Model
Relative density of cohesionless soils apparatus, complete set. 230V, 60Hz, 12.0 amps, 1ph, AC	H-3750.2F
Relative density of cohesionless soils apparatus, complete set. 230V, 50Hz, 12.0 amps, 1ph, AC	H-3750.5F

Shipping wt. 925 lbs. (420kg)

Pouring Funnel Set

Used for placement of loose 3/8" (9.5mm) or finer soils in relative density mold. Includes two 6" (152mm) dia. x 12" (305mm) long metal cylinders, each with a funnel.

Description	Model
Pouring funnel set.	H-3750FS

Relative Density Apparatus Components

Description	Shipping Wt	Model
Vibrating table. 230V, 60Hz, 12.0 amps, 1ph, AC	465 lbs. (211kg)	H-3756.2F
Vibrating table. 230V, 50Hz, 12.0 amps, 1ph, AC.		H-3756.5F
0.1 cu.ft.-Relative density mold set.	96 lbs. (43.6kg)	H-3757
0.5 cu.ft.-Capacity relative density mold set.	350 lbs. (159kg)	H-3758
Relative density gauge set.	—	H-3759

Vibration Indicator, Tachometer Type

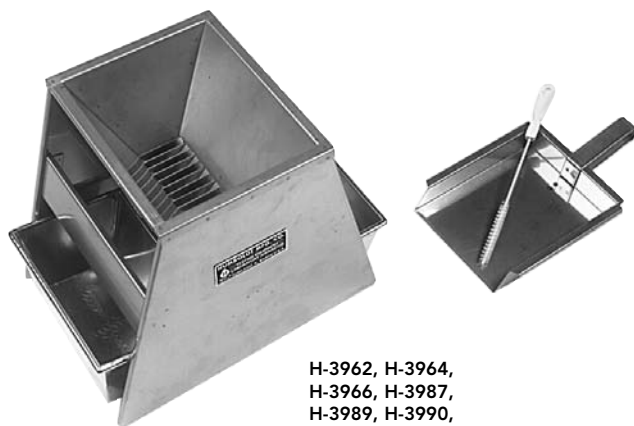
Precision tachometer is pen size to allow accurate readings even on hard-to-reach equipment. Scale gives readings from 2,000 to 21,000

Description	Model
Vibration indicator, tachometer type	H-3753

Vibration Indicator, Visual Type

Visual indicator gives accurate reading of amplitude of vibration so vibrating table may be adjusted to ASTM specification.

Description	Model
Vibration indicator, visual type	H-3754



H-3962, H-3964,
H-3966, H-3987,
H-3989, H-3990,
H-3992

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 hopper is divided into two equal portions by two series of chutes that discharge alternately in opposite directions into separate pans.

Splitters are stainless steel construction. Include pans of stainless steel or cold-rolled steel, see chart for type and quantity of pans included. Also includes scoop and cleaning brush. See chart for other product details on specific models. Meets 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 general labor field applications. See models: H-3962, H-3964, H-3966, H-3987, H-3989, H-3990, H-3992.

Sample Splitters with Removable Hopper

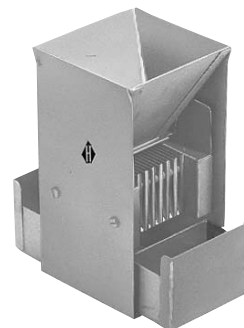
Include removable stainless steel hopper for easy cleaning. See models: H-3980 and H-3985.

Enclosed Sample Splitters

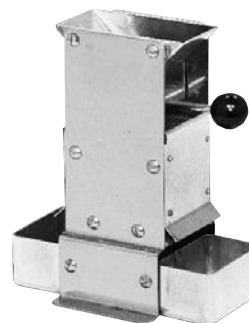
Ideal for dusty samples, including coal, coke and chaff. Meets ASTM C702, D410, D2013, D3176, D3180; AASHTO T248. See models: H-3970 and H-3975.



H-3970, H-3975



H-3971C



H-3973, H-3974



H-3994

Microsplitters & Pans

For fine easily segregated materials, particularly low-grade and radioactive ores. Stainless steel and aluminum alloy splitter is made entirely of nonmagnetic metals. Hopper is designed with cut-off gate to stop flow of materials from the hopper, preventing possible errors normally caused by overflowing material at corner of pan into riffles. See corresponding table for complete details on all models.

16-to-1 Sample Reducer

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).

Description	Model
16-to-1 Sample reducer. Shipping wt. 65 lbs. (29.5kg).	H-3994

Description, Replacement Parts & Accessories	Model
Materials pan.	H-3996
Wash tub.	H-3997



Sample Splitters							
No. of Chutes	Width of Chutes		Hopper Size	Pans Furn.	Ship Wt.		Model
	in.	mm. (approx.)			lbs.	kg.	
14	3/8	10	6-3/4x8" (172x203mm)	4	14	8.2	H-3962
14	1/2	13	6-3/4x11" (172x279mm)	4	17	7.7	H-3964
14	3/4	19	6-3/4x14-3/4" (172x375mm)	4	21	9.5	H-3966
14	3/8	10	6-1/2x8" (165x203mm)	2	22	10.0	H-3970 Enclosed
24	3/8	10	4-1/2x11" (114x279mm)	2	25	11.4	H-3975 Enclosed
12	1/2	13	8-1/2x11" (216x279mm)	4	15	6.8	H-3980 with Removable Hopper
12	3/4	19	8-1/2x14" (216x356mm)	4	21	9.5	H-3985 with Removable Hopper
16	1	25	9x20" (229x508mm)	4	31	14.1	H-3987
8	2	50	9-1/2x19-1/2" (241x495mm)	4	27	12.3	H-3989
10	1-1/2	38	9x20-1/2" (229x520mm)	4	50	22.7	H-3990
8	2-1/2	65	9x24" (229x610mm)	4	50	22.7	H-3992

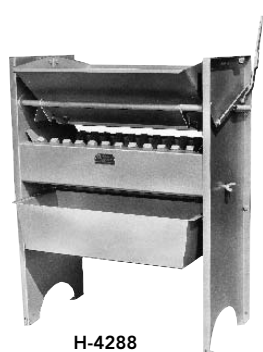
Splitters are stainless steel construction. All mm. dimensions are approximate.

* Pans shipped with sample splitters are cold-rolled steel except where "S" follows the pan model number. "S" after model number indicates stainless steel construction.

Sample Splitter Replacement Pans			
Dimensions	Ship. Wt.		Model
	lbs.	kg.	
8x5-1/4x4-1/2"D (203x133x114mm)	3	1.4	H-3981* and H-3981S
10-1/2x5-1/2x4-1/2"D (267x40x114mm)	4	1.8	H-3986* and H-3986S
13-1/2x6-3/4x5"D (343x71x127mm)	5	2.3	H-3967S
7x3-3/4x6"D (178x95x152mm)	5	2.3	H-3977S Drawer
11-3/4x6x5"D (298x152x127mm)	5	2.3	H-3976S Stainless Drawer
8x5-1/4x4-1/2"D (203x133x114mm)	3	1.4	H-3981* and H-3981S
10-1/2x5-1/2x4-1/2"D (267x140x114mm)	4	1.8	H-3986* and H-3986S
19x6-1/2x5-1/4"D (483x165x133mm)	6	2.7	H-3988* and H-3988S
19x6-1/2x5-1/4"D (483x165x133mm)	6	2.7	H-3988* and H-3988S
19x6-1/2x5-1/4"D (483x165x133mm)	6	2.7	H-3988* and H-3988S
22x6-1/2x5-1/4"D (559x165x133mm)	6	2.7	H-3993S

Microsplitters							
No. of Chutes	Width of Chutes (in/mm)		Hopper Size	Pans Furn.	Ship.Wt. (lbs/kg)		Model
16	1/8	3	4-1/4x4-1/4x3-1/2"D 108x108x89mm	2	7	3.2	H-3971C
32	1/4	6	7x8 1/4x3-1/2"D 178x210x89mm	2	23	10.4	H-3973
16	1/2	13	7x8x3-1/2"D 178x203x89mm	2	23	10.4	H-3974

Microsplitter Pans			
Dimensions	Ship. Wt. (lbs/kg)		Model
2x3-1/2x1-3/4"D 51x89x45mm	2	.9	H-3972
5-3/4x9-3/4x4"D 146x248x102mm	3	1.3	H-3973.1
5-1/2x9-1/2x4"D 140x241x102mm	3	1.3	H-3973.1



H-4288



H-4289, H-4290



H-4291



H-4287

Gilson Sample Splitters

Reduces test samples too large to handle conveniently. Divides samples so each half is representative of original total sample. Handles any material from sand sizes up to 4".

Heavy welded steel construction loading hopper, lever-actuated clamshell hopper, and two material pans that slide under each half of

splitter chute. One pan can be replaced by a bag loading chute to return one half of the charge to a sample bag.

The single-splitter chute has aluminum or plated steel bars with a locating rod passed through their lower ends to provide wide flexibility in sizes of chute openings. Two materials pans are included.

Gilson Sample Splitters						
Description	Materials Handled (max size)	Hopper Capacity	Width of Chutes	Dimensions (LxWxH)	Ship. Wt.	Model
Gilson no. SP-1 Sample Splitter large capacity, floor model	4"	1 cu. ft. (0.3m ³)	24" adjustable by 1/2" increments	29x19x39" (737x483x991mm)	136 lbs (61.7kg)	H-4288
Gilson no. SP-2 Porta-Splitter medium capacity, bench model	2"	.5 cu. ft. (0.15m ³)	Adjustable to 1/2, 1, 1-1/2, or 3"	22x14.5x20.5" (559x368x521mm)	64 lbs (29kg)	H-4289
Gilson no. SP-2.5 Versa-Splitter medium capacity, bench model	3/4"	.28 cu. ft. (0.084m ³)	Adjustable to 1/4, 1/2, 3/4, 1, 1-1/2, or 2"	15.5x12.5x17.5" (394x318x445mm)	40 lbs (18.2kg)	H-4290
Gilson no. SP-3 Mini-Splitter bench model	1/4"	125 in. ³ (2.0L)	Adjustable to 1/8, 1/4, 3/8, 1/2, 3/4, 1, or 1-1/2"	9.5x8.5x13.5" (241x216x343mm)	15 lbs (6.8kg)	H-4291

Parts and Accessories		
Description	Gilson no.	Model
Wheels (ball bearings/rubber tires)	SPA114	H-4288.1
Materials pan	SPA100	H-4288.2
Bag loading chute	SPA102	H-4288.3
Materials pan	SPA101	H-4289.1
Wheels (ball bearings/rubber tires)	SPA114	H-4288.1
Materials pan	SPA108	H-4290.1
Materials pan	SPA301	H-4291.1

Quartering Canvas

heavy-duty quartering canvas for use in selecting and quartering soils and aggregates. All edges are seamed and stitched. H-4135 does not meet ASTM and AASHTO specs. H-4136 meets ASTM C109, C702; AASTO T248.

Description	Model
Quartering canvas 5x5' (1.5x1.5m). Shipping wt. 6 lbs. (2.7kg).	H-4135
Quartering canvas 6x8' (2m x 2.5m). Shipping wt. 7 lbs. (3.2kg).	H-4136

California Sample Splitter

Designed by and constructed for the California Department of Transportation, this splitter meets CalTrans C 201 requirements. 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: 29x28x46" (71x74x 117cm).

Description	Model
California sample splitter.	H-4287

Description, Replacement Parts	Model
Material pan.	H-4287.1



Sieve Series

U.S.A. Standard Sieve Series

Sieve frames are seamless spun brass or stainless steel with rigid rolled edges, extended bottoms (skirts) to fit all frames, pans or separator bottoms of the same diameter. This allows a set of sieves to be stacked. Brass sieves are cost efficient; stainless steel sieves are longer lasting, with sag-resistant mesh.

Sieve number, microns, nominal opening in millimeters and inches are listed on a permanently attached metal plate on each sieve. U.S.A. Standard Sieves are stocked in full and half heights, 8" (203mm) in diameter; 12" (305mm) dia. sieves are available in full, intermediate and half heights. 3" (76mm), 4" (101mm), 5" (127mm), 6" (152mm) and 10" (254mm) are available. All sieves meet ASTM E11; AASHTO M92.

Information on sieves, covers and pans is featured on the following pages.

NOTE: All U.S.A. Standard Sieves are individually serialized on the sieve frame.

U.S.A. Standard Sieve Sizes and Equivalents

Alternative No.	Nominal Opening (in.)	Standard (mm)
4"	4.000	100mm
3-1/2"	3.500	90mm
3"	3.000	75mm
2-1/2"	2.500	63mm
2.12"	2.120	53mm
2"	2.000	50mm
1-3/4"	1.750	45mm
1-1/2"	1.500	37.5mm
1-1/4"	1.250	31.5mm
1.06"	1.060	26.5mm
1"	1.000	25.0mm
7/8"	0.875	22.4mm
3/4"	0.750	19.0mm
5/8"	0.625	16.0mm
0.530"	0.530	13.2mm
1/2"	0.500	12.5mm
7/16"	0.434	11.2mm
3/8"	0.375	9.5mm
5/16"	0.312	8.0mm
0.265"	0.265	6.7mm
1/4"	0.250	6.3mm
1/8"	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	500μ
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. 325	0.0017	45μ
No. 400	0.0014	38μ
No. 450	0.0012	32μ
No. 500	0.0009	25μ
No. 635	0.0007	20μ



8" Dia. USA Standard Sieves

Sieve Designation		Brass Frame and Mesh		Brass Frame, Stainless Mesh		Stainless Frame and Mesh	
Alt. No.	Std. (mm)	Full Height 2" (50mm)	Half Height 1" (25mm)	Full Height 2" (50mm)	Half Height 1" (25mm)	Full Height 2" (50mm)	Half Height 1" (25mm)
Coarse Series							
4"	100	—	—	H-3920CS4.000	H-3910CS4.000	H-3920CSS4.000	H-3910CSS4.000
3-1/2"	90	—	—	H-3920CS3.500	H-3910CS3.500	H-3920CSS3.500	H-3910CSS3.500
3"	75	H-3920C3.000	H-3910C3.000	H-3920CS3.000	H-3910CS3.000	H-3920CSS3.000	H-3910CSS3.000
2-1/2"	63	H-3920C2.500	H-3910C2.500	H-3920CS2.500	H-3910CS2.500	H-3920CSS2.500	H-3910CSS2.500
2 .12"	53	—	—	H-3920CS2.120	H-3910CS2.120	H-3920CSS2.120	H-3910CSS2.120
2"	50	H-3920C2.000	H-3910C2.000	H-3920CS2.000	H-3910CS2.000	H-3920CSS2.000	H-3910CSS2.000
1-3/4"	45	—	—	H-3920CS1.750	H-3910CS1.750	H-3920CSS1.750	H-3910CSS1.750
1-1/2"	37.5	H-3920C1.500	H-3910C1.500	H-3920CS1.500	H-3910CS1.500	H-3920CSS1.500	H-3910CSS1.500
1-1/4"	31.5	—	—	H-3920CS1.250	H-3910CS1.250	H-3920CSS1.250	H-3910CSS1.250
1.06"	26.5	—	—	H-3920CS1.060	H-3910CS1.060	H-3920CSS1.060	H-3910CSS1.060
1"	25.0	H-3920C1.000	H-3910C1.000	H-3920CS1.000	H-3910CS1.000	H-3920CSS1.000	H-3910CSS1.000
7/8"	22.4	—	—	H-3920CS.875	H-3910CS.875	H-3920CSS.875	H-3910CSS.875
3/4"	19.0	H-3920C.750	H-3910C.750	H-3920CS.750	H-3910CS.750	H-3920CSS.750	H-3910CSS.750
5/8"	16.0	—	—	H-3920CS.625	H-3910CS.625	H-3920CSS.625	H-3910CSS.625
0.530"	13.2	—	—	H-3920CS.530	H-3910CS.530	H-3920CSS.530	H-3910CSS.530
1/2"	12.5	H-3920C.500	H-3910C.500	H-3920CS.500	H-3910CS.500	H-3920CSS.500	H-3910CSS.500
7/16"	11.2	—	—	H-3920CS.438	H-3910CS.438	H-3920CSS.438	H-3910CSS.438
3/8"	9.5	H-3920C.375	H-3910C.375	H-3920CS.375	H-3910CS.375	H-3920CSS.375	H-3910CSS.375
5/16"	8.0	—	—	H-3920CS.312	H-3910CS.312	H-3920CSS.312	H-3910CSS.312
0.265"	6.7	—	—	H-3920CS.265	H-3910CS.265	H-3920CSS.265	H-3910CSS.265
1/4"	6.3	H-3920C.250	H-3910C.250	H-3920CS.250	H-3910CS.250	H-3920CSS.250	H-3910CSS.250
1/8"	3.17	—	—	H-3920CS.125	H-3910CS.125	H-3920CSS.125	H-3910CSS.125
Fine Series							
No. 3-1/2	5.6	—	—	H-3920FS3-1/2	H-3910FS3-1/2	H-3920FSS3-1/2	H-3910FSS3-1/2
No. 4	4.75	H-3920F4	H-3910F4	H-3920FS4	H-3910FS4	H-3920FSS4	H-3910FSS4
No. 5	4.00	—	—	H-3920FS5	H-3910FS5	H-3920FSS5	H-3910FSS5
No. 6	3.35	—	—	H-3920FS6	H-3910FS6	H-3920FSS6	H-3910FSS6
No. 7	2.80	—	—	H-3920FS7	H-3910FS7	H-3920FSS7	H-3910FSS7
No. 8	2.36	H-3920F8	H-3910F8	H-3920FS8	H-3910FS8	H-3920FSS8	H-3910FSS8
No. 10	2.00	H-3920F10	H-3910F10	H-3920FS10	H-3910FS10	H-3920FSS10	H-3910FSS10
No. 12	1.70	H-3920F12	H-3910F12	H-3920FS12	H-3910FS12	H-3920FSS12	H-3910FSS12
No. 14	1.40	H-3920F14	H-3910F14	H-3920FS14	H-3910FS14	H-3920FSS14	H-3910FSS14
No. 16	1.18	H-3920F16	H-3910F16	H-3920FS16	H-3910FS16	H-3920FSS16	H-3910FSS16
No. 18	1.00	H-3920F18	H-3910F18	H-3920FS18	H-3910FS18	H-3920FSS18	H-3910FSS18
No. 20	850	H-3920F20	H-3910F20	H-3920FS20	H-3910FS20	H-3920FSS20	H-3910FSS20
No. 25	710	H-3920F25	H-3910F25	H-3920FS25	H-3910FS25	H-3920FSS25	H-3910FSS25
No. 30	600	H-3920F30	H-3910F30	H-3920FS30	H-3910FS30	H-3920FSS30	H-3910FSS30
No. 35	500	H-3920F35	H-3910F35	H-3920FS35	H-3910FS35	H-3920FSS35	H-3910FSS35
No. 40	425	H-3920F40	H-3910F40	H-3920FS40	H-3910FS40	H-3920FSS40	H-3910FSS40
No. 45	355	H-3920F45	H-3910F45	H-3920FS45	H-3910FS45	H-3920FSS45	H-3910FSS45
No. 50	300	H-3920F50	H-3910F50	H-3920FS50	H-3910FS50	H-3920FSS50	H-3910FSS50
No. 60	250	H-3920F60	H-3910F60	H-3920FS60	H-3910FS60	H-3920FSS60	H-3910FSS60
No. 70	212	H-3920F70	H-3910F70	H-3920FS70	H-3910FS70	H-3920FSS70	H-3910FSS70
No. 80	180	H-3920F80	H-3910F80	H-3920FS80	H-3910FS80	H-3920FSS80	H-3910FSS80
No. 100	150	H-3920F100	H-3910F100	H-3920FS100	H-3910FS100	H-3920FSS100	H-3910FSS100
No. 120	125	H-3920F120	H-3910F120	H-3920FS120	H-3910FS120	H-3920FSS120	H-3910FSS120
No. 140	106	H-3920F140	H-3910F140	H-3920FS140	H-3910FS140	H-3920FSS140	H-3910FSS140
No. 170	90	—	—	H-3920FS170	H-3910FS170	H-3920FSS170	H-3910FSS170
No. 200	75	H-3920F200	H-3910F200	H-3920FS200	H-3910FS200	H-3920FSS200	H-3910FSS200
No. 230	63	H-3920F230	H-3910F230	H-3920FS230	H-3910FS230	H-3920FSS230	H-3910FSS230
No. 270	53	H-3920F270	H-3910F270	H-3920FS270	H-3910FS270	H-3920FSS270	H-3910FSS270
No. 325	45	H-3920F325	H-3910F325	H-3920FS325	H-3910FS325	H-3920FSS325	H-3910FSS325
No. 400	38	—	—	H-3920FS400	H-3910FS400	H-3920FSS400	H-3910FSS400
No. 450	32	—	—	H-3920FS450	H-3910FS450	H-3920FSS450	H-3910FSS450
No. 500	25	—	—	H-3920FS500	H-3910FS500	H-3920FSS500	H-3910FSS500
No. 635	20	—	—	H-3920FS635	H-3910FS635	H-3920FSS635	H-3910FSS635



12" Dia. USA Standard Sieves

Sieve Designation		Brass Frame and Mesh			Brass Frame, Stainless Mesh			Stainless Frame and Mesh	
Alt. No.	Std. (mm)	Full Height 3"(75mm)	Inter-Height 2" (50mm)	Half Height 1-5/8" (41mm)	Full Height 3" (75mm)	Inter-Height 2" (50mm)	Half Height 1-5/8" (41mm)	Full Height 3"(75mm)	Half Height 1-5/8" (41mm)
Coarse Series									
4"	100	—	—	—	H-3912CS4.000	H-3922CS4.000	H-3932CS4.000	H-3912CSS4.000	H-3932CSS4.000
3-1/2"	90	—	—	—	H-3912CS3.500	H-3922CS3.500	H-3932CS3.500	H-3912CSS3.500	H-3932CSS3.500
3"	75	H-3912C3.000	H-3922C3.000	H-3932C3.000	H-3912CS3.000	H-3922CS3.000	H-3932CS3.000	H-3912CSS3.000	H-3932CSS3.000
2-1/2"	63	H-3912C2.500	H-3922C2.500	H-3932C2.500	H-3912CS2.500	H-3922CS2.500	H-3932CS2.500	H-3912CSS2.500	H-3932CSS2.500
2.12"	53	—	—	H-3932C2.120	H-3912CS2.120	H-3922CS2.120	H-3932CS2.120	H-3912CSS2.120	H-3932CSS2.120
2"	50	H-3912C2.000	H-3922C2.000	H-3932C2.000	H-3912CS2.000	H-3922CS2.000	H-3932CS2.000	H-3912CSS2.000	H-3932CSS2.000
1-3/4"	45.0	—	—	H-3932C1.750	H-3912CS1.750	H-3922CS1.750	H-3932CS1.750	H-3912CSS1.750	H-3932CSS1.750
1-1/2"	37.5	H-3912C1.500	H-3922C1.500	H-3932C1.500	H-3912CS1.500	H-3922CS1.500	H-3932CS1.500	H-3912CSS1.500	H-3932CSS1.500
1-1/4"	31.5	—	—	—	H-3912CS1.250	H-3922CS1.250	H-3932CS1.250	H-3912CSS1.250	H-3932CSS1.250
1.06"	26.5	—	—	—	H-3912CS1.060	H-3922CS1.060	H-3932CS1.060	H-3912CSS1.060	H-3932CSS1.060
1"	25.0	H-3912C1.000	H-3922C1.000	H-3932C1.000	H-3912CS1.000	H-3922CS1.000	H-3932CS1.000	H-3912CSS1.000	H-3932CSS1.000
7/8"	22.4	—	—	H-3932C.875	H-3912CS.875	H-3922CS.875	H-3932CS.875	H-3912CSS.875	H-3932CSS.875
3/4"	19.0	H-3912C.750	H-3922C.750	H-3932C.750	H-3912CS.750	H-3922CS.750	H-3932CS.750	H-3912CSS.750	H-3932CSS.750
5/8"	16.0	—	—	H-3932C.625	H-3912CS.625	H-3922CS.625	H-3932CS.625	H-3912CSS.625	H-3932CSS.625
0.530"	13.2	—	—	—	H-3912CS.530	H-3922CS.530	H-3932CS.530	H-3912CSS.530	H-3932CSS.530
1/2"	12.5	H-3912C.500	H-3922C.500	H-3932C.500	H-3912CS.500	H-3922CS.500	H-3932CS.500	H-3912CSS.500	H-3932CSS.500
7/16"	11.2	—	—	—	H-3912CS.438	H-3922CS.438	H-3932CS.438	H-3912CSS.438	H-3932CSS.438
3/8"	9.5	H-3912C.375	H-3922C.375	H-3932C.375	H-3912CS.375	H-3922CS.375	H-3932CS.375	H-3912CSS.375	H-3932CSS.375
5/16"	8.0	—	—	—	H-3912CS.312	H-3922CS.312	H-3932CS.312	H-3912CSS.312	H-3932CSS.312
0.265"	6.7	—	—	—	H-3912CS.265	H-3922CS.265	H-3932CS.265	H-3912CSS.265	H-3932CSS.265
1/4"	6.3	H-3912C.250	H-3922C.250	H-3932C.250	H-3912CS.250	H-3922CS.250	H-3932CS.250	H-3912CSS.250	H-3932CSS.250
1/8"	3.17	—	—	H-3932C.125	H-3912CS.125	H-3922CS.125	H-3932CS.125	—	H-3932CSS.125
Fine Series									
No. 3-1/2	5.6	—	—	—	H-3912FS3-1/2	H-3922FS3-1/2	H-3932FS3-1/2	H-3912FSS3-1/2	H-3932FSS3-1/2
No. 4	4.75	H-3912F4	H-3922F4	H-3932F4	H-3912FS4	H-3922FS4	H-3932FS4	H-3912FSS4	H-3932FSS4
No. 5	4.00	—	—	—	H-3912FS5	H-3922FS5	H-3932FS5	H-3912FSS5	H-3932FSS5
No. 6	3.35	—	—	—	H-3912FS6	H-3922FS6	H-3932FS6	H-3912FSS6	H-3932FSS6
No. 7	2.80	—	—	—	H-3912FS7	H-3922FS7	H-3932FS7	H-3912FSS7	H-3932FSS7
No. 8	2.36	H-3912F8	H-3922F8	H-3932F8	H-3912FS8	H-3922FS8	H-3932FS8	H-3912FSS8	H-3932FSS8
No. 10	2.00	H-3912F10	H-3922F10	H-3932F10	H-3912FS10	H-3922FS10	H-3932FS10	H-3912FSS10	H-3932FSS10
No. 12	1.70	H-3912F12	H-3922F12	H-3932F12	H-3912FS12	H-3922FS12	H-3932FS12	H-3912FSS12	H-3932FSS12
No. 14	1.40	H-3912F14	H-3922F14	H-3932F14	H-3912FS14	H-3922FS14	H-3932FS14	H-3912FSS14	H-3932FSS14
No. 16	1.18	H-3912F16	H-3922F16	H-3932F16	H-3912FS16	H-3922FS16	H-3932FS16	H-3912FSS16	H-3932FSS16
No. 18	1.00	H-3912F18	H-3922F18	H-3932F18	H-3912FS18	H-3922FS18	H-3932FS18	H-3912FSS18	H-3932FSS18
No. 20	850	H-3912F20	H-3922F20	H-3932F20	H-3912FS20	H-3922FS20	H-3932FS20	H-3912FSS20	H-3932FSS20
No. 25	710	H-3912F25	H-3922F25	H-3932F25	H-3912FS25	H-3922FS25	H-3932FS25	H-3912FSS25	H-3932FSS25
No. 30	600	H-3912F30	H-3922F30	H-3932F30	H-3912FS30	H-3922FS30	H-3932FS30	H-3912FSS30	H-3932FSS30
No. 35	500	H-3912F35	H-3922F35	H-3932F35	H-3912FS35	H-3922FS35	H-3932FS35	H-3912FSS35	H-3932FSS35
No. 40	425	H-3912F40	H-3922F40	H-3932F40	H-3912FS40	H-3922FS40	H-3932FS40	H-3912FSS40	H-3932FSS40
No. 45	355	H-3912F45	H-3922F45	H-3932F45	H-3912FS45	H-3922FS45	H-3932FS45	H-3912FSS45	H-3932FSS45
No. 50	300	H-3912F50	H-3922F50	H-3932F50	H-3912FS50	H-3922FS50	H-3932FS50	H-3912FSS50	H-3932FSS50
No. 60	250	H-3912F60	H-3922F60	H-3932F60	H-3912FS60	H-3922FS60	H-3932FS60	H-3912FSS60	H-3932FSS60
No. 70	212	H-3912F70	H-3922F70	H-3932F70	H-3912FS70	H-3922FS70	H-3932FS70	H-3912FSS70	H-3932FSS70
No. 80	180	H-3912F80	H-3922F80	H-3932F80	H-3912FS80	H-3922FS80	H-3932FS80	H-3912FSS80	H-3932FSS80
No. 100	150	H-3912F100	H-3922F100	H-3932F100	H-3912FS100	H-3922FS100	H-3932FS100	H-3912FSS100	H-3932FSS100
No. 120	125	H-3912F120	H-3922F120	H-3932F120	H-3912FS120	H-3922FS120	H-3932FS120	H-3912FSS120	H-3932FSS120
No. 140	106	H-3912F140	H-3922F140	H-3932F140	H-3912FS140	H-3922FS140	H-3932FS140	H-3912FSS140	H-3932FSS140
No. 170	90	—	—	—	H-3912FS170	H-3922FS170	H-3932FS170	H-3912FSS170	H-3932FSS170
No. 200	75	H-3912F200	H-3922F200	H-3932F200	H-3912FS200	H-3922FS200	H-3932FS200	H-3912FSS200	H-3932FSS200
No. 230	63	H-3912F230	H-3922F230	H-3932F230	H-3912FS230	H-3922FS230	H-3932FS230	H-3912FSS230	H-3932FSS230
No. 270	53	H-3912F270	H-3922F270	H-3932F270	H-3912FS270	H-3922FS270	H-3932FS270	H-3912FSS270	H-3932FSS270
No. 325	45	H-3912F325	H-3922F325	H-3932F325	H-3912FS325	H-3922FS325	H-3932FS325	H-3912FSS325	H-3932FSS325
No. 400	38	—	—	—	H-3912FS400	H-3922FS400	H-3932FS400	H-3912FSS400	H-3932FSS400
No. 450	32	—	—	—	H-3912FS450	H-3922FS450	H-3932FS450	H-3912FSS450	H-3932FSS450
No. 500	25	—	—	—	H-3912FS500	H-3922FS500	H-3932FS500	H-3912FSS500	H-3932FSS500
No. 635	20	—	—	—	H-3912FS635	H-3922FS635	H-3932FS635	H-3912FSS635	H-3932FSS635



4" and 12" Dia. Deep Frame USA Standard Sieves

Sieve Designation		4" Diameter				12" Diameter Deep Frame			
Alt. No.	Std. (mm)	1-1/2" Deep Brass Frame and Mesh	1-1/2" Deep Brass Frame, Stainless Mesh	4" Deep Brass Frame and Mesh	4" Deep Brass Frame, Stainless Mesh	4" Deep Brass Frame and Mesh	4" Deep Brass Frame, Stainless Mesh	8" Deep Brass Frame and Mesh	8" Deep Brass Frame, Stainless Mesh
Coarse Series									
4"	100	—	—	—	—	—	H-3928CS4.000	—	H-3938CS4.000
3-1/2"	90	—	—	—	—	—	H-3928CS3.500	—	H-3938CS3.500
3"	75	—	—	—	—	H-3928C3.000	H-3928CS3.000	H-3938C3.000	H-3938CS3.000
2-1/2"	63	—	—	—	—	H-3928C2.500	H-3928CS2.500	H-3938C2.500	H-3938CS2.500
2.12"	53	—	—	—	—	H-3928C2.120	H-3928CS2.120	H-3938C2.120	H-3938CS2.120
2"	50	—	—	—	—	H-3928C2.000	H-3928CS2.000	H-3938C2.000	H-3938CS2.000
1-3/4"	45.0	—	—	—	—	H-3928C1.750	H-3928CS1.750	H-3938C1.750	H-3938CS1.750
1-1/2"	37.5	—	—	—	—	H-3928C1.500	H-3928CS1.500	H-3938C1.500	H-3938CS1.500
1-1/4"	31.5	—	—	—	—	—	H-3928CS1.250	—	H-3938CS1.250
1/6"	26.5	—	—	—	—	—	H-3928CS1.060	—	H-3938CS1.060
1"	25.0	H-3914C1.000	H-3914CS1.000	H-3924C1.000	H-3924CS1.000	H-3928C1.000	H-3928CS1.000	H-3938C1.000	H-3938CS1.000
7/8"	22.4	—	H-3914CS.875	—	H-3924CS.875	—	H-3928CS.875	—	H-3938CS.875
3/4"	19.0	H-3914C.750	H-3914CS.750	H-3924C.750	H-3924CS.750	H-3928C.750	H-3928CS.750	H-3938C.750	H-3938CS.750
5/8"	16.0	—	H-3914CS.625	—	H-3924CS.625	—	H-3928CS.625	—	H-3938CS.625
0.530"	13.2	—	H-3914CS.530	—	H-3924CS.530	—	H-3928CS.530	—	H-3938CS.530
1/2"	12.5	H-3914C.500	H-3914CS.500	H-3924C.500	H-3924CS.500	H-3928C.500	H-3928CS.500	H-3938C.500	H-3938CS.500
7/16"	11.2	—	H-3914CS.438	—	H-3924CS.438	—	H-3928CS.438	—	H-3938CS.438
3/8"	9.5	H-3914C.375	H-3914CS.375	H-3924C.375	H-3924CS.375	H-3928C.375	H-3928CS.375	H-3938C.375	H-3938CS.375
5/16"	8.0	—	H-3914CS.312	—	H-3924CS.312	—	H-3928CS.312	—	H-3938CS.312
0.265"	6.7	—	H-3914CS.265	—	H-3924CS.265	—	H-3928CS.265	—	H-3938CS.265
1/4"	6.3	H-3914C.250	H-3914CS.250	H-3924C.250	H-3924CS.250	H-3928C.250	H-3928CS.250	H-3938C.250	H-3938CS.250
1/8"	3.17	—	H-3914CS.125	—	H-3924CS.125	—	H-3928CS.125	—	H-3938CS.125
Fine Series									
No. 3-1/2	5.6	—	H-3914FS3-1/2	—	H-3924FS3-1/2	—	H-3928FS3-1/2	—	H-3938FS3-1/2
No. 4	4.75	H-3914F4	H-3914FS4	H-3924F4	H-3924FS4	H-3928F4	H-3928FS4	H-3938F4	H-3938FS4
No. 5	4.00	—	H-3914FS5	—	H-3924FS5	—	H-3928FS5	—	H-3938FS5
No. 6	3.35	—	H-3914FS6	—	H-3924FS6	—	H-3928FS6	—	H-3938FS6
No. 7	2.80	—	H-3914FS7	—	H-3924FS7	—	H-3928FS7	—	H-3938FS7
No. 8	2.36	H-3914F8	H-3914FS8	H-3924F8	H-3924FS8	H-3928F8	H-3928FS8	H-3938F8	H-3938FS8
No. 10	2.00	H-3914F10	H-3914FS10	H-3924F10	H-3924FS10	H-3928F10	H-3928FS10	H-3938F10	H-3938FS10
No. 12	1.70	H-3914F12	H-3914FS12	H-3924F12	H-3924FS12	H-3928F12	H-3928FS12	H-3938F12	H-3938FS12
No. 14	1.40	H-3914F14	H-3914FS14	H-3924F14	H-3924FS14	H-3928F14	H-3928FS14	H-3938F14	H-3938FS14
No. 16	1.18	H-3914F16	H-3914FS16	H-3924F16	H-3924FS16	H-3928F16	H-3928FS16	H-3938F16	H-3938FS16
No. 18	1.00	H-3914F18	H-3914FS18	H-3924F18	H-3924FS18	H-3928F18	H-3928FS18	H-3938F18	H-3938FS18
No. 20	850	H-3914F20	H-3914FS20	H-3924F20	H-3924FS20	H-3928F20	H-3928FS20	H-3938F20	H-3938FS20
No. 25	710	H-3914F25	H-3914FS25	H-3924F25	H-3924FS25	H-3928F25	H-3928FS25	H-3938F25	H-3938FS25
No. 30	600	H-3914F30	H-3914FS30	H-3924F30	H-3924FS30	H-3928F30	H-3928FS30	H-3938F30	H-3938FS30
No. 35	500	H-3914F35	H-3914FS35	H-3924F35	H-3924FS35	H-3928F35	H-3928FS35	H-3938F35	H-3938FS35
No. 40	425	H-3914F40	H-3914FS40	H-3924F40	H-3924FS40	H-3928F40	H-3928FS40	H-3938F40	H-3938FS40
No. 45	355	H-3914F45	H-3914FS45	H-3924F45	H-3924FS45	H-3928F45	H-3928FS45	H-3938F45	H-3938FS45
No. 50	300	H-3914F50	H-3914FS50	H-3924F50	H-3924FS50	H-3928F50	H-3928FS50	H-3938F50	H-3938FS50
No. 60	250	H-3914F60	H-3914FS60	H-3924F60	H-3924FS60	H-3928F60	H-3928FS60	H-3938F60	H-3938FS60
No. 70	212	H-3914F70	H-3914FS70	H-3924F70	H-3924FS70	H-3928F70	H-3928FS70	H-3938F70	H-3938FS70
No. 80	180	H-3914F80	H-3914FS80	H-3924F80	H-3924FS80	H-3928F80	H-3928FS80	H-3938F80	H-3938FS80
No. 100	150	H-3914F100	H-3914FS100	H-3924F100	H-3924FS100	H-3928F100	H-3928FS100	H-3938F100	H-3938FS100
No. 120	125	H-3914F120	H-3914FS120	H-3924F120	H-3924FS120	H-3928F120	H-3928FS120	H-3938F120	H-3938FS120
No. 140	106	H-3914F140	H-3914FS140	H-3924F140	H-3924FS140	H-3928F140	H-3928FS140	H-3938F140	H-3938FS140
No. 170	90	—	H-3914FS170	—	H-3924FS170	—	H-3928FS170	—	H-3938FS170
No. 200	75	H-3914F200	H-3914FS200	H-3924F200	H-3924FS200	H-3928F200	H-3928FS200	H-3938F200	H-3938FS200
No. 230	63	H-3914F230	H-3914FS230	H-3924F230	H-3924FS230	H-3928F230	H-3928FS230	H-3938F230	H-3938FS230
No. 270	53	H-3914F270	H-3914FS270	H-3924F270	H-3924FS270	H-3928F270	H-3928FS270	H-3938F270	H-3938FS270
No. 325	45	H-3914F325	H-3914FS325	H-3924F325	H-3924FS325	H-3928F325	H-3928FS325	H-3938F325	H-3938FS325
No. 400	38	—	H-3914FS400	—	H-3924FS400	—	H-3928FS400	—	H-3938FS400
No. 450	32	—	H-3914FS450	—	H-3924FS450	—	H-3928FS450	—	H-3938FS450
No. 500	25	—	H-3914FS500	—	H-3924FS500	—	H-3928FS500	—	H-3938FS500
No. 635	20	—	H-3914FS635	—	H-3924FS635	—	H-3928FS635	—	H-3938FS635



3", 5", 6" and 10" Dia. USA Standard Sieves

Sieve Designation		3" Diameter		5" Diameter		6" Diameter		10" Diameter	
No.	(mm)	1" Deep Brass Frame and Mesh	1" Deep Brass Frame, Stainless Mesh	1-1/2" Deep Brass Frame and Mesh	1-1/2" Deep Brass Frame, Stainless Mesh	1-1/2" Deep Brass Frame and Mesh	1-1/2" Deep Brass Frame, Stainless Mesh	3" Deep Brass Frame and Mesh	3" Deep Brass Frame, Stainless Mesh
Coarse Series									
4"	100mm	—	—	—	—	—	—	—	H-3919CS4.000
3-1/2"	90mm	—	—	—	—	—	—	—	H-3919CS3.500
3"	75mm	—	—	—	—	—	—	H-3919C3.000	H-3919CS3.000
2-1/2"	63mm	—	—	—	—	—	—	H-3919C2.500	H-3919CS2.500
2.12"	53mm	—	—	—	—	—	—	—	H-3919CS2.120
2"	50mm	—	—	—	—	—	—	H-3919C2.000	H-3919CS2.000
1-3/4"	45.0mm	—	—	—	—	—	—	—	H-3919CS1.750
1-1/2"	37.5mm	—	—	—	—	—	—	H-3919C1.500	H-3919CS1.500
1-1/4"	31.5mm	—	—	—	—	—	—	—	H-3919CS1.250
1/6"	26.5mm	—	—	—	—	—	—	—	H-3919CS1.060
1"	25.0mm	H-3913C1.000	H-3913CS1.000	H-3915C1.000	H-3915CS1.000	H-3916C1.000	H-3916CS1.000	H-3919C1.000	H-3919CS1.000
7/8"	22.4mm	—	H-3913CS.875	—	H-3915CS.875	—	H-3916CS.875	—	H-3919CS.875
3/4"	19.0mm	H-3913C.750	H-3913CS.750	H-3915C.750	H-3915CS.750	H-3916C.750	H-3916CS.750	H-3919C.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-3913C.500	H-3913CS.500	H-3915C.500	H-3915CS.500	H-3916C.500	H-3916CS.500	H-3919C.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-3913C.375	H-3913CS.375	H-3915C.375	H-3915CS.375	H-3916C.375	H-3916CS.375	H-3919C.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-3913C.250	H-3913CS.250	H-3915C.250	H-3915CS.250	H-3916C.250	H-3916CS.250	H-3919C.250	H-3919CS.250
1/8"	3.17mm	—	H-3913CS.125	—	H-3915CS.125	—	H-3916CS.125	—	H-3919CS.125
Fine Series									
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-3913F4	H-3913FS4	H-3915F4	H-3915FS4	H-3916F4	H-3916FS4	H-3919F4	H-3919FS4
No. 5	4.00mm	—	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-3913F8	H-3913FS8	H-3915F8	H-3915FS8	H-3916F8	H-3916FS8	H-3919F8	H-3919FS8
No. 10	2.00mm	H-3913F10	H-3913FS10	H-3915F10	H-3915FS10	H-3916F10	H-3916FS10	H-3919F10	H-3919FS10
No. 12	1.70mm	H-3913F12	H-3913FS12	H-3915F12	H-3915FS12	H-3916F12	H-3916FS12	H-3919F12	H-3919FS12
No. 14	1.40mm	H-3913F14	H-3913FS14	H-3915F14	H-3915FS14	H-3916F14	H-3916FS14	H-3919F14	H-3919FS14
No. 16	1.18mm	H-3913F16	H-3913FS16	H-3915F16	H-3915FS16	H-3916F16	H-3916FS16	H-3919F16	H-3919FS16
No. 18	1.00mm	H-3913F18	H-3913FS18	H-3915F18	H-3915FS18	H-3916F18	H-3916FS18	H-3919F18	H-3919FS18
No. 20	850	H-3913F20	H-3913FS20	H-3915F20	H-3915FS20	H-3916F20	H-3916FS20	H-3919F20	H-3919FS20
No. 25	710	H-3913F25	H-3913FS25	H-3915F25	H-3915FS25	H-3916F25	H-3916FS25	H-3919F25	H-3919FS25
No. 30	600	H-3913F30	H-3913FS30	H-3915F30	H-3915FS30	H-3916F30	H-3916FS30	H-3919F30	H-3919FS30
No. 35	500	H-3913F35	H-3913FS35	H-3915F35	H-3915FS35	H-3916F35	H-3916FS35	H-3919F35	H-3919FS35
No. 40	425	H-3913F40	H-3913FS40	H-3915F40	H-3915FS40	H-3916F40	H-3916FS40	H-3919F40	H-3919FS40
No. 45	355	H-3913F45	H-3913FS45	H-3915F45	H-3915FS45	H-3916F45	H-3916FS45	H-3919F45	H-3919FS45
No. 50	300	H-3913F50	H-3913FS50	H-3915F50	H-3915FS50	H-3916F50	H-3916FS50	H-3919F50	H-3919FS50
No. 60	250	H-3913F60	H-3913FS60	H-3915F60	H-3915FS60	H-3916F60	H-3916FS60	H-3919F60	H-3919FS60
No. 70	212	H-3913F70	H-3913FS70	H-3915F70	H-3915FS70	H-3916F70	H-3916FS70	H-3919F70	H-3919FS70
No. 80	180	H-3913F80	H-3913FS80	H-3915F80	H-3915FS80	H-3916F80	H-3916FS80	H-3919F80	H-3919FS80
No. 100	150	H-3913F100	H-3913FS100	H-3915F100	H-3915FS100	H-3916F100	H-3916FS100	H-3919F100	H-3919FS100
No. 120	125	H-3913F120	H-3913FS120	H-3915F120	H-3915FS120	H-3916F120	H-3916FS120	H-3919F120	H-3919FS120
No. 140	106	H-3913F140	H-3913FS140	H-3915F140	H-3915FS140	H-3916F140	H-3916FS140	H-3919F140	H-3919FS140
No. 170	90	—	H-3913FS170	—	H-3915FS170	—	H-3916FS170	—	H-3919FS170
No. 200	75	H-3913F200	H-3913FS200	H-3915F200	H-3915FS200	H-3916F200	H-3916FS200	H-3919F200	H-3919FS200
No. 230	63	H-3913F230	H-3913FS230	H-3915F230	H-3915FS230	H-3916F230	H-3916FS230	H-3919F230	H-3919FS230
No. 270	53	H-3913F270	H-3913FS270	H-3915F270	H-3915FS270	H-3916F270	H-3916FS270	H-3919F270	H-3919FS270
No. 325	45	H-3913F325	H-3913FS325	H-3915F325	H-3915FS325	H-3916F325	H-3916FS325	H-3919F325	H-3919FS325
No. 400	38	—	H-3913FS400	—	H-3915FS400	—	H-3916FS400	—	H-3919FS400
No. 450	32	—	H-3913FS450	—	H-3915FS450	—	H-3916FS450	—	H-3919FS450
No. 500	25	—	H-3913FS500	—	H-3915FS500	—	H-3916FS500	—	H-3919FS500
No. 635	20	—	H-3913FS635	—	H-3915FS635	—	H-3916FS635	—	H-3919FS635



Sieve Pans and Covers

200mm Dia Test Sieves

Brass frame with stainless steel cloth mesh. Full ht. 2-5/8" (66mm); Half ht. = 1-5/8" (40.6mm). Depth to cloth: Full ht. = 2" (50.8mm); Half ht. = 1" (25.4mm).

200mm Diameter Test Sieves

Micron	Std. (mm)	Full Ht. Model	Half Ht. Model
40000	40	H-3906.40000	H-3908.40000
28000	28	H-3906.28000	H-3908.28000
20000	20	H-3906.20000	H-3908.20000
14000	14	H-3906.14000	H-3908.14000
10000	10	H-3906.10000	H-3908.10000
5000	5	H-3906.05000	H-3908.05000
2500	2.5	H-3906.02500	H-3908.02500
1250	1.5	H-3906.01250	H-3908.01250
630	630	H-3906.00630	H-3908.00630
315	315	H-3906.00315	H-3908.00315
160	160	H-3906.00160	H-3908.00160
80	80	H-3906.00080	H-3908.00080

Description, Accessories

Model

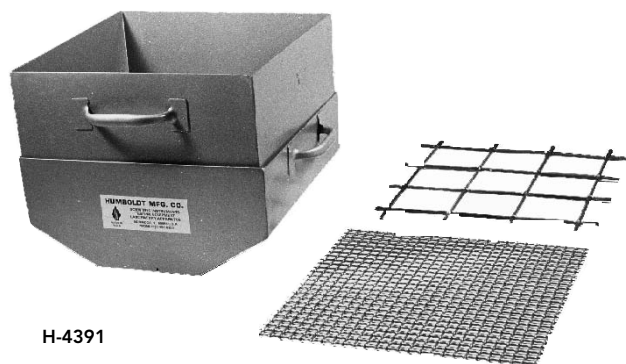
Brass cover for 200mm diam test sieves.	H-3908BC
Full height brass pan for 200mm diam test sieves.	H-3906BP
Half height brass pan for 200mm diam test sieves.	H-3908BP

Sieve Covers With Ring

Description	Brass	Stainless
3" Dia. Sieve Cover	H-3913BC	H-3913SC
4" Dia. Deep Frame 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

Sieve Pans

Description	Brass	Stainless
3" Dia. Bottom Pan, 1" (25mm) deep	H-3913P	H-3913SS
3" Dia. Separator Pan	H-3913SP	—
4" Dia. Separator Pan, 1-1/2" (38.1mm) deep 4" Dia. Separator Pan, 4" (102mm) deep	H-3914SP H-3924SP	—
5" Dia. Bottom Pan, 1" (25mm)	H-3915P	—
5" Dia. Separator Pan	H-3915SP	—
6" Dia. Bottom Pan, 1" (25mm) deep	H-3916P	—
6" Dia. Separator Pan	H-3916SP	—
8" Dia. Bottom Pan 1" (25mm) deep 8" Dia. Bottom Pan 2" (51mm) deep	H-3960P H-3950P	H-3960SS H-3950SS
8" Dia. Separator Pan, 1" (25mm) deep 8" Dia. Separator Pan, 2" (51mm) deep	H-3955SP H-3956SP	H-3955SS H-3956SS
10" Dia. Bottom Pan, 2" (51mm) deep	H-3919P	—
10" Dia. Separator Pan	H-3919SP	—
12" Dia. Bottom Pan, 1" (25mm) deep 12" Dia. Bottom Pan, 2" (51mm) deep 12" Dia. Bottom Pan, 3" (75mm) deep	H-3932P H-3922P H-3912P	H-3932PSS — H-3912PSS
12" Dia. Separator Pan, 1" (25mm) deep 12" Dia. Separator Pan, 2" (51mm) deep 12" Dia. Separator Pan, 3" (75mm) deep 12" Dia. Separator Pan, 4" (100mm) deep 12" Dia. Separator Pan, 8" (200mm) deep	H-3932SP H-3922SP H-3912SP H-3928SP H-3938SP	H-3932PSS — H-3912PSS — —



H-4391



H-4100 Series

Rocker-Type Field-Testing Sieves

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" (19.0mm), 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. O.D. 15-1/4x12-1/4x10" (387x311x354mm). Replacement screens available, call 1-800-544-7220.

Description	Model
Rocker-type field testing sieves.	H-4391

Shipping wt. 42 lbs. (19kg)

Soil Analysis Sieves

Used by agricultural engineers because of their accuracy and ease of handling. Frames are seamless brass with rolled edges and extended skirts for nesting.

5"-Dia. Perforated Plate Soil Analysis Sieve Set

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.

Description	Model
5"-Dia. Perforated plate mechanical soil analysis sieve set.	H-3902

Shipping wt. 10 lbs. (4.5kg)

Sieve Brushes (see page 218)

18"-Dia. Brass Frame Riddles (Sieves)

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. Meet ASTM specifications.

18" Brass Frame Riddles		
Screen No. or Size Mesh		Model
4"	100mm	H-4109.4
3-1/2"	90mm	H-4109A
3"	75mm	H-4109
2-1/2"	63mm	H-4108
2"	50mm	H-4107
1-1/2"	37.5mm	H-4106
1-1/4"	31.5mm	H-4105A
1"	25.0mm	H-4105
7/8"	22.4mm	H-4104A
3/4"	19.0mm	H-4104
5/8"	16.0mm	H-4103A
1/2"	12.5mm	H-4103
3/8"	9.5mm	H-4102
1/4"	6.3mm	H-4101
No. 3-1/2	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	850μ	H-4100.20

18" Diameter Brass Cover and Bottom Pan for Riddles

Description	Model
18" diam brass cover.	H-4100C
18" diam brass bottom pan.	H-4100P



H-3949



H-3880

Aggregate Washer

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.x13"D (27x33cm) and locks in four angle positions. Includes valve and 3/8" goose-neck water tube. O.D. 30x20x32"H (76x51x81cm). Order USA Standard Sieve, 200 mesh separately. Meets ASTM C117.

Description	Model
Aggregate washer. 115/230V, 60Hz. 1ph, 3 amps AC.	H-3949
Aggregate washer. 230V, 50Hz. 1ph, AC.	H-3949.5F
U.S.A. Standard Sieve, No. 200 mesh, 8" diam.	H-3920FS200
U.S.A. Standard Sieve, No. 200 mesh, 12" diam.	H-3912FS200

Shipping wt. 115 lbs. (52.2kg)

Table-Top Aggregate Washer

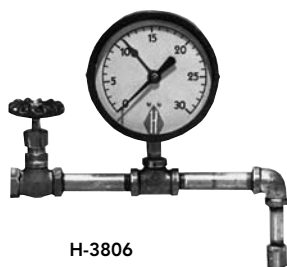
This lightweight, table-top model is designed to be located near the sink drain on a laboratory countertop. The easily removable drum that measures 9" diameter by 10-3/4" deep (229x273mm) is manufactured from stainless steel for rust and corrosion resistance. With the drum mounted in its fixed tilted 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. Meets ASTM C117.

Description	Model
Table-top aggregate washer. 115V, 59/60 Hz.	H-3880
Table-top aggregate washer. 230V, 50/60 Hz.	H-3880.4F

Shipping wt. 40 lbs. (18.1kg)



H-3942, H-3943



H-3806



H-3807



H-3945

Deep Frame Wet Washing Sieves with Replaceable Mesh Discs

Description	Size (diam x deep)	Shpg. Wt. lbs. (kg)	Model
Deep frame wet washing sieve with replacement mesh disc	8 x 4" (203x101mm)	7 (3.2)	H-3942
Deep frame wet washing sieve with replacement mesh disc and backup mesh	8 x 6" (203x152mm)		H-3943
Replaceable 200 mesh disc for H-3942 and H-3943	8" diam (203mm)		H-3942.200

Wet Washing Sieve Apparatus

Controls spray and water pressure. Includes valve, pressure gauge, piping, and H-3808 spray nozzle. Meets ASTM C430, D1514; AASHTO T-192; Test Std. No. 158 (Method 211).

Description	Model
Wet washing sieve apparatus.	H-3806

Description, Replacement Parts & Accessories	Model
Replacement spray nozzle for H-3806.	H-3808

Cement Wet Washing Sieves

Nickel-plated brass frame with stainless steel mesh and legs for support when drying on hot plate.

Description	Model
Cement wet washing sieve, USA standard No. 325 mesh, 2" diam x 3" deep (52x76mm).	H-3807
Cement wet washing sieve, USA standard No. 200 mesh, 3" diam x 3-1/2" deep (76x89mm).	H-3804
Cement wet washing sieve, USA standard No. 325 mesh, 4" diam x 4-1/2" deep (102x114mm).	H-3809

Description, Replacement Parts & Accessories	Model
Replacement legs for cement wet washing sieves.	H-3807.4
Replacement screws for cement wet washing sieves.	H-3807.5
Replacement mesh disc, 2" diam, USA standard No. 325 mesh.	H-3807.325
Replacement mesh disc, 3" diam, USA standard No. 200 mesh.	H-3804.200
Replacement mesh disc, 4" diam, USA standard No. 200 mesh.	H-3809.200

Other mesh discs are available in most sizes, call 1-800-544-7220

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.

Deep Frame Wet Washing Sieves			
Description	Size (dia x deep)	Shpg. Wt. lbs. (kg)	Model
Wet washing sieve with No. 200 stainless steel cloth	8 x 4" (203x102mm)	7 (3.2)	H-3945
Same as H-3945 with supporting back-up cloth			H-3945RC
Wet washing sieve with No. 200 stainless steel cloth	8 x 6" (203x152mm)		H-3946
Same as H-3946 with supporting back-up cloth			H-3946RC
Wet washing sieve with No. 200 stainless steel cloth	8 x 8" (203x203mm)		H-3947
Same as H-3947 with supporting back-up cloth			H-3947RC
Wet washing sieve with No. 200 stainless steel cloth	12 x 4" (305x102mm)	11 (5.0)	H-3928FS200
Same as H-3928FS200 with supporting back-up cloth			H-3928FS200RC
Wet washing sieve with No. 200 stainless steel cloth	12 x 8" (305x203mm)	14 (6.3)	H-3938FS200
Same as H-3938FS200 with supporting back-up cloth			H-3938FS200RC
NOTE: Available from 50–400 mesh. Call 1-800-544-7220 to order mesh not listed.			



H-4325, H-4310, H-4330



H-4315A



H-4326



H-4328



H-4320, H-4322

Sieve Shakers

Complete line of heavy-duty sieve shakers to meet virtually every application—and every budget.

Sieve Shakers													
Description	Handles Sieve Diam. in. (mm)	Maximum Capacity (No. of sieves)			Meets ASTM	Timer Minutes	Mounting Required	Motor HP	Dimensions W x D x H	Ship. Wt.	Model (115V. 60Hz)	Model (220V. 60Hz)	Model (220V. 50Hz)
		Full Ht.	Intmed. Ht.	Half Ht.									
Hand Operated Sieve Shaker	3" (76mm) 5" (127mm) 8" (203mm)	16 12 10	—	18	C136	—	Yes	—	15x15x45" (380x380x1,143mm)	49 lbs* (22.2kg)	(non electrical) H-4310	—	—
Motorized Sieve Shaker	3" (76mm)	6	—	—	—	—	—	1/20	8x8x16" (203x203x406mm)	6 lbs* (2.7kg)	H-4326	—	—
Motorized Sieve Shaker	3" (76mm) 5" (127mm) 8" (203mm)	16 12 10	—	18	C136	30	Yes	1/4	15x15x45" (380x380x1,143mm)	65 lbs* (29.5kg)	H-4325	—	H-4325.5F
Larger Capacity Motorized Sieve Shaker	8" (203mm) 10" (254mm) 12" (305mm)	11 7 7	11	13	C136	30	Yes	1/4	21x18x47" (533x457x1,194mm)	85 lbs (38.5kg)	H-4330	—	H-4330.5F
Wet/Dry Sieve Shaker	8" (203mm)	2	—	3	—	—	No	1/20	14x14x10" (355x355x254mm)	12 lbs* (5.4kg)	H-4328	—	—
Ro-Tap Motorized Sieve Shaker	8" (203mm)	6	—	13	C136	99 (Digital)	No	1/4	28x21x25" (635x711x533mm)	225 lbs (102.1kg)	H-4320	H-4320.2F	H-4320.5F
Ro-Tap Motorized Sieve Shaker	12" (305mm)	4	6	10	C136	99 (Digital)	No	1/4	28x21x25" (635x711x537mm)	225 lbs (102.1kg)	H-4322	H-4322.2F	H-4322.5F
Sound enclosure for all Ro-Tap Models		—	—	—	—	—	—	—	34x24x31" (860x610x780mm)	120 lbs (55kg)	H-4324	—	—
Mary Ann Motorized Laboratory Sifter	8" (203mm) 12" (305mm)	10 6	—	—	—	99 (Digital)	No	1/3	13x35x45" (330x889x1,143mm)	140lbs (63.5kg)	H-4315A	—	—

Order Sieves Separately. Replacement parts and exploded views available, call 1-800-544-7220 *Ships via UPS



H-4334



H-3948



H-2813

Micron Air-Jet Sieve Shaker

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 20 μ particle size range. Unit adapts to 75mm diameter electroformed sieves in 90mm drums for 45 μ to 5 μ . Timer and vacuum controls allow results' reproducibility. 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, gage and 9.5 gal. recoverable capacity steel filter canister. Sieves are not included. Accessories and air-jet sieve drums are available; call Humboldt for details and pricing.

Description	Model
Micron air-jet sieve shaker. 115V. 60Hz.	H-4334
Micron air-jet sieve shaker. 230V. 50/60Hz.	H-4334.4F

Shipping wt. 110 lbs. (50kg)

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. Meets ASTM E-11.

Micron Air-Jet Sieves			Micron Air-Jet Sieves		
U.S. Std (Mesh)	Micron	Model	U.S. Std (Mesh)	Micron	Model
No. 8	2360	H-4335F8	No. 80	180	H-4335F80
No. 10	2000	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			

Corps of Engineers Wash Screen Assembly

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.

Description	Model
Corps of Engineers wash screen assembly.	H-3948
No. 10 overload screen for H-3948.	H-3948M10
Replacement No. 200 mesh for H-3948.	H-3948M200

Shipping wt. 112 lbs. (5.4kg)

Magnifying Comparator

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 three interchangeable scales. A 15mm by 0.1mm scale; a parallel line decimal inch scale spaced 0.01" apart and marked at each 0.1" with a total of 51 lines covering 0.5" in width; and a parallel line fractional scale with lines spaced every 1/64" and marked every 1/8" with a total of 33 lines covering 1/2" in width.

Description	Model
Magnifying comparator.	H-2813



H-4283

For Technical Assistance or Professional Sales Service, Call Humboldt: 1-800-544-7220



H-4273



H-4295

Gilson Testing Screens

Ideal for sizing test samples of crushed stone, sand gravel, slag, coal, coke, wood chips, ores, pellets, and similar materials. Hydraulic clamping model recommended for heavy-use situations.

Note: Coarse screen trays and dustpan are included.

See chart below.

Gilson Testing Screens															
Description	Gilson No.		Maximum Batch Capacity		Material Size Max. to Min.	Tray Capacity	Overall Tray Size (LxW)	Features (see key)	Includes Trays*		Motor	Dimensions	Ship Wt.	Humboldt Model (110V, 60Hz)	Humboldt Model (220V, 50Hz)
	110V, 60Hz	220V, 50Hz	Vol.	Wt.					Coarse	Dustpan					
Gilson Testing Screen with hydraulic clamping	TS1	TS1F	1 cu.ft. (0.3m³)	80 lbs (36kg)	4" (104mm) to No. 200 mesh (14.75mm)	6	18x26" (457x660mm)	1 2 3	5	1	1/3-HP† capacitor	23x31x33" (584x787x 838mm)	470 lbs* (214kg)	H-4283	H-4283.5F
Gilson Testing Screen with hand clamping	TS2	TS2F	1 cu.ft. (0.3m³)	80 lbs (36kg)	4" (104mm) to No. 200 mesh (14.75mm)	6	18x26" (457x660mm)	1 2	5	1	1/2-HP‡ 1/3-HP‡	23x31x33" (584x787x 838mm)	470 lbs (214kg)	H-4276	H-4276.5F
Gilson Porta-Screen for field control of aggregates—quality control of blacktop/ready-mix plants	PS4	PS4F	.75 cu.ft. (0.023m³)	60 lbs (27.3kg)	2" (50.8mm) to No. 16 mesh (1.18mm) or finer meshes to No. 200 (75)	7	16x16-1/2" (406x419mm)	1 4 5 6	7	1	1/4-HP	19x16.5x48.3" (483x419x 1,222mm)	225 lbs (116kg)	H-4295	H-4295.5F
	PS3	PS3F				5		5	19x16.5x42" (483x419x 1,067mm)			H-4297		H-4297.5F	
Gilson Test-Master®	TM3	TM3F	1 cu.ft. (0.3m³)	80 lbs (36kg)	4" (104mm) to No. 4 mesh (4.75mm) or finer meshes to No. 200 (75)	6	18x26" (457x660mm)	5 6 7	5	1	1/3-HP	27x33x45" (686x838x 1,143mm)	650 lbs (295kg)	H-4273	H-4273.5F
7-Tray Capacity Gilson Test-Master®	TM4	TM4F	1 cu.ft. (0.3m³)	80 lbs (36kg)	4" (104mm) to No. 4 mesh (4.75mm) or finer meshes to No. 200 (75)	7	18x26" (457x660mm)	5 6 7	5	1	1/3-HP	27x33x45" (686x838x 1,143mm)	650 lbs (295kg)	H-4274	H-4274.5F
* Specify desired tray mesh. † TEFC or Explosion-Proof motors quoted on request ‡ 1/2-HP Motor for H-4276, 1/3-HP Motor for H-4276.5F								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.							

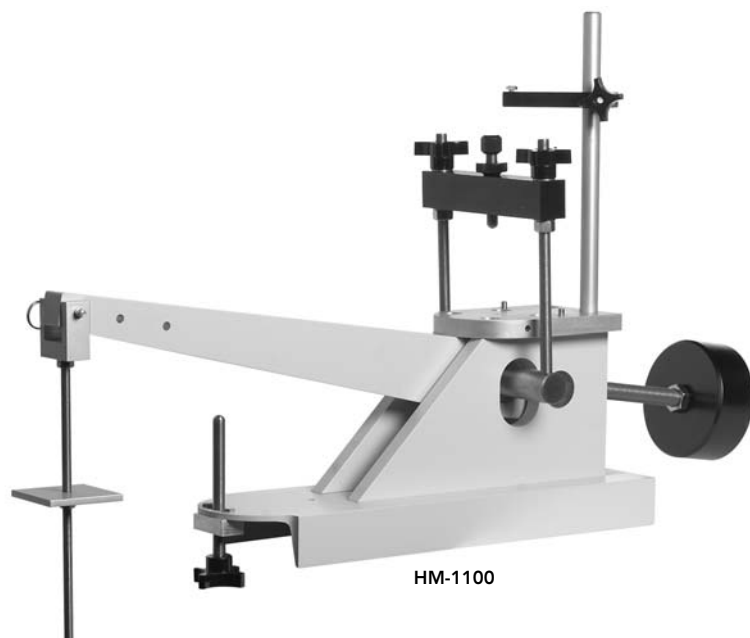
**Accessories for Gilson Testing Screens,
Porta-Screen, Test-Master®**

Description	Gilson No.	For Use With	Ship Wt.	Humboldt Model
Dustpan Tray	TSA-113	H-4273 H-4274	15 lbs (6.8 kg)	H-4273P
Dustpan Tray	TSA-112	H-4276 H-4283	15 lbs (6.8 kg)	H-4283P
Stationary Dustpan Tray with Adapter	TSA-116	H-4273 H-4274	23 lbs (10.4 kg)	H-4273DP
Porta Wheels	PSA-114	H-4288 H-4297		H-4288.1
Dustpan Tray	PSA-310	H-4295 H-4297	10 lbs (4.5 kg)	H-4302
Porta-Screen® Cover	PSA-312	H-4295 H-4297		H-4305
Gilson Porta-Pan	PSA-367	H-4295 H-4297	14 lbs (6.3 kg)	H-4306
Gilson Sand Attachment	TSA-158T	H-4283 H-4276	14 lbs (6.3 kg)	H-4281T
Gilson Sand Attachment	TSA-158M	H-4273 H-4274	14 lbs (6.3 kg)	H-4281M
Gilson Tray Rack	TSA-156	H-4273 H-4274 H-4276 H-4283	43 lbs (19.5 kg)	H-4285
Gilson Door Enclosure	TSA-157	H-4276 H-4283	12 lbs (5.4 kg)	H-4286
Gilson Clean-n-Weigh Accessory	TSA-167	H-4273 H-4274 H-4276 H-4283	63 lbs (28.6 kg)	H-4307

Note: For included screen trays see coarse series.

U.S.A. Standard Screen Trays

Alt. No.	Nominal Opening (in.)	Standard (mm)	18x26" Model (457x660mm) for H-4273, H-4274, H-4276 and H-4283 Screens (Gilson Nos. TM-3, TM-4, TS-2 and TS-1)	16x16-1/2" Model (406x419mm) Porta-Screen Trays for H-4295 and H-4297 (Gilson Nos. PS-4 and PS-3)
Coarse Series				
4"	4.000	100	H-4278C4.000	—
3-1/2"	3.500	90	H-4278C3.500	—
3"	3.000	75	H-4278C3.000	—
2-1/2"	2.500	63	H-4278C2.500	—
2"	2.000	50	H-4278C2.000	H-4398C2.000
1-3/4"	1.750	45	H-4278C1.750	H-4398C1.750
1-1/2"	1.500	38.1	H-4278C1.500	H-4398C1.500
1-1/4"	1.250	31.5	H-4278C1.250	H-4398C1.250
1"	1.000	25.0	H-4278C1.000	H-4398C1.000
7/8"	.875	22.4	H-4278C.875	H-4398C.875
3/4"	.750	19.0	H-4278C.750	H-4398C.750
5/8"	.625	16.0	H-4278C.625	H-4398C.625
1/2"	.500	12.5	H-4278C.500	H-4398C.500
7/16"	.438	11.2	H-4278C.438	H-4398C.438
3/8"	.375	9.5	H-4278C.375	H-4398C.375
5/16"	.312	8.0	H-4278C.312	H-4398C.312
1/4"	.250	6.3	H-4278C.250	H-4398C.250
No. 3-1/2	.223	5.6	H-4278F3-1/2	H-4398F3-1/2
No. 4	.187	4.75	H-4278F4	H-4398F4
Intermediate Series				
No. 5	.157	4.00	H-4278F5	H-4398F5
No. 6	.132	3.35	H-4278F6	H-4398F6
No. 7	.111	2.80	H-4278F7	H-4398F7
No. 8	.0937	2.36	H-4278F8	H-4398F8
No. 10	.0787	2.00	H-4278F10	H-4398F10
No. 12	.0661	1.70	H-4278F12	H-4398F12
No. 14	.0555	1.40	H-4278F14	H-4398F14
Fine Series				
No. 16	.0469	1.18	H-4278F16	H-4398F16
No. 18	.0394	1.00	H-4278F18	H-4398F18
No. 20	.0331	850μ	H-4278F20	H-4398F20
No. 25	.0278	710μ	H-4278F25	H-4398F25
No. 30	.0234	600μ	H-4278F30	H-4398F30
No. 35	.0197	500μ	H-4278F35	H-4398F35
No. 40	.0165	425μ	H-4278F40	H-4398F40
No. 45	.0139	335μ	H-4278F45	H-4398F45
No. 50	.0117	300μ	H-4278F50	H-4398F50
No. 60	.0098	250μ	H-4278F60	H-4398F60
No. 70	.0083	212μ	H-4278F70	H-4398F70
No. 80	.0070	180μ	H-4278F80	H-4398F80
No. 100	.0059	150μ	H-4278F100	H-4398F100
No. 200	.0029	75μ	H-4278F200	H-4398F200



HM-1100

Dead-Weight Consolidation Frame

- Triple beam ratios minimizes 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 indicators, digital indicators or with strain transducers (LSCT) coupled to one of our data acquisition system and Windows®-based software packages

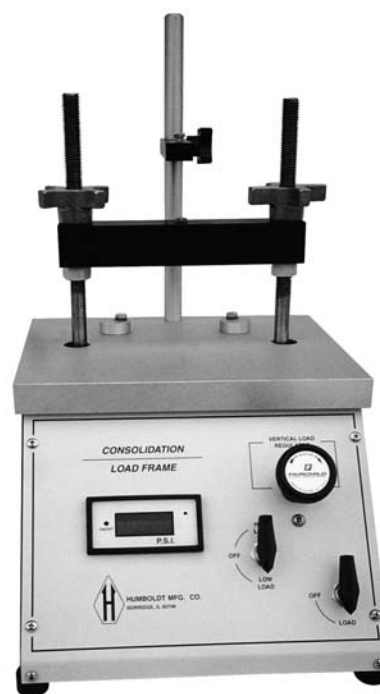
The HM-1100 series Dead-Weight Consolidation Frame is designed for the harshest laboratory environments. The design features a rugged frame design manufactured from aluminum with stainless steel vertical rods, horizontal cross arms and beam support rods. The load arm incorporates 9:1, 10:1, and 11:1 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 (5,148 kPa).

Specifications:

Load Capacity:	48 tsf (5,148 kPa)
Beam Ratios:	9:1, 10:1 and 11:1
Frame Construction:	Heavy-duty anodized aluminum frame with stainless steel vertical, horizontal and beam support rods
Cell Platform:	Anodized aluminum with locating pins for centering cell
Dimensions (w x d x h)	7-3/4" x 32" x 19-1/2" (197 x 812 x 495 mm) excluding loading weight hanger
Net Weight	47 lbs. (104 kg)
Shipping Weight	62 lbs. (137 kg)

Description	Model
Dead-weight consolidation frame.	HM-1100

Note: Consolidation cell, displacement measurement indicator and loading weights required for operation, not included. See following page for a complete listing of available accessories.



HM-2432

ConMatic Soil Consolidation Machine

Compact & easy-to-use for pneumatic, one-dimensional consolidation. Estimate the rate and amount of settlement anticipated for a proposed structure with ease & accuracy.

- 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

Predetermined load may be set before applying load to sample. Supports either fixed ring, floating ring, or permeability cells on 2-1/2" (63.5mm) dia platen. 12"Wx14.5"Dx20.5"H (305X368X521mm). Meets ASTM D2435, D4546; AASHTO T-216; BS 1377 part 5.

Description, English Models	Model
ConMatic 16 TSF, 110 V, 50/60Hz.	HM-2416
ConMatic 16 TSF, 220V, 50/60Hz.	HM-2416.4F
ConMatic 32 TSF, 110 V, 50/60Hz.	HM-2432
ConMatic 32 TSF, 220V, 50/60Hz.	HM-2432.4F

Description, Metric Models	Model
ConMatic 16 kg, 110 V, 50/60Hz.	HM-2416M
ConMatic 16 kg, 220V, 50/60Hz.	HM-2416M.4F
ConMatic 32 kg, 110 V, 50/60Hz.	HM-2432M
ConMatic 32 kg, 220V, 50/60Hz.	HM-2432M.4F

Shipping wt. 48 lbs. (21.8kg)

Note: Consolidation cell and displacement measurement indicator required for operation, not included. See following page for a complete listing of available accessories.


Cells and Accessories
Indicators
Weights

Fixed Ring Consolidation Cells

Sample Size	Cell Part No.	Upper Stone	Lower Stone	Cutter Ring	Filter Paper	Calibration Disc	Perspex
50mm	HM-1222	HM-4184.1955	HM-4184.331	HM-1222.3	HM-4189.20	HM-1222.4	HM-1222.2
70mm	HM-1224	HM-4184.2743	HM-4184.331	HM-1224.3	HM-4189.28	HM-1224.4	HM-1224.2
75mm	HM-1225	HM-4184.2940	HM-4184.331	HM-1225.3	HM-4189.30	HM-1225.4	HM-1225.2
100mm	HM-1227	HM-4184.3925	HM-4184.40	HM-1227.3	HM-4189.40	HM-1227.4	HM-1227.2
2.0"	HM-1221	HM-4184.1985	HM-4184.331	HM-1221.3	HM-4189.20	HM-1221.4	HM-1221.2
2.42"	HM-1229	HM-4184.2405	HM-4184.331	HM-1229.3	HM-4189.25	HM-1229.4	HM-1229.2
2.5"	HM-1220	HM-4184.2485	HM-4184.331	HM-1220.3	HM-4189.25	HM-1220.4	HM-1220.2
3.0"	HM-1226	HM-4184.2985	HM-4184.331	HM-1226.3	HM-4189.30	HM-1226.4	HM-1226.2
4.0"	HM-1228	HM-4184.3985	HM-4184.40	HM-1228.3	HM-4189.40	HM-1228.4	HM-1228.2

Permeability Cells

Sample Size	Cell Part No.
50mm	HM-1222P
70mm	HM-1224P
75mm	HM-1225P
100mm	HM-1227P
2.0"	HM-1221P
2.42"	HM-1229P
2.5"	HM-1220P
3.0"	HM-1226P
4.0"	HM-1228P

Loading Weights

TSF Weight	Model	KGF Weight	Model
0.125 (1/8) TSF	HM-1220.125	0.5 kg	HM-1122.05
0.25 (1/4) TSF	HM-1220.250	1.0 kg	HM-1122.1
0.50 (1/2) TSF	HM-1220.500	2.0 kg	HM-1122.2
1.0 TSF	HM-1220.1	4.0 kg	HM-1122.4
2.0 TSF	HM-1220.2	8.0 kg	HM-1122.8
4.0 TSF	HM-1220.4	—	—

Displacement Indicators

Description	Model
Dial gauge (clockwise), 12x0.002mm.	H-4465.12
Dial gauge (clockwise), 0.5x0.0001".	H-4471
Dial gauge (counter-clockwise), 12x 0.002mm.	H-4465.12CC
Dial gauge (counter-clockwise), 0.5x0.0001".	H-4471CC
Digital indicator (both clockwise & counter-clockwise), 0.5x0.0001" (12x0.0002mm).	HM-4469.05
Digital indicator (both clockwise & counter-clockwise), 1.0x 0.0001" (25x0.0002mm).	HM-4469.10
AC Adapter for digital indicator.	HM-4469AC
Transducer, 0.4x0.0001" (10x0.0002mm).	HM-2310.04
Transducer, 1.0x 0.0001" (25x0.0002mm).	HM-2310.10
Single channel transducer readout.	HM-2350

Note: See following page for complete test sets.

Dead-Weight
Consolidation Sets
for HM-1100, HM-1220
and H-4471CC



Pneumatic Loading Consolidation Sets
for HM-2432, HM-1220 and H-4471CC

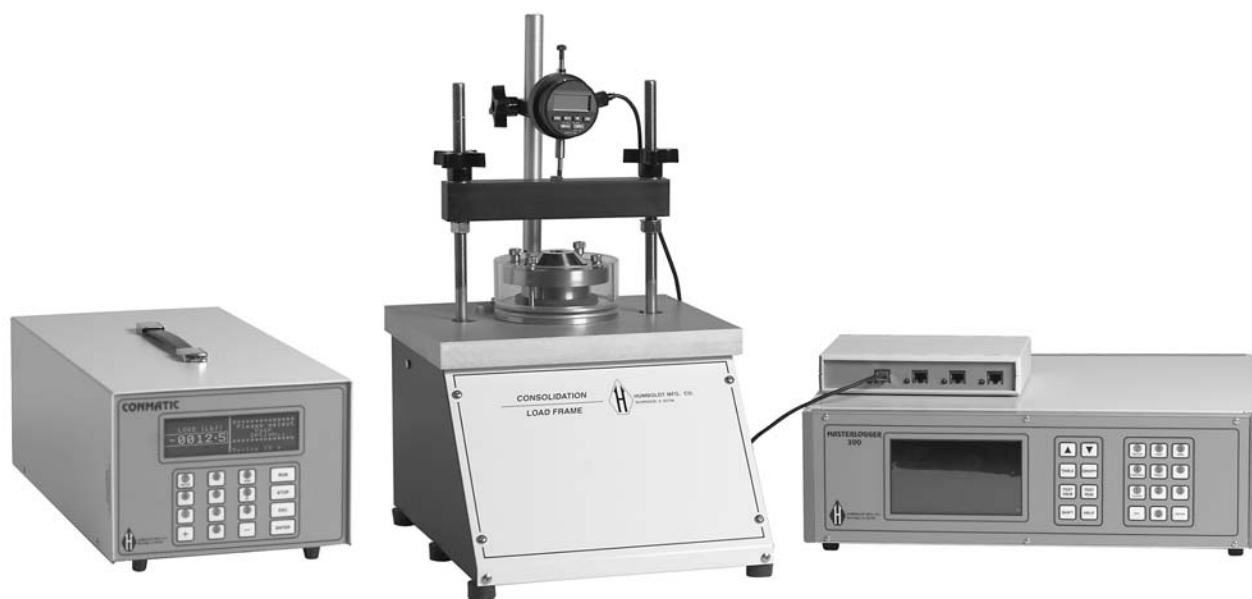
Dead-Weight Consolidation Basic Sets

Description, English Models	Qty. in Set	Model
Dead-weight consolidation set (English).		HM-1100E25-16
Set Includes:		
Dead-weight consolidation frame.	1	HM-1100
Fixed ring cell, 2.5".	1	HM-1220
Dial gauge, 0.5x0.0001" (counter clockwise).	1	H-4471CC
0.125 (1/8) TSF slotted weight.	2	HM-1120.125
0.25 (1/4) TSF slotted weight.	1	HM-1120.250
0.50 (1/2) TSF slotted weight.	1	HM-1120.500
1.0 TSF slotted weight.	1	HM-1120.1
2.0 TSF slotted weight.	1	HM-1120.2
4.0 TSF slotted weight.	3	HM-1120.4
Description, Metric Models	Qty. in Set	Model
Dead-weight consolidation set (Metric).		HM-1100M75-16
Set Includes:		
Dead-weight consolidation frame.	1	HM-1100
Fixed ring cell, 75 mm.	1	HM-1225
Dial gauge, 12mm x 0.002mm (counter clockwise).	1	H-4465.12CC
1kg slotted weight.	2	HM-1122.1
2kg slotted weight.	1	HM-1122.2
4kg slotted weight.	1	HM-1122.4
8kg slotted weight.	7	HM-1122.8

Pneumatic Loading Consolidation Basic Sets

Description, English Models	Qty. in Set	Model
Pneumatic consolidation set (English)		HM-2432E25-32
Set Includes:		
ConMatic with digital readout, 32 TSF, 110v, 50/60Hz	1	HM-2432
Fixed ring cell, 2.5".	1	HM-1220
Dial gauge, 0.5x0.0001" (counter clockwise).	1	H-4471CC

Description, Metric Models	Qty. in Set	Model
Pneumatic consolidation set (Metric).		HM-2432M75-32
Set Includes:		
ConMatic with digital readout, 32 TSF, 220v, 50/60Hz	1	HM-2432.4F
Fixed ring cell, 75mm	1	HM-1225
Dial gauge, 12mm X 0.002mm (counter clockwise).	1	H-4465.12CC



Fully-Automated Incremental Consolidation Test Set

Humboldt's Fully-Automated Incremental Consolidation Test Set has transformed consolidation testing by reducing the duration of the testing procedure by half. Saving time invariably allows for greater profitability. The unique design of the system enables the user to choose from multiple tests to be run simultaneously and independently. The complete set consists of the ConMatic loading unit, Incremental Pressure Controller (APC), Master Logger 300, Four-Channel Digital Input Module, 2.5 Fixed Ring Cell, Windows 98 compatible computer with WinODE Consolidation Reporting Software and Digital Indicator. Up to sixteen Units can be linked for optimum productivity.

Through innovative engineering, the ConMatic Load Frame features state-of-the-art electronics with a stepper motor driven system for exceptionally accurate stress applications.

Test Parameters of the system include:

- Incremental Loading Tests (controlled by loading time, by settlement or manually).

The ConMatic System allows for real-time display of load-compression, as well as time-compression curves for each loading step on Incremental Loading Tests.

Upon completion of the tests, the WinODE Consolidation Reporting Software allows the user reporting options, such as relative compression, modulus of compressibility, coefficient of consolidation and deformation rate as the function of the effective load on the sample. Reports may be generated in linear, logarithmic and/or square root scale. Incremental Loading Tests can be reported through displacement vs. time and displacement vs. square root of time generations.

Key Features

- No need for weights that can be easily knocked, ruining days of testing.
- Fully-automatic loading and unloading sequences based on user-selected conditions.

Specifications:

Sample Size	2.5 or (75mm)
Maximum Load	32 TSF (32Kg/cm ²)
Vertical Clearance	8.25" (210mm)
Horizontal Clearance	7.75" (197mm)
Maximum Piston Travel	0.5" (12.7mm)
Dimensions:	
ConMatic:	12" W x 14.5" W x 20.5" D (305 x 368 x 521mm)
APC:	8" W x 6" H x 14"D (210 x 165 x 375mm)
MasterLogger:	5.9" H x 17.7" W x 14.6" D (150 x 450 x 370mm)

Note: *Requires a supply of good clean air to use this system.
*PC minimum recommended Pentium IV.

Description	Model
Fully-Automated Incremental Consolidation Test Set	HM-2430E25-32
Set includes:	
ConMatic w/ blank front panel, 32 TSF, 110V, 50/60Hz. Qty. 1.	HM-2430
Incremental Automatic Pressure Controller, 110/220V, 50/60Hz. Qty. 1.	HM-2450.3F
Fixed Ring Cell, 2.5 or (75mm HM-1225). Qty. 1.	HM-1220
Master Logger 300, 110/220V. Qty. 1.	HM-2250.3F
Four-channel Digital Input Module. Qty. 1.	HM-2253
WinODE Consolidation Reporting Software. Qty. 1.	HM-2157
Digital Indicator 1.0 x 0.0001. Qty. 1.	HM-4469.10
Cable for Digital Indicator. Qty. 1.	HM-4469C



Expansion Index Consolidometer

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.

- Simple, compact
- Quick test results
- Corrosion resistant, durable anodized aluminum and stainless steel construction.

Includes anodized aluminum base & collar, stainless steel specimen ring, 12.6 lb. (5.7kg) loading weight, and 3.99" dia. x 1/2" (101.4x12.5mm) porous stones. Shown with dial indicator; not included, order separately. 6" dia x 11"H (152x279 mm). Meets ASTM D4829, California Test Method UBC 29-2.

Description	Model
Expansion index consolidometer.	HM-2405
Dial indicator, 0.5" x 0.0001".	H-4471
Porous stones, 3.99" x 1/2".	HM-4184.399T

Shipping wt. 20 lbs. (9 kg)

Soil Volume Change Meter (PVC)

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.

- Measures both shrinkage & swelling of soils
- Ideal for gauging swelling of clay soils
- Fast & simple operation

Includes 1,000 lb. (4.5 kN) capacity proving ring and compaction hammer, mold assembly, loading cap, porous stones, loading pistons, 2-3/4" (70 mm) dia. specimen ring, and conversion charts. 7-1/4" (184 mm) dia base x 15-1/2"H (394 mm).

Description	Model
Soil volume change meter (PVC).	HM-2415

Shipping wt. 30 lbs. (16.3 kg)

Description, Replacement Parts & Accessories	Model
Proving ring, 1,000 lb.	H-4454.010

Discrete Stormwater Sampler

The Discrete Stormwater Sampler can be installed near any storm water channel to take samples throughout a storm event. The unit takes a discrete sample (about 2.5L) based on rainfall accumulation and storm water runoff. The rain sensors can also be used independently. The sampler's rechargeable battery will last without requiring recharging throughout several storm events. The unit is waterproof and requires minimum maintenance.

Description, Replacement Parts & Accessories	Model
Discrete Stormwater Sampler.	H-4042

**HM-4502****HSM-2100**

Double Ring Infiltrometer

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 Mariotte 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 Mariotte tubes with 3,000 ml and 10,000 ml capacities.

Meets ASTM D3385.

Description	Model
Double ring infiltrometer.	HM-4502

Shipping wt. 160 lbs. (72.5kg)

Description, Replacement Parts & Accessories	Model
Mariotte tube, 3,000 cc capacity.	HM-4503
Mariotte tube, 10,000 cc capacity.	HM-4510
Mariotte tube, 100,000 cc capacity.	HM-4512

Guelph Permeameter Kit

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 75 cm 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. Meets ASTM D5126.

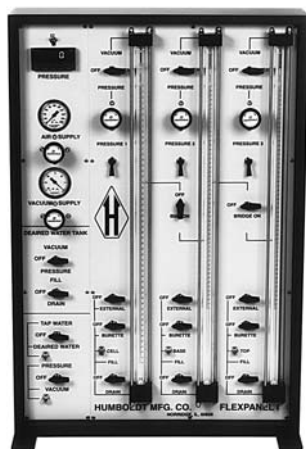
Description	Model
Guelph Permeameter Kit.	HSM-2100

Shipping wt. 33 lbs. (14.9 kg)

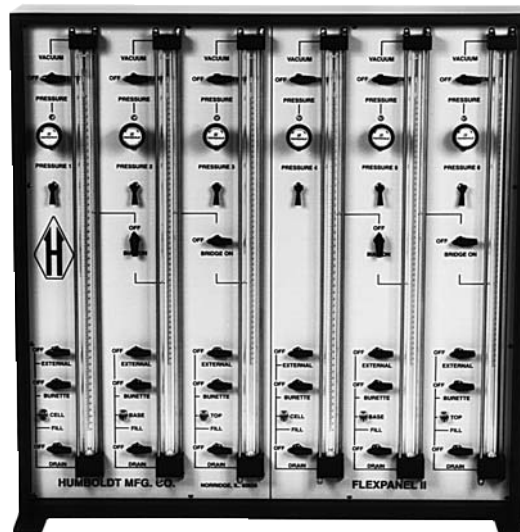
Description, Accessories	Model
Extension Kit. Extends the depth of operation by 80cm.	HSM-2102
10cm Ring Infiltrometer Attachment. Enables the Guelph to measure permeability and flow conditions using a 10cm ring, for retained pressure heads.	HSM-2104
20cm Ring Infiltrometer Attachment. Provides greater sensitivity. Same as above except includes a 20cm ring for greater sensitivity in low permeability conditions.	HSM-2106
Tenison Infiltrometer Adapter. Allows the Guelph to measure permeability and flow under adsorptive, tensional, and very low head conditions. Supplied with 20cm porous foot, Mariott bubbler, and reservoir connection tube.	HSM-2108



HM-4140



HM-4150



HM-4160A

Hydraulic Conductivity/Permeability

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.

FlexPanel Series

FlexPanel pressure distribution panels are used for triaxial and permeability testing of standard or contaminated soil samples, including soils containing hazardous or toxic waste.

- 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
- Cost efficient, expandable system
- Uses no-volume-change Whitey valves
- Bridge feature delivers simultaneous control of base and top pressures by adjusting one pressure regulator
- 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
- Quick-connect inlets and outlets

Meets ASTM D5084; BS 1377 Part 6 1990.

FlexPanel Master Controller Panels

Description	Shipping Weight	Model
FlexPanel master controller panel, 110V, 60Hz.	18 lbs. (8.2kg)	HM-4140
FlexPanel master controller panel, 220V, 50/60Hz.	18 lbs. (8.2kg)	HM-4140.4F
FlexPanel I 3-burette testing panel with master controller 110V, 60Hz.	95 lbs. (43kg)	HM-4150
FlexPanel I 3-burette testing panel with master controller 220V, 50/60Hz.	95 lbs. (43kg)	HM-4150.4F
FlexPanel II 6-burette testing panel with master controller 110V, 60Hz.	125 lbs. (56.7kg)	HM-4160
FlexPanel II 6-burette testing panel with master controller 220V, 50/60Hz.	125 lbs. (56.7kg)	HM-4160.4F

FlexPanel Add-On Panels

Description	Shipping Weight	Model
FlexPanel I 3-burette testing panel without master controller.	77 lbs. (34.9kg)	HM-4150A
FlexPanel II 6-burette testing panel without master controller.	157 lbs. (71.2kg)	HM-4160A



Flexible Wall Permeameter Cell

Accurate, reliable, flexible—with five Whitey valves aligned on one side of cell for maximum convenience. Two valves handle top drainage; two valves handle bottom drainage; a fifth valve handles filling, emptying, and providing confining pressure to cell.

- Quick-connect in center of cell top
- Top machined so air moves to center to be bled out of fitting
- Cell has 3 strain rods with knobs for easy set-up

Cast acrylic chamber withstands up to 250psi. Top caps and bases available in several sizes (see chart below). Other sizes available on request. Choice of brass or stainless steel valve fittings (order stainless steel for use with hazardous permeants). Order top cap, base pedestal, and porous stones separately. Cell is 12H x 8" dia; 11" overall dia. Meets ASTM D5084.



Toxic Interface Unit

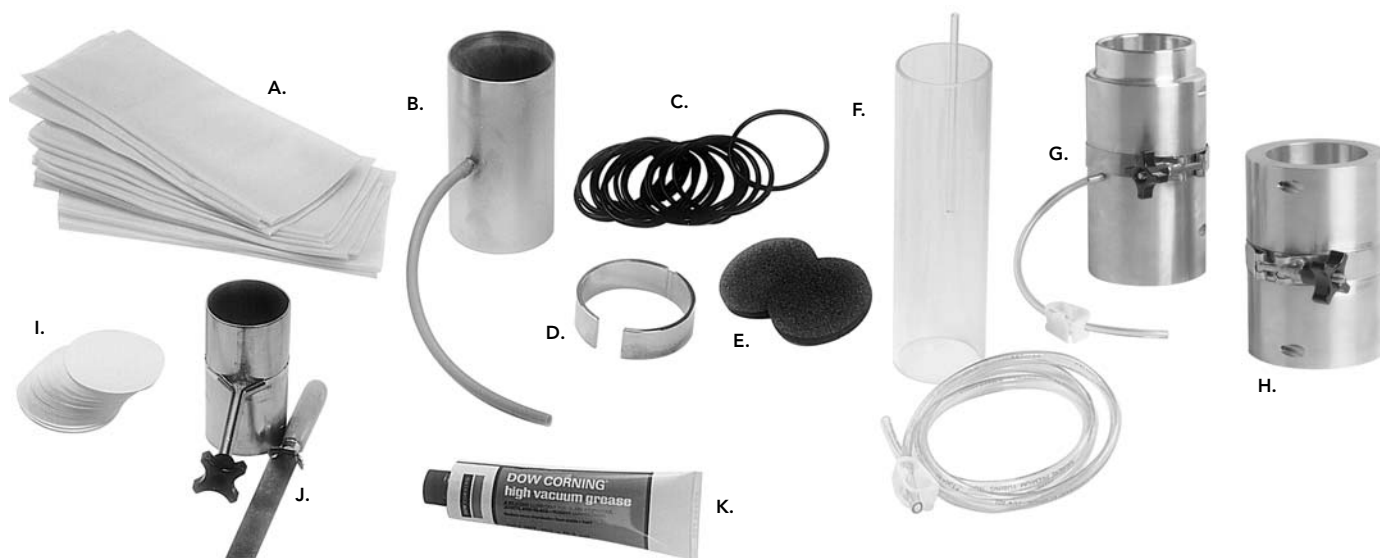
Safe & convenient means of performing permeability tests of corrosive or toxic permeants. Flexible bladder accumulator interfaces between control panel and sample drains on permeameter. Serves as a fluid separator to prevent permeant from entering control panel. Also prevents contact of air with permeant, thus no toxic or corrosive vapors can escape into lab. Handles any fluid compatible with stainless steel, Teflon, and the flexible bladder. 8" H x 5" dia.

Description	Model
Toxic interface unit.	HM-4190

Shipping wt. 6 lbs. (2.72kg)

Permeability Cells/Caps/Bases

Sample Size	Brass			Stainless Steel		
	Permeability Cell (Brass)	Top Cap (Polycarbonate)	Base Pedestal (Polycarbonate)	Permeability Cell (Stainless Steel)	Top Cap (Stainless Steel)	Base Pedestal (Stainless Steel)
35 mm	HM-4188B	HM-4193.35T	HM-4193.35B	HM-4188SS	HM-4193.35TSS	HM-4193.35BSS
1.4 in	HM-4188B	HM-4193.14T	HM-4193.14B	HM-4188SS	HM-4193.14TSS	HM-4193.14BSS
50 mm	HM-4188B	HM-4193.50T	HM-4193.50B	HM-4188SS	HM-4193.50TSS	HM-4193.50BSS
2.0 in	HM-4188B	HM-4193.20T	HM-4193.20B	HM-4188SS	HM-4193.20TSS	HM-4193.20BSS
70 mm	HM-4188B	HM-4193.70T	HM-4193.70B	HM-4188SS	HM-4193.70TSS	HM-4193.70BSS
2.8 in	HM-4188B	HM-4193.28T	HM-4193.28B	HM-4188SS	HM-4193.28TSS	HM-4193.28BSS
100 mm	HM-4188B	HM-4193.100T	HM-4193.100B	HM-4188SS	HM-4193.100TSS	HM-4193.100BSS
4.0 in	HM-4188B	HM-4193.40T	HM-4193.40B	HM-4188SS	HM-4193.40TSS	HM-4193.40BSS



Permeability Accessories

A. Latex Membranes

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.

B. Membrane Stretcher

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

C. O-Rings

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

D. O-Ring Placing Tool

Position rings to seal membrane with minimum disturbance to specimen.

E. Porous Stones

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

F. Membrane Tester

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

G. Two-Part Vacuum Split Former

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

H. Two-Part Split Miter Box

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

I. Filter Paper

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

J. Sample Trimmer with Knife

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

K. High Vacuum Grease

Effective means of sealing latex membranes to sides of the top cap and base pedestal. Especially useful during sample preparation.

Permeability Accessories

	A*	B	C*	D	E*	F	G	H	I	J	K
Sample Size	Latex Membranes (0.012" thick) (12/pkg)	Membrane Stretcher	O-Rings (12/pkg)	O-Ring Placing Tool	Porous Stones (1/4" thick)	Membrane Tester	Two-Part Vacuum Split Former	Two-Part Split Miter Box	Filter Paper (100/pkg)	Sample Trimmer w/Knife	Vacuum Grease
35 mm	HM-4180.14	HM-4181.14	HM-4182.14	HM-4183.14	HM-4184.35	HM-4185.14	HM-3821M	HM-3841M	HM-4189.14	HM-4186.14	HM-4198
1.4 in	HM-4180.14	HM-4181.14	HM-4182.14	HM-4183.14	HM-4184.14	HM-4185.14	HM-3821	HM-3841	HM-4189.14	HM-4186.14	
50 mm	HM-4180.20	HM-4181.20	HM-4182.20	HM-4183.20	HM-4184.50	HM-4185.20	HM-3824M	HM-3844M	HM-4189.20	HM-4186.20	
2.0 in	HM-4180.20	HM-4181.20	HM-4182.20	HM-4183.20	HM-4184.20	HM-4185.20	HM-3824	HM-3844	HM-4189.20	HM-4186.20	
70 mm	HM-4180.28	HM-4181.28	HM-4182.28	HM-4183.28	HM-4184.70	HM-4185.28	HM-3827M	HM-3847M	HM-4189.28	HM-4186.28	
2.8 in	HM-4180.28	HM-4181.28	HM-4182.28	HM-4183.28	HM-4184.28	HM-4185.28	HM-3827	HM-3847	HM-4189.28	HM-4186.28	
100 mm	HM-4180.40	HM-4181.40	HM-4182.40	HM-4183.40	HM-4184.100	HM-4185.40	HM-3828M	HM-3848M	HM-4189.40	HM-4186.40	
4.0 in	HM-4180.40	HM-4181.40	HM-4182.40	HM-4183.40	HM-4184.40	HM-4185.40	HM-3828	HM-3848	HM-4189.40	HM-4186.40	

* Other sizes and thicknesses are available on request.



HM-4130.28

Permeability Test Sets

Basic Permeability Test Sets

Sample Size	One Cell Permeability Test Set	Two Cell Permeability Test Set	Three Cell Permeability Test Set	Four Cell Permeability Test Set	Five Cell Permeability Test Set
35 mm	HM-4110.35	HM-4120.35	HM-4130.35	HM-4140.35	HM-4150.35
1.4 in	HM-4110.14	HM-4120.14	HM-4130.14	HM-4140.14	HM-4150.14
50 mm	HM-4110.50	HM-4120.50	HM-4130.50	HM-4140.50	HM-4150.50
2.0 in	HM-4110.20	HM-4120.20	HM-4130.20	HM-4140.20	HM-4150.20
70 mm	HM-4110.70	HM-4120.70	HM-4130.70	HM-4140.70	HM-4150.70
2.8 in	HM-4110.28	HM-4120.28	HM-4130.28	HM-4140.28	HM-4150.28
100 mm	HM-4110.100	HM-4120.100	HM-4130.100	HM-4140.100	HM-4150.100
4.0 in	HM-4110.40	HM-4120.40	HM-4130.40	HM-4140.40	HM-4150.40

Components

Description	Model Series
Flexpanel(s);	HM-4150's or HM-4160's
Flexwall permeability cell(s);	HM-4188's
Top cap and base pedestal (one per cell);	HM-4193's
Membranes, one pkg. (12/pkg);	HM-4180's
Porous stones (two per cell);	HM-4184's
O-rings, one pkg. (12/pkg);	HM-4182's
De-Airing tank (one per set);	HM-4187E
Membrane stretcher (one per set);	HM-4181's
Membrane tester (one per set);	HM-4185's
Vacuum grease, one tube;	HM-4198

Permeability Test Set Optional Accessories

Description	Model Series
FOR MONITORING PORE PRESSURE:	
Pore pressure transducer.	HM-4170
De-airing block.	HM-4170B
Single-channel or four-channel readout.	HM-2350 or HM-2370
FOR TOXIC PERMEANTS:	
Stainless steel permeability cell.	HM-4188SS
Stainless steel top cap.	HM-4193 SS Series
Stainless steel base pedestal.	HM-4193 SS Series
Toxic interface units (two per cell).	HM-4190
FOR SPEEDING UP VERY LONG TESTS:	
Constant volume device.	HM-4192



HM-4187E



HM-4187



HM-4175

De-Airing Water Tank

For use with FlexPanel I & II Triaxial/Permeability Panels. Cast acrylic chamber, 6 dia. x 16" H (152x406mm). Head plate mounted with three fittings. Two are modified to allow 1/4" tubing to pass through to tank bottom, one for filling with tap water and the other for extracting the water once de-aired. The third fitting is used to connect vacuum/pressure to tank.

Description	Model
De-airing water tank, 6L.	HM-4187E

Shipping wt. 13 lb. (5.8kg)

Nold De-Aerator Water System

Completely self-contained unit produces 6-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. 1/55hp motor 110V, 60Hz. 7.5x7.5x20" (190x190x508mm).

Description	Model
Nold de-aerator, 6L.	HM-4187

Shipping wt. 19 lb. (8.6kg)

Digital Pore Pressure Set

For accurately measuring & 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.

Description, Complete Set	Model
Digital pore pressure set. 115V, 50/60 Hz.	HM-4175
Digital pore pressure set. 220V, 50/60 Hz.	HM-4175.4F

Shipping wt. 8 lb. (3.63kg)

Description, Component Parts	Model
Pore pressure transducer (200 psi).	HM-4170
De-airing block.	HM-4170B
Single-channel readout, 4-digit. 115V, 50/60 Hz.	HM-2350
Single-channel readout, 4-digit. 220V, 50/60 Hz.	HM-2350.4F



Two-Part Compaction Molds

Two-Part Compaction Molds		
Sample Size	Two-Part Compaction Mold	Base Plate Pedestal
35mm	HM-3811M	HM-3811MBP
1.4"	HM-3811	HM-3811BP
38mm	HM-3812M	HM-3812MBP
1.5"	HM-3812	HM-3812BP
1.875"	HM-3813	HM-3813BP
50mm	HM-3814M	HM-3814MBP
2.0"	HM-3814	HM-3814BP
2.36"	HM-3815	HM-3815BP
2.5"	HM-3816	HM-3816BP
70mm	HM-3817M	HM-3817MBP
2.8"	HM-3817	HM-3817BP
100mm	HM-3818M	HM-3818MBP
4.0"	HM-3818	HM-3818BP
6.0"	HM-3819	HM-3819BP
Wire Saw		HM-3175

Open-Type Miter Box

For trimming and squaring soil specimens, miter box consists of base and sides. Opening is 3.2"W X 3-1/2"H (81x89mm) Plated for corrosion resistance.

Description	Model
Open-type miter box.	H-4187

Shipping wt. 10 lbs. (4.5kg)



HM-3130,
HM-3130.14,
HM-3130.28,
HM-3175

Soil Sample Trimmers

For cutting samples to precise diameters. Adjustable between 1–4" (see exact diameters in chart below) 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 platens and saw separately.

Description	Model
Soil sample trimmer, 1.0 to 3.0". Order platens separately.	HM-3130
Soil sample trimmer, 1.0 to 4.0". Order platens separately.	HM-3140

Shipping wt. 6 lbs. (2.72kg)

Accessories for Soil Sample Trimmers

For use with HM-3130 & HM-3140.

Description, Replacement Parts & Accessories	Model
Top platen, 1.0".	HM-3130.10
Top platen, 1.4".	HM-3130.14
Top platen, 1.875".	HM-3130.18
Top platen, 2.0".	HM-3130.20
Top platen, 2.5".	HM-3130.25
Top platen, 2.8".	HM-3130.28
Top platen, 3.0".	HM-3130.30
Top platen, 4.0".	HM-3130.40
Wire saw (w/replaceable wire).	HM-3175



HM-3860, HM-3880, HM-3802



Economy Manometer Tube Stand

Economical manometer tube stand for use with many permeameters. Two acrylic tubes with valving mounted on aluminum rail, with scale for monitoring flow volumes. Scale is 100 cm long with cm and mm graduations. Each tube has own valve to allow running two tests. Wall mounted or free standing manometer available. Meets ASTM D2434.

Description	Model
Wall mounted manometer tube stand.	HM-3860
Free standing manometer tube stand.	HM-3861

Shipping wt. 8 lbs. (3.7kg)

Constant Head Tank

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 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.

Description	Model
Constant head tank, 1000cc.	HM-3880
Constant head tank, 4000cc.	HM-3881

Shipping wt. 8 lbs. (3.7kg)



Detail of HM-3802

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 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. Meets ASTM D2434; BS 1377 Part 1990.

Description	Model
Permeameter cell, 2.5". (63.4mm).	HM-3801
Permeameter cell, 3.0". (76mm).	HM-3802
Permeameter cell, 4.5" (114mm).	HM-3803
Permeameter cell, 6.0" (152mm).	HM-3804
Permeameter cell, 9.0" (229mm).	HM-3805

Shipping wt. 7 to 12 lbs. (3.2 to 5.4kg)

Compacting Hammer

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.

Description	Model
Compacting hammer.	HM-3701

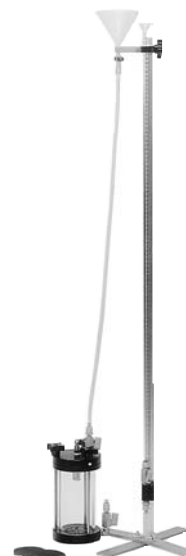
Shipping wt. 6 lbs. (2.72kg)



HM-3915



H-4145, H-4146



HM-3892

Shelby Tube Permeameter

Saves time & money by performing permeability test right in the actual Shelby tube liner. Ideal for cohesionless materials and sands. It is suggested that specimen be ejected at test conclusion and examined for voids or large pieces 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.

Description	Model
Shelby tube permeameter, 2".	HM-3913
Shelby tube permeameter, 2.5".	HM-3914
Shelby tube permeameter, 3".	HM-3915

Shipping wt. 6 lbs. (2.72kg)

Compaction Permeameters

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.

Description	Model
Soil permeameter, 4".	H-4145
Soil permeameter, 6".	H-4146

Shipping wt. 18 lbs. (8.16kg)

Note: Manometers available in various sizes for permeameters.

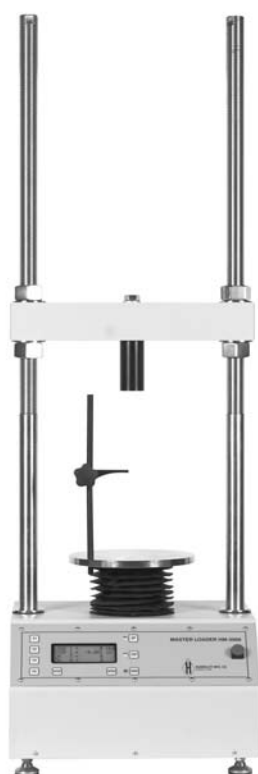
Constant/Falling Head Permeameters

For use with granular soils for determining the coefficient of permeability via the constant or falling head method for laminar flow of water. Acrylic chamber allows viewing. Compact & portable unit has 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 & clamping ring of anodized aluminum. Each set complete with: chamber with valves; manometer tube; two funnels; either porous stones or perforated screens, depending on the diameter; and tubing for connection to water source.

Description	Model
Constant/falling head permeameter set, 2.5" (63.4mm).	HM-3891
Constant/falling head permeameter set, 3.0" (76mm).	HM-3892
Constant/falling head permeameter set, 4.5" (114mm).	HM-3893
Constant/falling head permeameter set, 6.0" (152mm).	HM-3894
Constant/falling head permeameter set, 9.0" (229mm).	HM-3895

Shipping wt. 13 lbs. (5.9kg)

HM-3000 Series



Digital MasterLoader

Designed for applications requiring multi-purpose loading systems, the HM-3000 series MasterLoader is ideal for road construction projects, educational institutions and start-up labs. Its modular design minimizes initial costs and allows easy upgrades as desired. 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. Key features include:

- Microprocessor-based stepper motor speed control
- Four channel analogue-to-digital converter with real-time data acquisition
- Large, backlit LCD display 5 x 2-3/4" (127 x 70 mm)
- Touch-sensitive keypad
- Emergency stop button
- Speeds range 0-3.0000 in/min (0-75.0000 mm/min) fully-adjustable by the user
- RS-232 interface for computer control of load frame functions and data transfer
- Analogue output port for use with Xyt chart recorder
- Nonvolatile storage of test data and instrument calibration
- Battery-backed, real-time clock
- Auto conversion of instrument calibration and speed from English units to SI units and vice versa
- Test setup and selection via keypad
- Fully-automatic test performing (starting/stopping the motor, speed selection and acquisition of test data)
- Download test data for data analysis via Windows®-based software (included)



HM-3001



HM-3002



HM-3004



HM-3006

For TSR
HM-2300.100H-1349
or
H-1369
sold
separately

Specifications:

Mechanical:	
Dimensions (l x w x h)	17 x 19 x 59" (430 x 480 x 1500mm)
Platen Travel	4" (100mm) Max.
Net Weight	240 lbs. (110Kg)
Shipping Weight	85 lbs. (130Kg)
Speed Range	0 -3.0000 in/min (0 - 75.0000 mm/min)
Load Capacity	11,000 lbs. (50 KN)
Vertical Clearance	40" (1000mm) Max.
Horizontal Clearance	15" (380mm)
Electrical /Electronics:	
Current	8.5 Amps
A/D Digital Converter	16 Bit
Data Storage	4000 Reading
Data Collection Rate	100 ms
Computer Port	RS232

Description	Model
Digital MasterLoader, 110/220 VAC 50/60Hz.	HM-3000.3F

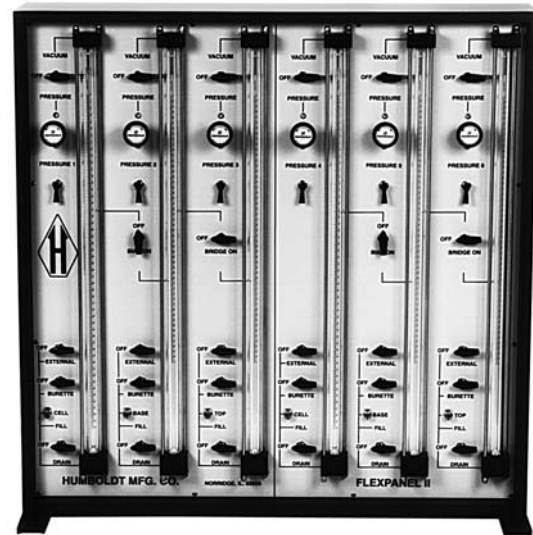
Description, Accessories	Model
CBR Accessory Set. Consists of a 10,000 lb.(50 KN) load cell, 1.0" (25mm) displacement transducer with mounting bracket and CBR Plunger.	HM-3001
Unconsolidated Undrained (UU) Triaxial Accessory Set. Consists of a 2,000 lb. (10 KN) load cell, ball seat adapter, and a 2.0" (50mm) displacement transducer with mounting bracket.	HM-3002
Consolidated Undrained (CU) Triaxial Accessory Set. Consists of a 2,000 lb. (10 KN) load cell, ball seat adapter, 2.0" (50mm) displacement transducer with mounting bracket, and a 200 PSI (1400 kPa) pore water pressure transducer with deairing block.	HM-3003
Unconfined Compression (UC) Accessory Set. Consists of a 500 lb. (2.5 KN) load Cell, 2.0" (50mm) displacement transducer with mounting bracket, and a unconfined upper platen.	HM-3004
Marshall Stability Accessory Set. Consists of a 10,000 lb. (50 KN) load cell, and a 1.0" (25mm) displacement transducer with mounting bracket.	HM-3005
Soil Cement Accessory Set. Consists of a 10,000 lb. (50 KN) load cell, and soil cement platen set.	HM-3006
For TSR use HM.2300.100 and H-1349 or H-1369.	



HM-4140



HM-4150



HM-4160A

FlexPanel Series Constant Pressure System

FlexPanel pressure distribution panels are used for triaxial and permeability testing of standard or contaminated soil samples, including soils containing hazardous or toxic waste.

- 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
- Cost efficient, expandable system

- Uses no-volume-change Whitey valves
- Bridge feature delivers simultaneous control of base and top pressures by adjusting one pressure regulator
- 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
- Quick-connect inlets and outlets

FlexPanel Master Controller Panels

Description	Shipping Weight	Model
FlexPanel master controller panel, 110V, 60Hz.	18 lbs. (8.2kg)	HM-4140
FlexPanel master controller panel, 220V, 50/60Hz.	18 lbs. (8.2kg)	HM-4140.4F
FlexPanel I 3-burette testing panel with master controller 110V, 60Hz.	95 lbs. (43kg)	HM-4150
FlexPanel I 3-burette testing panel with master controller 220V, 50/60Hz.	95 lbs. (43kg)	HM-4150.4F
FlexPanel II 6-burette testing panel with master controller 110V, 60Hz.	125 lbs. (56.7kg)	HM-4160
FlexPanel II 6-burette testing panel with master controller 220V, 50/60Hz.	125 lbs. (56.7kg)	HM-4160.4F

FlexPanel Add-On Panels

Description	Shipping Weight	Model
FlexPanel I 3-burette testing panel without master controller.	77 lbs. (34.9kg)	HM-4150A
FlexPanel II 6-burette testing panel without master controller.	157 lbs. (71.2kg)	HM-4160A



HM-4199 Series

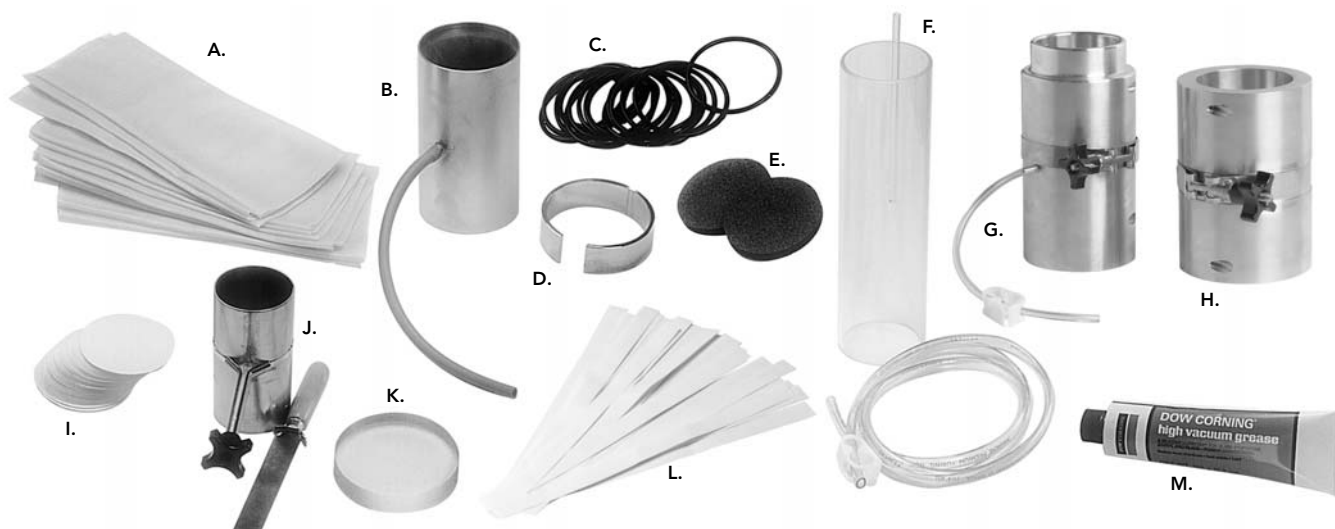
Triaxial Cells

HM-4199B is ideal for sample sizes from 1.4" (35mm) to 3" (75mm). The clear acrylic chamber has a working pressure of 150 psi (1,000 Kpa) and is tested to 250 psi (1,700 Kpa). The new state-of-art design features a solid base making it easier to center on the platen and more timely test set-up; top of the cell and chamber are all one piece that easily detaches by removing three knobs for extremely easy access to the sample; de-airing block for the pore pressure transducer is also built into the side of the cell. Cell has 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/emptying and providing confining pressure to the cell. Removable base pedestal accommodates various sample diameters. Top cap and base pedestal are available in choice of black anodized aluminum or stainless steel in various sizes (see chart below). Other sizes available.

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 (stainless steel for use with hazardous materials). Order top cap, base pedestal and porous stones separately. Cell 13-3/4"H x 8-3/4" dia. (349.2 x 222.3mm); 11" (279.4mm) overall dia.

Triaxial Cells/Caps/Bases

Sample Size	Brass			Stainless Steel		
	Triaxial Cell (Brass)	Top Cap (Aluminum)	Base Pedestal (Aluminum)	Triaxial Cell (Stainless Steel)	Top Cap (Stainless Steel)	Base Pedestal (Stainless Steel)
35 mm	HM-4199B	HM-4199.35T	HM-4199.35B	HM-4199SS	HM-4199.35TSS	HM-4199.35BSS
1.4 in	HM-4199B	HM-4199.14T	HM-4199.14B	HM-4199SS	HM-4199.14TSS	HM-4199.14BSS
38mm	HM-4199B	HM-4199.38T	HM-4199.38B	HM-4199SS	HM-4199.38TSS	HM-4199.38BSS
50 mm	HM-4199B	HM-4199.50T	HM-4199.50B	HM-4199SS	HM-4199.50TSS	HM-4199.50BSS
2.0 in	HM-4199B	HM-4199.20T	HM-4199.20B	HM-4199SS	HM-4199.20TSS	HM-4199.20BSS
70 mm	HM-4199B	HM-4199.70T	HM-4199.70B	HM-4199SS	HM-4199.70TSS	HM-4199.70BSS
2.8 in	HM-4199B	HM-4199.28T	HM-4199.28B	HM-4199SS	HM-4199.28TSS	HM-4199.28BSS
100 mm	HM-4199B-4	HM-4199.100T	HM-4199.100B	HM-4199SS-4	HM-4199.100TSS	HM-4199.100BSS
4.0 in	HM-4199B-4	HM-4199.40T	HM-4199.40B	HM-4199SS-4	HM-4199.40TSS	HM-4199.40BSS



Triaxial Accessories

A. Latex Membranes

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.

B. Membrane Stretcher

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

C. O-Rings

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

D. O-Ring Placing Tool

Position rings to seal membrane with minimum disturbance to specimen.

E. Porous Stones

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

F. Membrane Tester

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

G. Two-Part Vacuum Split Former

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

H. Two-Part Split Miter Box

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

I. Filter Paper

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

J. Sample Trimmer with Knife

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

K. Base Disk

Acrylic disk used in UU triaxial test.

L. Filter Paper Strips

Wrapped around sample to accelerate saturation in triaxial testing. 50pkg.

M. High Vacuum Grease

Effective means of sealing latex membranes to sides of the top cap and base pedestal. Especially useful during sample preparation.

Triaxial Accessories

	A	B	C	D	E	F	G	H	I	J	K	L	M
Sample Size	Latex Membranes (0.012" thick) (12/pkg)	Membrane Stretcher	O-Rings (12/pkg)	O-Ring Placing Tool	Porous Stones (1/4" thick)	Membrane Tester	Two-Part Vacuum Split Mold	Two-Part Split Miter Box	Filter Paper (100/pkg)	Sample Trimmer w/Knife	Base Disk	Filter Paper Strips	Vacuum Grease
35mm	HM-4180.14	HM-4181.14	HM-4182.14	HM-4183.14	HM-4184.35	HM-4185.14	HM-3821M	HM-3841M	HM-4189.14	HM-4186.14	HM-4179.35	HM-4189FS 5 x 150mm Grade 55 (pkg/100)	HM-4198
38mm	HM-4180.38	HM-4181.38	HM-4182.38	HM-4183.38	HM-4184.38	HM-4185.38	HM-3822M	HM-3842M	HM-4189.38	HM-4186.38	HM-4179.38		
50mm	HM-4180.20	HM-4181.20	HM-4182.20	HM-4183.20	HM-4184.50	HM-4185.20	HM-3824M	HM-3844M	HM-4189.20	HM-4186.20	HM-4179.50		
70mm	HM-4180.28	HM-4181.28	HM-4182.28	HM-4183.28	HM-4184.70	HM-4185.28	HM-3827M	HM-3847M	HM-4189.28	HM-4186.28	HM-4179.70		
100mm	HM-4180.40	HM-4181.40	HM-4182.40	HM-4183.40	HM-4184.100	HM-4185.40	HM-3828M	HM-3848M	HM-4189.40	HM-4186.40	HM-4179.100		
150mm	HM-4180.60	HM-4181.60	HM-4182.60	HM-4183.60	HM-4184.150	HM-4185.60	HM-3829M	HM-3849M	HM-4189.60	HM-4186.60	HM-4179.150		
1.4 in	HM-4180.14	HM-4181.14	HM-4182.14	HM-4183.14	HM-4184.14	HM-4185.14	HM-3821	HM-3841	HM-4189.14	HM-4186.14	HM-4179.14		
2.0 in	HM-4180.20	HM-4181.20	HM-4182.20	HM-4183.20	HM-4184.20	HM-4185.20	HM-3824	HM-3844	HM-4189.20	HM-4186.20	HM-4179.20		
2.8 in	HM-4180.28	HM-4181.28	HM-4182.28	HM-4183.28	HM-4184.28	HM-4185.28	HM-3827	HM-3847	HM-4189.28	HM-4186.28	HM-4179.28		
4.0 in	HM-4180.40	HM-4181.40	HM-4182.40	HM-4183.40	HM-4184.40	HM-4185.40	HM-3828	HM-3848	HM-4189.40	HM-4186.40	HM-4179.40		
6.0 in	HM-4180.60	HM-4181.60	HM-4182.60	HM-4183.60	HM-4184.60	HM-4185.60	HM-3829	HM-3849	HM-4189.60	HM-4186.60	HM-4179.60		



Automated Triaxial Testing System

The Humboldt Automated Triaxial Testing System is a state-of-the-art system specifically designed for soil testing laboratories conducting UU, CU, and CD triaxial, unconfined compression and other tests, such as CBR, LBR and Marshall tests. This is the most advanced Triaxial testing system available to soil testing laboratories on the market today. The system consists of a microprocessor-based Tri-Scan 50 frame, incorporating a large graphical display and a touch-sensitive keypad for data entry, Master Logger 300 allowing data acquisition from load, strain, pore pressure and volume transducers for up to 64 channels. The System includes the Flex Panel, Triaxial Cell, Automatic Pressure Controller (APC), computer and accessories.

In addition, the WinTriax reporting software allows the user to transform from collected data effective and total triaxial testing reports at the click of a mouse. The system allows for real-time display of current test curves for easy monitoring of test progress. Data acquisition is automated from the computer by setting trigger conditions to start and stop logging. Tests are automatically initiated and terminated, as well as from the computer, by the preset channel condition offering the freedom of unsupervised triaxial testing in a timely manner.

Key Features include:

- 11,000 lb. (50kN) capacity load frame
- Microprocessor-based load frame
- Fully-automated computer-controlled system
- Flex Panel readability to 0.02cc for the 10cc burette and 0.1cc burette and 0.1cc for the 50cc burette.
- Flex Panel is economically expandable for multiple test chambers
- Triaxial Cell, up to 3 (built-in de-airing block)
- Capable of monitoring and logging up to 64 channels

Description	Model
Tri-Scan 50, Standard Version 110/220V, 50/60Hz	HM-2605.3F
Ball Seat Adapter, Qty. 1.	HM-200387
Automatic Pressure Controller, Dual Channel 110/220V, 50/60Hz, Qty. 1.	HM-2451.3F
FlexPanel I, (3-burette/master control) 110/60Hz, Qty. 1.	HM-4150
S-Type Load Cell 2,000 lbs. (10kN), Qty. 1.	HM-2300.020
Strain Transducer 2.0 (50mm), Qty. 1.	HM-2310.20
Displacement Transducer Bracket, Qty. 1.	HM-4178BRT
Triaxial Cell, (up to 3 Qty.) brass fittings, built-in de-airing block, Qty. 1.	HM-4199B
Top Cap and Base Pedestal (choose sample size), Qty. 1.	HM-4199.xx
Pore Pressure Transducer, 200psi., Qty. 1.	HM-4170
Automatic Volume Change Device (add ddi or transducer), Qty. 1.	HM-2315
Strain Transducer 1 (25mm), Qty. 1.	HM-2310.10
Bracket for Strain Transducer, Qty. 1.	HM-2310BR
De-Airing Tank, Qty. 1.	HM-4187E
Master Logger 300, 110/220V, Qty. 1.	HM-2250.3F
Eight-channel Analogue Input Module, Qty. 1.	HM-2251
WinTRIAX Reporting Software, Qty. 1.	HM-2155
See Page 159 for Sample Preparation Accessories	



Unconsolidated Undrained (UU) Triaxial Test Sets

Meets ASTM D2850; BS1377 Part 7 1990.

Mechanical UU Triaxial Setup	
Each Set Includes:	Model
Flexpanel or Flexpanels.	HM-4150's
(1) Triaxial Load Frame.	HM-2000A
(1) 1,000 lb. (5kN) Proving Ring.	H-4454.010
(1) 1" Strain Indicator or 25mm Strain Indicator	H-4158.1 H-4465.25
Triaxial Cell or Cells.	HM-4199's
Top Cap & Base Pedestal, (1) for each cell.	HM-4199's
(1) Pkg. of Membranes (12/pkg.)	HM-4180's
Base Disk (2 each cell).	HM-4179's
(1) Pkg. of O-rings (12/pkg.)	HM-4182's
(1) Membrane Stretcher.	HM-4181's
(1) Membrane Tester.	HM-4185's
(1) Tube of Vacuum Grease.	HM-4198

Digital UU Triaxial Setup	
Each Set Includes:	Model
Flexpanel or Flexpanels.	HM-4150's
(1) Triaxial Load Frame.	HM-3000.3F
(1) 2,000 lb. (10kN) Load Cell.	HM-2300.020
(1) 2" (50mm) Strain Indicator	HM-2310.20
(1) Strain Indicator Bracket.	HM-4178BRT
Triaxial Cell or Cells.	HM-4199's
Top Cap & Base Pedestal, (1) for each cell.	HM-4199's
(1) Pkg. of Membranes (12/pkg.)	HM-4180's
Base Disk (2 each cell).	HM-4179's
(1) Pkg. of O-rings (12/pkg.)	HM-4182's
(1) Membrane Stretcher.	HM-4181's
(1) Membrane Tester.	HM-4185's
(1) Tube of Vacuum Grease.	HM-4198

Unconfined Compression Test Sets

Meets ASTM D2166; AASHTO T208; BS 1377 Part 7 1990.

Mechanical Unconfined Compression Setup	
Each Set Includes:	Model
(1) Triaxial Load Frame.	HM-2000A
(1) 1,000 lb (5kN) Proving Ring.	H-4454.010
(1) 1" Strain Indicator or 25mm Strain Indicator	H-4158.1 H-4465.25
(1) Lower Platen.	HM-2001
(1) Upper Platen	HM-2002

Digital Unconfined Compression Setup	
Each Set Includes:	Model
(1) Triaxial Load Frame.	HM-3000.3F
(1) 500 lb (2.5kN) Load Cell.	HM-2300.005
(1) 2" (50mm) Strain Indicator	HM-2310.20
(1) Upper Platen	HM-2002



HM-4187E

De-Airing Water Tank

For use with FlexPanel I & II Triaxial/Permeability Panels. Cast acrylic chamber, 6 dia. x 16"H (152x406mm). Head plate mounted with three fittings. Two are modified to allow 1/4" tubing to pass through to tank bottom, one for filling with tap water and the other for extracting the water once de-aired. The third fitting is used to connect vacuum/pressure to tank.

Description	Model
De-airing water tank, 6L.	HM-4187E

Shipping wt. 13 lb. (5.8kg)

Nold De-Aerator Water System

Completely self-contained unit produces 6-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. 1/55hp motor 110V, 60Hz. 7.5x7.5x20" (190x190x508mm).

Description	Model
Nold de-aerator, 6L.	HM-4187

Shipping wt. 19 lb. (8.6kg)



HM-4187



HM-3130, HM-3130.14, HM-3130.28, HM-3175

Soil Sample Trimmers

For cutting samples to precise diameters. Adjustable between 1–4" (see exact diameters in chart below) 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 platens and saw separately.

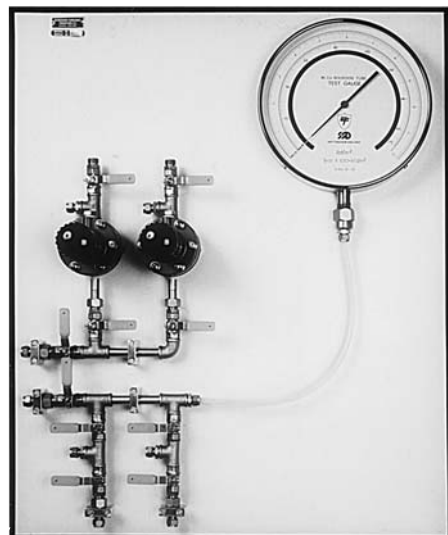
Description	Model
Soil sample trimmer, 1.0 to 3.0". Order platens separately.	HM-3130
Soil sample trimmer, 1.0 to 4.0". Order platens separately.	HM-3140

Shipping wt. 6 lbs. (2.72kg)

Accessories for Soil Sample Trimmers

For use with HM-3130 & HM-3140.

Description, Replacement Parts & Accessories	Model
Top platen, 1.0".	HM-3130.10
Top platen, 1.4".	HM-3130.14
Top platen, 1.875".	HM-3130.18
Top platen, 2.0".	HM-3130.20
Top platen, 2.5".	HM-3130.25
Top platen, 2.8".	HM-3130.28
Top platen, 3.0".	HM-3130.30
Top platen, 4.0".	HM-3130.40
Wire saw (w/replaceable wire).	HM-3175



HM-4152



HM-4151

Bladder Air-Water Cylinder Constant Pressure System

For distribution and control of de-aired water within triaxial testing systems.

Description	Shipping wt.	Model
2-Unit, Compressed Air/Water Control Panel.	35 lbs (16kg)	HM-4152
4-Unit, Compressed Air/Water Control Panel.	75 lbs (34kg)	HM-4154
6-Unit, Compressed Air/Water Control Panel.	97 lbs (44kg)	HM-4156

Bladder Air-Water Cylinders

For use with constant pressure systems to permit the use of de-aired water. Cost effective for multi output systems. Up to 1,000 kPa maximum pressure capacity. Panel-mounted precision pressure regulators. Standard gauge calibrated up to 1,200 kPa.

- Accurate within $\pm 0.1\%$ of full scale reading
- Can be used with any suitable compressor

Includes: one impervious rubber bladder; connections for 8mm o.d. tubing, air inlet, water outlet to triaxial cell, and pressure line. Pressure source required.

Description	Model
Bladder air-water cylinder.	HM-4151

Shipping wt. 19 lbs. (9kg)

Description, Replacement Parts & Accessories	Model
Spare bladder for HM-4151.	HM-4151.1



Resistivity Meter

The resistivity meter can be easily used to measure resistivity of soil in-situ using the 2, 3, or 4 electrode method or with the soil box to measure resistivity of soil or water in the range of distilled to sea water. It has a wide range (0.01 ohm to 1.1 megohm) in 8 ranges with 10% overlap. It is fully temperature stabilized over temperature ranges encountered in all field conditions; is insensitive to A.C. or D.C. ground currents; can be used safely in wet ground and comes with (1) 12-volt lantern battery and shoulder carrying strap.

Description	Model
Resistivity Meter.	H-4385

Shipping wt. 11 lbs (5kg)

Soil Box

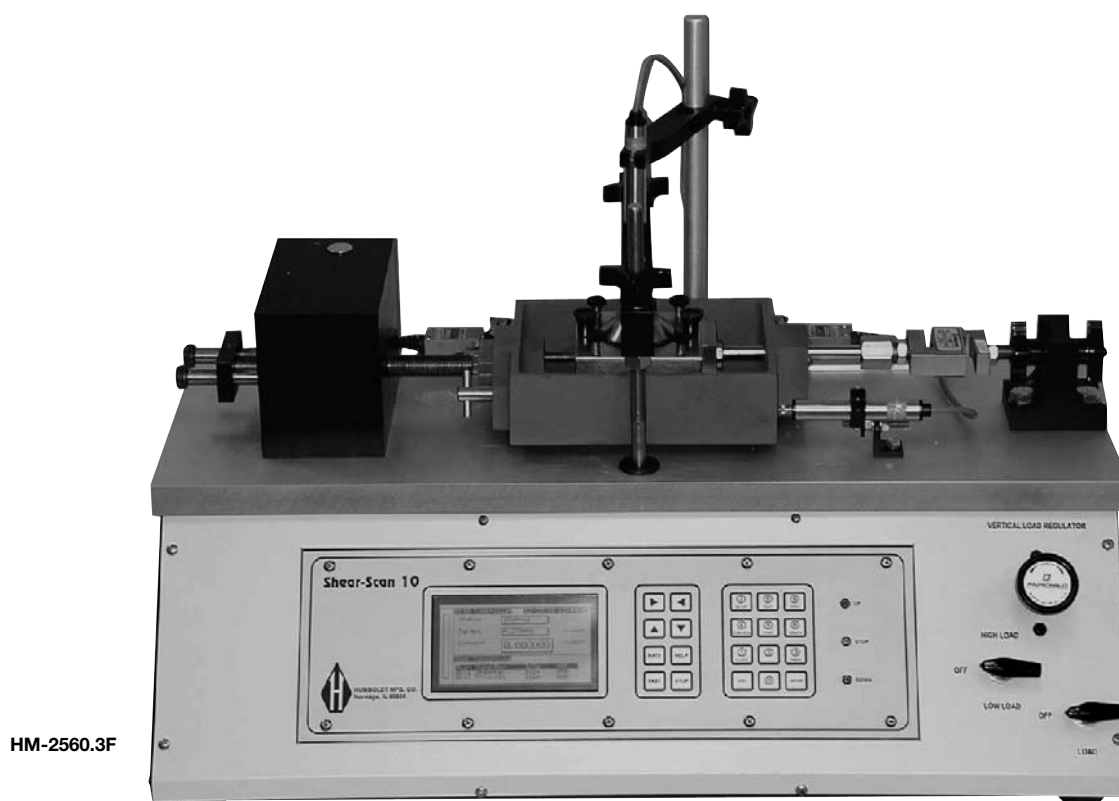
The soil box is used with H-4385 resistivity meter for a quick and accurate measurement of resistivity of a soil or water sample in the field or laboratory. Construction is clear plastic with stainless steel current plates and brass potential pins. The dimensions are such that the measured resistivity 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.

Description	Model
Soil box	H-4386
Soil box leads, set of 4.	H-4387

Resistivity Test Reel with Soil Pins

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.

Description	Model
Resistivity test reel with soil pins.	H-4388



ShearScan 10 Pneumatic Direct/Residual Shear Apparatus

- Windows menu-driven system
- Microprocessor control with stepper motor drive
- Real-time display via large graphical display (3x5") system
- Touch sensitive data entry keypad
- Variable speed settings from 0 to 0.40000 in/min (0 to 10,00000 mm/min)
- Up to 1000 readings per channel with time stamp
- Linear, Incremental and Custom logging modes
- Viewable test data in tabular and graphical form
- Password protected test/channel configuration and calibration
- Nonvolatile storage of test data and calibration
- Battery-backed real time clock
- RS232 serial port interface for computer/printer
- Auxiliary port for optional data acquisition channel expansion
- Optional WinShear PC program for control/data analysis

The Humboldt ShearScan 10 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 loading weights used in dead weight-type systems.

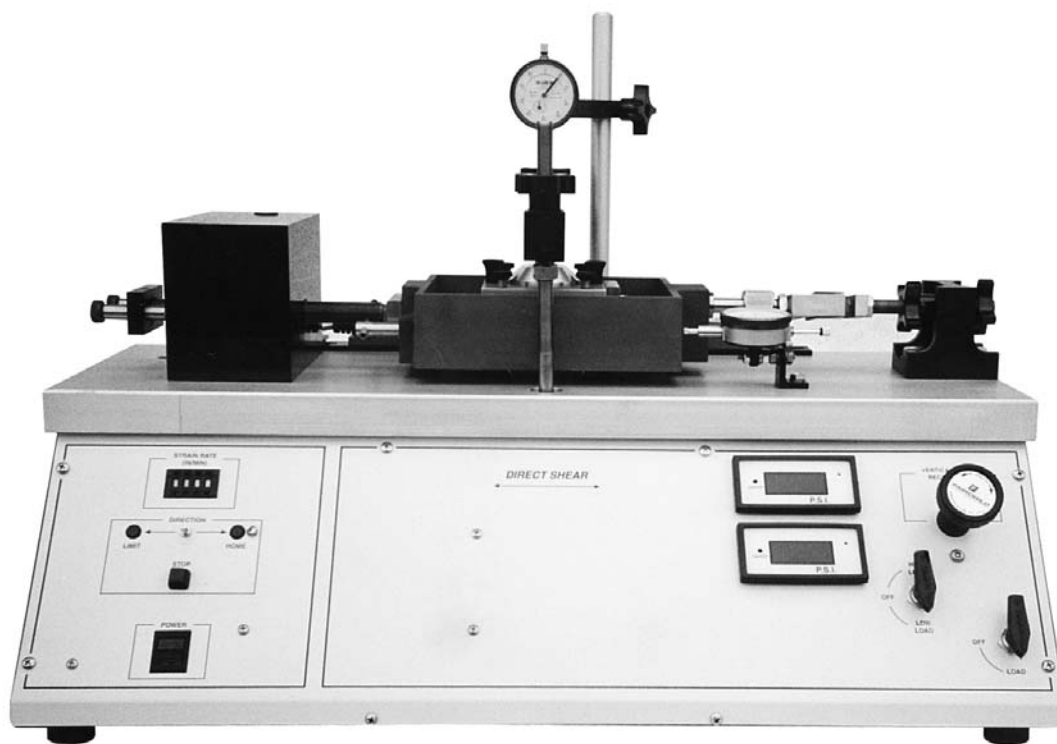
The microprocessor-based ShearScan 10 system features a stepper motor drive system, large graphical display, touch-sensitive keypad and forward/reverse travel limit switches. Through the use of a built-in 4-channel data acquisition system, the operator can preset the starting and stopping conditions 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 and shear boxes 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 ShearScan 10 is supplied complete with a 2,000 lb. (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. Meets ASTM D3080, AASHTO T236 and BS1377 standards.

Specifications:

Horizontal Movement.	2" (50.4mm) maximum
Vertical Load.	2,000 lbs. (10kN)
Horizontal Shear Force.	2,000 lbs. (10kN)
Speed Range.	0.00001 to 0.40000 in/min.; (0.00001 to 10,00000 mm/min)
Dimensions.	30"Lx15.5"Dx22"H (760x368x558mm)
Weight.	Net 140 lbs. (64kg); shipping 168 lbs. (76kg)



HM-2550

Pneumatic Direct/Residual Shear Apparatus (Basic Model)

- Basic, economical version for laboratories not requiring data acquisition and storage
- Pneumatic system eliminates cumbersome manual loading of weights
- 1,500 lb. (6.7kN) vertical load and horizontal shear force capacity
- Built-in digital readouts for vertical load pressure and horizontal shear force loads
- Shearbox assemblies available in a wide range of sizes

Similar in design to the ShearScan 10, this model offers the user a more basic version of the apparatus. The unit has built-in digital readouts for pressure and load. These are used for setting the vertical load and for measurement of shear forces. Horizontal and vertical shear displacement values are measured by means of two mechanical dial indicators. Shearbox assemblies and related accessories are not include and must be ordered separately. Meets ASTM D3080, AASHTO T236 and BS1377 standards.

Specifications:

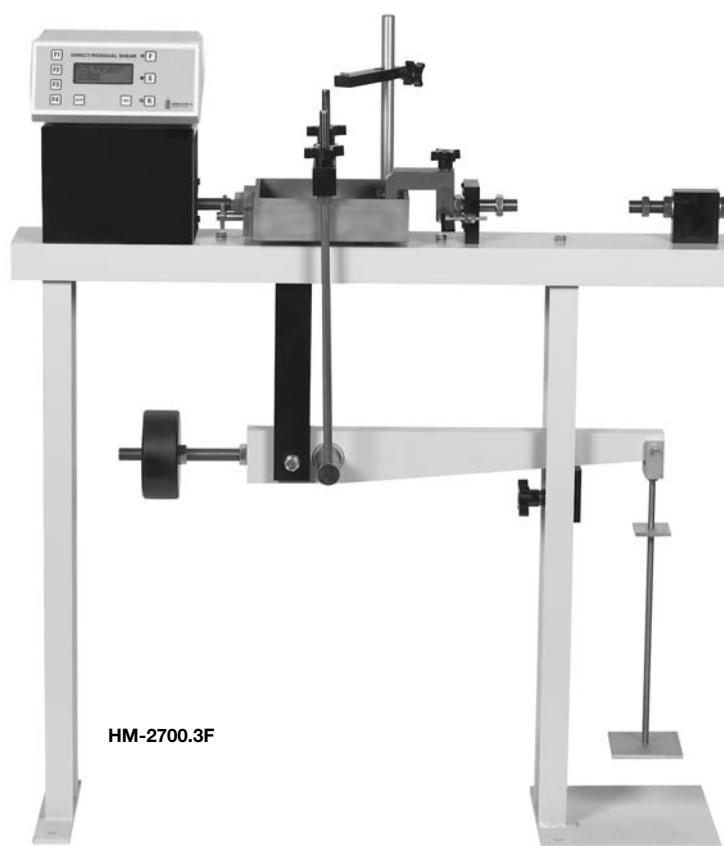
Horizontal Movement.	.08" (20.3mm) maximum
Vertical Load.	1,500 lbs. (6.7kN)
Horizontal Shear Force.	1,500 lbs. (6.7kN)
Speed Range.	0.0001 to 0.3 in/min.; (0.0025 to 7.6200 mm/min)
Dimensions.	30"Lx14.5"Dx22"H (760x368x558mm)
Weight.	Net 140 lbs. (64kg); shipping 190 lbs. (86.2kg)

Description	Model
ShearScan 10 direct/residual apparatus. 110-220V, 50/60 Hz, 1 ph.	HM-2560.3F

Description	Model
Pneumatic direct/residual apparatus. 110-120V, 50/60 Hz, 1 ph.	HM-2550
Pneumatic direct/residual apparatus. 220-240V, 50/60 Hz, 1 ph.	HM-2550.4F

Description, Accessories	Model
Auxilliary input, 4-digital channels.	HM-2625
Auxilliary input, 4-analog channels.	HM-2630
WinShear reporting software for control and data analysis	HM-2156

Shearbox and Accessories				
Sample Size	Shearbox (includes Porous Plates)	Cutter	Tamper	Porous Plate (Stones)
2.0" Dia.	HM-2551.20D	HM-2552.20D	HM-2553.20D	HM-2554.20D
2.42" Dia.	HM-2551.24D	HM-2552.24D	HM-2553.24D	HM-2554.24D
2.5" Dia.	HM-2551.25D	HM-2552.25D	HM-2553.25D	HM-2554.25D
60mm Sq.	HM-2551.60S	HM-2552.60S	HM-2553.60S	HM-2554.60S
60mm Dia.	HM-2551.60D	HM-2552.60D	HM-2553.60D	HM-2554.60D
100mm Sq.	HM-2551.100S	HM-2552.100S	HM-2553.100S	HM-2554.100S
100mm Dia.	HM-2551.100D	HM-2552.100D	HM-2553.100D	HM-2554.100D
4.0" Sq.	HM-2551.40S	HM-2552.40S	HM-2553.40S	HM-2554.40S
4.0" Dia.	HM-2551.40D	HM-2552.40D	HM-2553.40D	HM-2554.40D



HM-2700.3F

Direct/Residual Shear

A shear test in which soil or rock under applied normal load is stressed to failure by moving one section of the sample or sample container (shear box) relative to the other section. This test shears the sample along a predefined plane.

Direct/Residual Shear Apparatus

With stepless speed range from 0.00001 to 0.49999 in./min. (0.00001mm to 12.99999mm/min.) per minute with stepper motor control. Permits testing specimen of 60mm, 100mm, 2.5" and 4.0" dimension both square and circular. The speed rate for application of the shearing force can be rapidly adjusted manually. Maximum shear force 2,000 lb. (10 kN). Maximum consolidation force 2,000 lb. (10 kN). Carriage accepts shear box squares up to 100mm internal dimension. Forward and reverse measurements permit residual shear testing as standard. Safety feature prevents overload of load measuring system. Meets ASTM D3080, BS 1377.

- No gear changing required
- Stand mounted

Includes: carriage, stand, vertical load hanger, and balanced lever loading arm of 10:1 ratio that reduces weights required.

Description, Complete Set	Model
Direct Residual Shear Apparatus, 110/220V, 50/60Hz, 1ph.	HM-2700.3F
10:1 Lever Loading Device for fitting beneath stand for large stress application.	HM-2710
Direct Residual Shear Apparatus with analog inputs.	HM-2700A.3F
Direct Residual Shear Apparatus with digital inputs.	HM-2700D.3F

Shipping wt. 178 lbs. (52kg)

Description, English Set	Qty. in Set	Shipping wt.	Model
Direct/Residual shear set (English).		265 lbs	HM-2700.2.5
Set Includes:			
Direct/Residual Shear Apparatus.	1	178 lbs	HM-2700.3F
10:1 Lever Loading Device	1		HM-2710
Shearbox Assembly, 2.5" diameter	1	7 lbs	HM-2701.25D
Proving ring, 1,100 lbf (5.0 kN).	1	5 lbs.	H-4454.010
Mechanical Dial Gauge, 0.5x 0.0001". (Vert.)	1	1 lb.	H-4471
Mechanical Dial Gauge, 1.0x 0.001". (Horz.)	1	1 lb.	H-4158.1
Weight Set, 32 Kg. (4=1kg, 3=4kg, 2=8kg)	1	71 lbs.	HM-1122
Cutter, 2.5 in diameter.	1	1 lb.	HM-2702.25D
Dolly/Tamper, 2.5 in diameter.	1	1 lb.	HM-2703.25D
Description, Metric Set	Qty. in Set	Shipping wt.	Model
Direct/Residual shear set (Metric).		120 kg	HM-2700M.60
Set Includes:			
Direct/Residual Shear Apparatus.	1	81 kg	HM-2700.3F
10:1 Lever Loading Device	1		HM-2710
Shearbox Assembly, 60mm Square	1	3.2 kg	HM-2701.60S
Proving ring, 5.0kN (1,000lbf).	1	2.3kg	H-4454.010
Mechanical Dial Gauge, 12mm x 0.002mm. (Vert.)	1	1 kg	H-4465.12
Mechanical Dial Gauge, 25mm x 0.01mm. (Horz.)	1	1 kg	H-4465.25
Weight Set, 32 Kg. (4=1kg, 3=4kg, 2=8kg)	1	32 kg	HM-1122
Cutter, 60mm diameter.	1	.5 kg	HM-2702.60S
Dolly/Tamper, 2.5 in diameter.	1	.5 kg	HM-2703.60S



Shearbox & Accessories

Weights

Shearbox and Accessories

Shearbox and Accessories									
SQUARE					ROUND				
Sample Size	Shearbox	Cutter	Dolly/Tamper	Porous Plate	Sample Size	Shearbox	Cutter	Dolly/Tamper	Porous Plate
50mm square	HM-2701.50S	HM-2702.50S	HM-2703.50S	HM-2704.50S	50mm dia.	HM-2701.50D	HM-2702.50D	HM-2703.50D	HM-2704.50D
60mm square	HM-2701.60S	HM-2702.60S	HM-2703.60S	HM-2704.60S	60mm dia.	HM-2701.60D	HM-2702.60D	HM-2703.60D	HM-2704.60D
2.5" square	HM-2701.25S	HM-2702.25S	HM-2703.25S	HM-2704.25S	2.0" dia.	HM-2701.20D	HM-2702.20D	HM-2703.20D	HM-2704.20D
4.0" square	HM-2701.40S	HM-2702.40S	HM-2703.40S	HM-2704.40S	2.42" dia.	HM-2701.24D	HM-2702.24D	HM-2703.24D	HM-2704.24D
					2.5" dia.	HM-2701.25D	HM-2702.25D	HM-2703.25D	HM-2704.25D
					2.875" dia.	HM-2701.2875D	HM-2702.2875D	HM-2703.2875D	HM-2704.2875D
					4.0" dia.	HM-2701.40D	HM-2702.40D	HM-2703.40D	HM-2704.40D

Load Measuring Devices

Load Measuring Devices	Model
Proving ring w/ mechanical dial gauge, 220 lbf (1.0 kN).	H-4454.002
Proving ring with digital indicator, 220 lbf (1.0 kN).	H-4454.002D
Proving ring w/ mechanical dial gauge, 550 lbf (2.5 kN).	H-4454.005
Proving ring w/ digital indicator, 550 lbf (2.5 kN).	H-4454.005D
Load cell, 500 lbf (2.2 kN).	HM-2300.005
Proving ring w/ mechanical dial gauge, 1,100 lbf (5.0 kN).	H-4454.010
Proving ring w/ digital indicator, 1,100 lbf (5.0 kN).	H-4454.0010D
Load cell, 1,000 lbf (5.0 kN).	HM-2300.010
Data cable for digital indicator.	HM-4469C

Displacement Measuring Devices

Vertical Measuring Devices	Model
Mechanical dial gauge, 0.5x0.0001".	H-4471
Mechanical dial gauge, 12x0.002mm.	H-4465.12
Digital indicator, 0.5x0.0001".	HM-4469.05
Data cable for digital indicator.	HM-4469C
LVDT, 0.4" (10mm)	HM-2310.04
Horizontal Measuring Devices	Model
Mechanical dial gauge, 1.0x0.001".	H-4158.1
Mechanical dial gauge, 25x0.01mm.	H-4465.25
Digital indicator, 1.0x0.0001".	HM-4469.10
Data cable for digital indicator.	HM-4469C
LVDT, 1.0" (25mm).	HM-2310.10

Weights

Weight Sets							
Weight Set	1kg Weight	2kg Weight	4kg Weight	5kg Weight	8kg Weight	10kg Weight	Set Model Number
	HM-1122.1	HM-1122.2	HM-1122.4	HM-1122.5	HM-1122.8	HM-1122.10	
32kg Weight Set. Includes:	4	—	3	—	2	—	HM-1122
50kg Weight Set. Includes:	3	1	—	1	—	4	HM-1125



HM-2250.3F

Data Logging/Electronic Instrumentation

Now, data acquisition systems are available which offer unprecedented technology to dramatically increase laboratory productivity and cost effectiveness. More importantly, your increased use of these state-of-the-art devices and systems will increase the accuracy, reliability, and repeatability of every type of test you perform—saving recorded data for meaningful comparative analysis as well as for your permanent records. Automating your monitoring and other data logging systems can free your personnel for other tasks. And, most devices and systems are modular—giving you maximum choice, for example, the option to start with low cost digital indicators and later upgrade as you deem appropriate.

MasterLogger 300

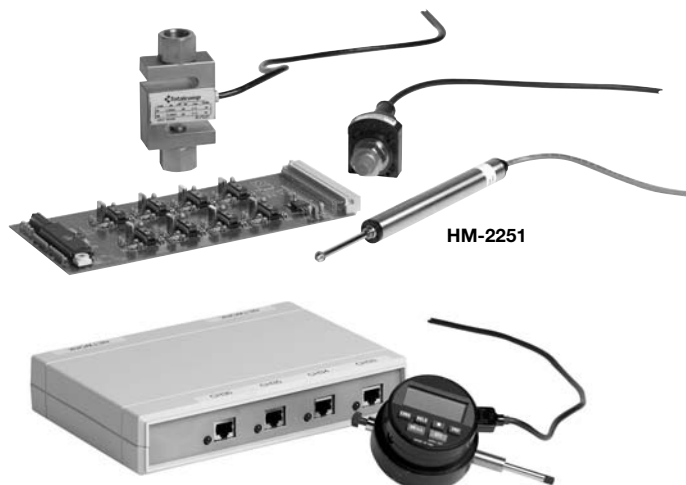
Make your every test routine easier and faster with this versatile and expandable microprocessor based system. Up to 64 channels, 16-bit A/D converter.

- Dial indicator & transducer excitation 10V
- Real time clock (HH:MM:SS, MM:DD:YY) and storage of logged data are battery backed
- Non-volatile storage of calibration
- Logged reading per channel of 512 max
- Logging rate configured in linear, logarithmic, square root, or incremental
- Automatic START/STOP logging modes in delay, greater than, and less than
- Windows™ WinHOST based PC program for a control/monitoring channel, or multiple channels
- Includes standard RS232 port for external interface
- Free-standing 19" rack EMC enclosure

Capable of channel configuration, calibration, and control via either standard RS232 port, or integral 20-key membrane touch pad. Graphics display of 240x64 pixels for viewing logged data.

Description	Model
MasterLogger-300, 110/220 VAC, 50/60Hz.	HM-2250.3F

Shipping wt. 20 lbs. (9kg)



HM-2253

MasterLogger Options	Model
Input Modules	
4-Channel digital input module.	HM-2253
8-Channel analogue input module.	HM-2251
Monitoring Software	
Host Management Software (WinHOST) data acquisition monitoring software (Windows version).	HM-2150
Reporting Software	
Win TRIAX, Triaxial Software.	HM-2155
Win SHEAR, Shear Software.	HM-2156
Win ODE, Consolidation Software.	HM-2157

GeoSpec2 Materials Testing Reporting Software

GeoSpec2 software is specifically designed for the construction materials testing industry. All modules are completely mouse driven and employ the Microsoft Windows® interface. The software can run on virtually any PC today and uses very little disk space and memory. Modules are currently included for Atterberg Limits, Proctor Density, Sieve Analysis, Concrete Compression, Asphalt Mix Analysis and Field Density reporting.

Description	Model
GeoSpec2 materials testing software.	HM-2165

**HM-2325, HM-2330****HM-2340**

miniScanner Series

miniScanner modules are microprocessor based with 4-line by 20 character LCD display and membrane touch pad designed for a broad spectrum of geotechnical laboratory applications.

miniScanner Twin-Channel Marshall/CBR/LBR Acquisition

Designed specifically for Marshall, CBR, LBR, UC, and UU testing. Includes standard RS232 port for external interface to printer or computer, plus two analog output channels for X/Yt chart recorder. Up to 999 reading per channel. In the Marshall mode, the two analog channels accept stability and flow measurements at a rate of four readings per second, with peak hold and auto tare. In the CBR, LBR, unconfined and UU mode, the two analog channels accept load and strain measurements at a rate of one reading per second with no peak hold.

Description	Model
miniScanner twin-channel Marshall/CBR display. 110V, 60Hz.	HM-2340
miniScanner twin-channel Marshall/CBR display. 220V, 50Hz.	HM-2340.5F

Shipping wt. 10 lbs. (4.5kg)

miniScanner Four-Channel Data Acquisition for Analog Instrumentation

For fully automated test data collection. Easy to use, stand-alone system specifically designed for soil testing laboratories. Ideal for Triaxial, UU, CU, CD, one dimensional consolidation, direct shear, and other tests.

- Windows™ based program for data acquisition monitoring
- Input for up to four analog transducers (0-100mV)
- Up to 250 storage of reading per channel
- Logging mode in linear, logarithmic, and square root times.

Includes: standard RS232 port for external interface, Real time clock, 16-bit A/D converter, and 10V transducer excitation supply.

Description	Model
miniScanner four-channel analog data acquisition unit. 110V, 60Hz.	HM-2325
mini Scanner four-channel analog data acquisition unit. 220V, 50Hz.	HM-2325.5F

Shipping wt. 10 lbs. (4.5kg)

miniScanner Four-Channel Data Acquisition for Digital Dial Indicators

For fully automated test data collection. Easy to use, stand-alone system specifically designed for soil testing laboratories. Ideal for Triaxial, UU, unconfined, one dimensional consolidation, direct shear, and other tests.

- Windows™ based program for data acquisition monitoring
- Auto start logging (greater than, less than, delay)
- Input for up to four digital indicators
- Up to 250 storage of reading per channel
- Logging mode in linear, logarithmic, and square root times.

Includes: standard RS232 port for external interface, and real time clock.

Description	Model
miniScanner four-channel analog to digital data acquisition unit. 110V, 60Hz.	HM-2330
miniScanner four-channel analog to digital data acquisition unit. 220V, 50Hz.	HM-2330.5F

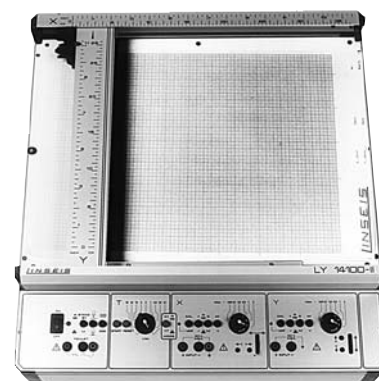
Shipping wt. 10 lbs. (4.5kg)



HM-2320



HM-2350



H-1326

Digital Transducer Readouts

Microprocessor based state-of-the-art instruments specifically designed for direct monitoring of load, displacement, pore water pressure, and volume change during laboratory soil testing. Readouts in engineering units. Provides excitation voltage to all Humboldt transducers for load cell, strain, pressure, and volume change.

Four-Channel Transducer Readout

Accepts four analog signals such as pressure, strain, load cell and volume change transducers. Conversion from analog to digital via 16-bit A/D converter. Channel readings in engineering units together with unit name and unit. Four line x 20 character LCD display. Membrane touch pad. Built-in stabilized voltage for transducer (10Vdc, -5Vdc). Input voltage (0-100mV). Includes standard RS232 port for external interface, plus four rear mounted 5-pin DIN plugs.

Description	Model
miniScanner, four-channel display. 110V, 60Hz.	HM-2320
miniScanner, four-channel display. 220V, 50Hz.	HM-2320.5F

Shipping wt. 10 lbs. (4.5kg)

Single Channel, 4-Digit Transducer Readout

Large, easy-to-read LED display. Two-point calibration with or without known (load, displacement, pressure). Built-in stabilized voltage for transducer (10Vdc, + 24Vdc). Input voltage (0-100mV, ± 50 mV, 0-10V, ± 5 V, 0-20mA, 4-20mA). Tare and peak hold features. Includes one rear mounted 5-pin DIN plug and carrying case. Optional analog output available.

Description	Model
Single channel, 4-digit transducer readout. 110V, 60Hz.	HM-2350
Single channel, 4-digit transducer readout. 220V, 50Hz.	HM-2350.5F

Shipping wt. 6 lbs. (2.72kg)

Single Channel, 6-Digit Transducer Readout

Large, easy-to-read LED display. Two-point calibration with or without known (load, displacement, pressure). Built-in stabilized voltage for transducer (10Vdc, + 24Vdc). Input voltage (0-100mV, ± 50 mV, 0-10V, ± 5 V, 0-20mA, 4-20mA). Tare and peak hold features. Includes one rear mounted 5-pin DIN plug and carrying case. Optional analog output and RS232 port for external interface available.

Description	Model
Single channel, 6-digit transducer readout. 110V, 60Hz.	HM-2360
Single channel, 6-digit transducer readout. 220V, 50Hz.	HM-2360.5F

Shipping wt. 6 lbs. (2.72 kg)

X-Y/t Chart Recorder

Single pen flatbed plotter. Over range indication. X-Y input range selectable (0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500, 1,000, 2,000, mV/cm). Time base on X-axis selectable (50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1, sec/cm). Includes two black pens and 100 sheets of DIN A4 paper.

Description	Model
X/Yt Chart Recorder, 110V, 60Hz.	H-1326
X/Yt Chart Recorder, 220V, 60Hz.	H-1326.2F
X/Yt Chart Recorder, 220V, 50Hz.	H-1326.5F

Shipping wt. 20 lbs. (9kg)

Description	Model
Replacement black pens, 5/pkg.	H-1326BP
Replacement DIN A4 graph paper, 100 sheets.	H-1326GP



HM-4175

Digital Pore Pressure Transducer Set

For reading back pressure and determining "B" value during the saturation stages of both triaxial and permeability tests. Includes: pore pressure transducer, de-airing block, and 4-digit single-channel readout.

Description, Complete Set	Model
Digital pore pressure set. 115V, 50/60 Hz.	HM-4175
Digital pore pressure set. 220V, 50/60 Hz.	HM-4175.4F

Shipping wt. 6 lbs. (2.72kg)

Description, Component Parts	Model
Pore pressure transducer (200 psi).	HM-4170
De-airing block.	HM-4170B
Single-channel readout, 4-digit. 115V, 50/60 Hz.	HM-2350
Single-channel readout, 4-digit. 220V, 50/60 Hz.	HM-2350.4F

Digital Pressure Transducer

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 half 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.

Description	Model
Digital pressure transducer.	HM-4172



HM-4172

Strain Indicators

Strain Indicators

Used for accurate vertical deformation of sample during triaxial tests.

Strain Indicator, Mechanical Dial Gauge

Description	Model
Dial gauge, 1,000x0.001" clockwise, 2-1/4" diam.	H-4158.1
Dial gauge, 2,000x0.001" clockwise, 2-3/4" diam.	H-4463
Dial gauge, 25x0.010mm clockwise, 57mm diam.	H-4465.25
Dial gauge, 50x0.02mm clockwise, 70mm diam.	H-4465.50

Strain Indicator, Digital Indicator

Description	Model
Digital dial gauge, 1.0" (25.0mm) x0.0001".	HM-4469.10
Digital dial gauge, 2.0" (50.0mm) x0.0001".	HM-4469.20
AC adapter for HM-4469.10, HM-4969.20.	HM-4469AC

Linear Strain Transducers

Description	Model
Linear strain transducer, 1.0" (25mm).	HM-2310.10
Linear strain transducer, 2.0" (50mm).	HM-2310.20
Mounting bracket for fitting LSCT to equipment instead of dial gauge.	HM-2310BR



H-4454.100



H-4454.100D



HM-2300 Series



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 Master Loader Multi-Use Compression Tester, and/or a wide variety of other instrumentation as well—such as using load rings together with digital indicators, or using with load cells for data acquisition.

Our high quality tensile steel rings have spherical seatings suitable for all shear boxes and load frames. Each load ring shipped with a fitted dial gauge and calibration certificate, and supplied with tables listing all measurement units. 8-1/4" (210mm) high, 3/4-16UNF thread female mounting. When using linear strain devices in automated systems, linearity is a factor, but does not apply when used with tables or equations. 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). Meets ASTM E74.

Load Rings

Description	Range and Measurement Units			Meets Spec.	Model (Analog Gauge) (Digital Gauge)
	lbf	kN	kgf		
Tensile steel load rings, 0.75% FS linearity, 0.15 % FS error, 8.20" high, 3/4-16 female mounting.	110	0.5	50	ASTM E74	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

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 asphalt, concrete or soil instrumentation to measure loads. Includes: 20 ft. cable with 5-pin DIN plug and calibration certificate. Order readout separately.

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:	300% 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

Description	Model
Load cell, 500 lbf (2.5 kN).	HM-2300.005
Load cell, 1000 lbf (5.0 kN).	HM-2300.010
Load cell, 2000 lbf (10.0 kN).	HM-2300.020
Load cell, 5000 lbf (25.0 kN).	HM-2300.050
Load cell, 10,000 lbf (50.0 kN).	HM-2300.100
Single channel readout.	HM-2350

Other capacities and styles (pancake, submersible) available, call: 1-800-537-4183 for details



H-4158.1



HM-4469.05



HM-2310 series

Mechanical Dial Gauges

For use in field and laboratory. High quality, low friction design for accurate, repeatable readings and long life. Continuous graduations and revolution counters.

Dial Indicators, Inches					
Range	Division	Diameter	Brake	Counter-clockwise Model	Model
0.200"	0.0001"	2-1/4"	No	H-4460CC	* H-4460
0.200"	0.0001"	2-1/4"	Yes	H-4461CC	* H-4461
0.300"	0.0001"	2-1/4"	No	H-4462CC	H-4462
0.500"	0.0001"	2-1/4"	No	H-4471CC	H-4471
1.000"	0.0010"	2-1/4"	No	H-4158.1CC	* H-4158.1
2.000"	0.0010"	2-3/4"	No	H-4463CC	* H-4463
3.000"	0.0010"	2-3/4"	No	H-4464CC	H-4464
* Models include two revolution counters					

Dial Indicators, Metric					
Range	Division	Diameter	Brake	Counter-clockwise Model	Clockwise Model
8mm	0.002mm	57mm	No	H-4465.08CC	H-4465.08
12mm	0.002mm	57mm	No	H-4465.12CC	H-4465.12
25mm	0.010mm	57mm	No	H-4465.25CC	H-4465.25
50mm	0.020mm	70mm	No	H-4465.50CC	H-4465.50

Digital Indicators

Switchable inch/metric digital indicator is accurate to $\pm 0.0001"$ (0.002mm). 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. Will replace any mechanical dial gauges.

Digital Indicators		
Range	Dial Face Diameter	Model
0.25x0.0001" (6.25x0.002mm)	2-1/4"	HM-4469.02
0.5x0.0001" (12.5x0.002mm)	2-1/4"	HM-4469.05
1.0x0.0001" (25.0x0.002mm)	2-1/4"	HM-4469.10
2.0x0.0001" (50.0x0.002mm)	2-1/4"	HM-4469.20
AC Adapter for digital indicators.		HM-4469AC
Data cable for digital indicators.		HM-4469C
6' extension cable.		HM-4170EC
25' extension cable.		HM-2310C

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.

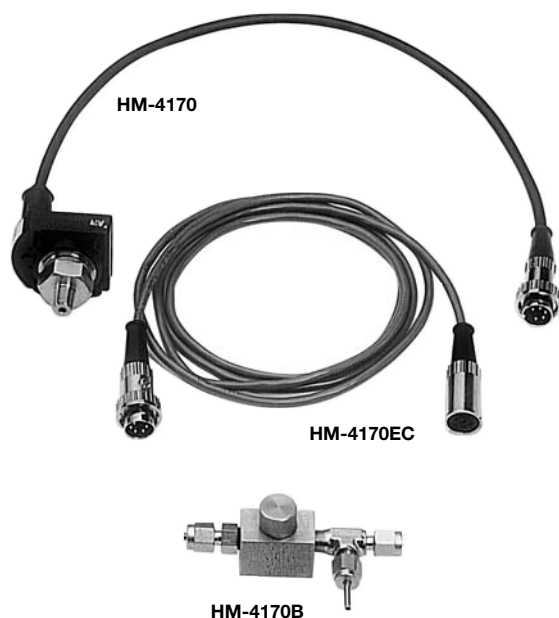
- Less than 250g spring force on spindle
- Non-linearity better than $\pm 0.1\%$ of full scale deflection
- Hysteresis-compensated with linearity better than $\pm 0.1\%$ of full scale in both directions
- Negligible temperature effect

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.

Description	Model
Linear strain transducer, 0.4"(10mm).	HM-2310.04
Linear strain transducer, 1.0" (25mm).	HM-2310.10
Linear strain transducer, 2.0" (50mm).	HM-2310.20

Mounting Brackets	Model
Mounting Bracket for fitting LSCT to equipment instead of dial gauge.	HM-2310BR
Mounting bracket for fitting LSCT to the upper part of a triaxial cell with a 15.5mm diam ram for strain measurement. (HM-2310BR also required.)	HM-4193BR

Other brackets available, call: 1-800-537-4183 for details



Pressure Measurement (Pore Pressure)

Highly accurate and reliable instruments designed especially for geotechnical testing laboratories.

- Outstanding overload protection
- Protected against corrosive pore water

Operating temperature range 0 to 70°C. Requires input of 10V DC; output up to 100 mV. Supplied with 2 meters of cable, plus a 5-pin DIN plug.

Description	Model
Pressure transducer, 200 psi (1,400 kPa).	HM-4170
De-airing block for use with HM-4170.	HM-4170B
6-foot extension cable.	HM-4170EC



HM-2315

Automatic Volume Change Measuring Apparatus

For measuring large volumes. Two-part assembly consists of:

- Upper assembly—a stand-alone unit for measuring automatic volume change, having standard capacity of 100 ml
- Lower assembly—containing changeover valves

Using the upper assembly together in conjunction with the lower assembly gives limitless capacity.

Complete model includes both upper and lower assemblies. Use with linear strain transducer, digital indicator, or as part of an automated system. Accurate to better than ± 0.05 ml. Easily de-aired in seconds. Includes connectors, valves, and tubing. Order indicator separately.

Description	Model
Automatic volume change measuring apparatus (two-part assembly).	HM-2315

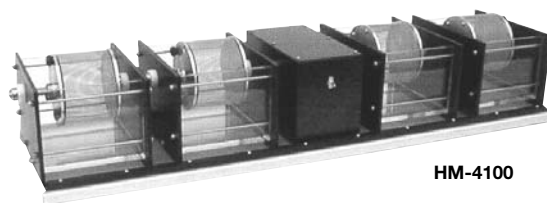
Shipping wt. 21 lbs. (9.5kg)

Description, Replacement Parts & Accessories	Model
Automatic volume change measuring apparatus stand-alone 100ml upper assembly.	HM-2315.1
Transducer for analog measurement, 25mm travel.	HM-2310.10
Bracket to fit HW-17015 to HW-17043.	HM-2310BR
Digital indicator, 25mm travel (no bracket required).	HM-4469.10
AC adapter for digital indicator.	HM-4469AC



HM-4501

HM-3930



HM-4100

Calcium Carbonate Content Chamber

This test method covers the quantitative determination of the calcium carbonate (CaCO₃) content of soils. This test complies with ASTM-D-4373. 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" I.D. 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.

Description	Model
Calcium Carbonate Content Chamber.	HM-4501

Pin Hole Dispersion Apparatus

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.

Description	Model
Pin Hole Dispersion Apparatus.	HM-3930

Slake Durability Apparatus

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. Conforms to ASTM D-4644 standard.

Significant features include:

- Corrosion resistant mesh drums
- Ability to test two or four drums simultaneously
- Test speed accuracy of 20 revolutions per minute
- Quick and easy release of water tank assemblies

Description & Accessories	Model
Slake durability apparatus, 110vAC, 60Hz.	HM-4100
Wire mesh drums – set of two (2).	HM-4100.1
Wire mesh drums/water tanks assembly – set of two (2).	HM-4100.2

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Sales or Technical Assistance — 1-800-544-7220

H-3538D
H-3540DC

H-3543



H-3585



H-3558D



H-3539C



H-3588



Digital Thermometers

Type	Description	Range	Model
Electronic Stem	5" long stem. Approximately 1" flat-style-head pocket thermometer features thermistor sensors, 0.25"-high display, 1.5V #392 battery instant update button, auto shut-off, red protective sheath, clip and battery. Accuracy: 2 F (from -4 to 77 F) or 4 F max. over entire range.	-40 to 450 F	H-3538D
		40 to 230 C	H-3540DC
Min/Max	Reads indoor or outdoor temperatures from indoors. Minimum and maximum temperature memory button displays the higher low temperature. Unit hangs or stands with 1.25" high LCD display. Includes one 1.5V battery.	-58 to 158 F -50 to 70 C	H-3543
Electronic Hand-Held Thermocouple	Heavy-duty design with 3-1/2-digit LCD display. Range of up to 2000 F (1093 C) at an accuracy of 4 F from -58 to 32 F and, 0.3% +2 F from 32 to 2000 F. Resolution 1 F/C. Dual input jacks allow operator to monitor two locations at once when used with two probes. Other features include hold button, max temperature display and min/max memory. Supplied complete with removable rubber boot and one type K samll handle 3-1/2" (89mm) stainless steel probe.	-58 to 2000 F -50 to 1093 C	H-3558D
Electronic Stem	Waterproof model, pocket size.	-40 to 999 F	H-3539F
		-40 to 550 C	H-3539C
K, J, T-Type Thermocouple Thermometer	Meter switches between different types of thermocouples. Meters can read with a resolution of 0.1 in an extended range of -149.9 to 999.9 C or -24.9 to 999.9 F. Dual-level LCD displays highest and lowest readings in cycle along with current temperature. Toggles between C and F. H-3585N allows easy user-calibration of meter and probe in an ice bath at C.	-149.9 to 999.9 C -24 to 999.9 F	H-3585 H-3585N
Waterproof, Interchangeable Probes	High performance waterproof thermometer made for lab or field applications. Switchable from Fahrenheit to Celsius. Provides 0.1 C or 0.1 F (-59 to 230 F/0.2 F outside). Accuracy is 0.4 C or 0.8 F. Dual-level LCD displays highest and lowest readings in cycle along with current temperature. Accuracy is consistent across entire range and battery life has been increased to 2000 hours. H-3588N allows easy user-calibration of meter and probe in an ice bath at C.	-50.0 to 150.0 C -58 to 302 F	H-3588 H-3588N
Shockproof Rubber boot for for Models H-3585, H-3585N, H-3588 and H-3588N (see photos) Available in:		orange	H-3588
		blue	H-3588



H-3494



H-3590



H-3595



H-3591



H-3498

Infrared Non-Contact Temperature Measuring Devices

Basic, value priced, hand held sensors use infrared technology to accurately measure temperature without touching. Safely monitor hot, hazardous, or hard-to-reach materials or surfaces—all without contact, contamination, or damage. Simply aim, press trigger, and read. All models have 3-digit display with hold, selectable in °F or °C.

Infrared Non-Contact Temperature Measuring Devices		
Specifications	H-3493 "Remote" Type Infrared	H-3590 "Pistol" Type Infrared
Temperature Range	0 to 600 F (-18 to 315 C)	0 to 750 F (-18 to 400 C)
Resolution	1 F (1 C)	1 F (1 C)
Accuracy	2% of reading (3 F/2 C)	2% of reading (3 F/2 C) at ambient 64 to 82 F (18 to 28 C)
Response Time	1 second	500 mSec
Repeatability	0.5% of reading, + 1 digit	1% of reading (2 F \approx 1 C)
Power Source	9V alkaline battery	9V alkaline, or NiCad battery
Dimensions	7.26x1.7x0.75" (185x43x19mm)	5.4x1.6x7.7" (137x41x196mm)
Emissivity	pre-set at 0.95	pre-set at 0.95

Description	Model
Infrared non-contact temperature measuring device, "remote" type, with standard infrared. Includes belt loop type pouch.	H-3494
Infrared non-contact temperature measuring device, "pistol" type.	H-3590

Description	Model
Pouch with hand strap for H-3590.	H-3592

Mini Fun Gun Laser Infrared Temperature Sensor

The Mini Fun Gun is a pocket size, laser infrared temperature measuring sensor. Operation is simple. Just aim, press trigger and read the large, backlit display. Dual Temperature range from -18 to 260°C (0 to 500°F). Only 6" H x 1.5" W x 4" D (152x38x101mm)

Description	Model
Mini fun gun laser infrared temperature sensor.	H-3595

Ultimate Fun Gun—External/Internal Temperature Measurement Sensor

Provides the user with accurate external and internal temperature readings. For external non-contact temperature readings, the gun is simply pointed at the material or surface being measured. Accurate temperature values within the range of -25° to 1,100°F. For internal temperature readings of materials, the gun features an integrated temperature probe. All temperature values are accurate within 1% or $\pm 0.2^\circ$. Other features include: 8-point circular laser sighting; 12-point data logging; MAX, MIN, DIF and AVE temperature display; and hi/low audible and visual alarms. Supplied with hard carrying case.

Description	Model
Ultimate fun gun temperature sensor with probe.	H-3498

8-pt, Circular Laser Non-Contact Thermometer

Unit provides a wide temperature range and MAX temperature display. Temperature range is from -25 to 950°F (-32° to 545°C) with an accuracy of 1%. Includes Display hold of 7 seconds and an LCD backlight. Includes hard carrying case.

Description	Model
8-point, circular laser, infrared noncontact thermometer.	H-3591

HUMBOLDT



Sales or Technical Assistance — 1-800-544-7220



H-2601 Series

PerformaTherm™ Non-Mercury Certified Thermometers

PerformaTherm™ thermometers STB blue liquid is safer than both mercury and most other traditional spirit thermometer liquids. The formula is biodegradable, nontoxic, noncaustic, and nonhazardous. The thermometers meet all ASTM standards for accuracy, tolerance and uncertainty. They are available in protective cases, both individually and in sets, in either Celsius or Fahrenheit. Each thermometer is supplied with a calibration report including corrections to the nearest 1/10th scale division, and the NIST traceability, uncertainty and test method used.

Range	Divisions	Calibration Report Points	Protective Case	Model
-38 to +2°C	0.1°C	-37, -30, -20, -10, & 0°C	No	H-2601.S62CFC
-38 to +2°C	0.1°C	-37, -30, -20, -10, & 0°C	Yes	H-2601C.S62CFC
-8 to +32°C	0.1°C	-7, 0, 10, 20, & 30°C	No	H-2601.S63CFC
-8 to +32°C	0.1°C	-7, 0, 10, 20, & 30°C	Yes	H-2601C.S63CFC
20 to 50°C	0.1°C	20, 30, 40, 50°C	No	H-2601.S91CFC
20 to 50°C	0.1°C	20, 30, 40, 50°C	Yes	H-2601C.S91CFC
25 to 55°C**	0.1°C	0, 25, 35, 45, & 55°C	No	H-2601.S64CFC
25 to 55°C**	0.1°C	0, 25, 35, 45, & 55°C	Yes	H-2601C.S64CFC
38.5 to 41.5°C**	0.05°C	0, 40, 41°C	No	H-2601.S120CFC
38.5 to 41.5°C**	0.05°C	0, 40, 41°C	Yes	H-2601C.S120CFC
50 to 80°C**	0.1°C	0, 50, 60, 70, & 80°C	No	H-2601.S65CFC
50 to 80°C**	0.1°C	0, 50, 60, 70, & 80°C	Yes	H-2601C.S65CFC
75 to 105°C**	0.1°C	0, 75, 85, 95, & 105°C	No	H-2601.S66CFC
75 to 105°C**	0.1°C	0, 75, 85, 95, & 105°C	Yes	H-2601C.S66CFC
95 TO 155°C**	0.2°C	0, 100, 110, 130, & 150°C	No	H2601.S67CFC
95 TO 155°C**	0.2°C	0, 100, 110, 130, & 150°C	Yes	H2601C.S67CFC
-36 to +35°F	0.2°F	-35, -15, 0, 15 & 32°F	No	H2601.S62FFC
-36 to +35°F	0.2°F	-35, -15, 0, 15 & 32°F	Yes	H2601C.S62FFC
18 to +89°F	0.2°F	20, 32, 50, 70 & 88°F	No	H2601.S63FFC
18 to +89°F	0.2°F	20, 32, 50, 70 & 88°F	Yes	H2601C.S63FFC
77 to +131°F**	0.2°F	32, 80, 95, 115 & 130°F	No	H2601.S64FFC
77 to +131°F**	0.2°F	32, 80, 95, 115 & 130°F	Yes	H2601C.S64FFC
122 to +176°F**	0.2°F	32, 125, 145, 160 & 175°F	No	H2601.S65FFC
122 to +176°F**	0.2°F	32, 125, 145, 160 & 175°F	Yes	H2601C.S65FFC
167 to +221°F**	0.2°F	32, 168, 185, 200 & 220°F	No	H2601.S66FFC
167 to +221°F**	0.2°F	32, 168, 185, 200 & 220°F	Yes	H2601C.S66FFC
203 to +311°F**	0.5°F	32, 205, 240, 275, & 310°F	No	H2601.S67FFC
203 to +311°F**	0.5°F	32, 205, 240, 275, & 310°F	Yes	H2601C.S67FFC

** Has auxiliary ice point.



Precision Certified Standard Thermometers Custom Calibrated and Pointed ASTM Thermometers

Precision Certified Standard Thermometers

Each thermometer certified at the five ASTM verification temperatures specified in ASTM E-1. Certificates show all corrections to the nearest tenth of the smallest scale division. Each thermometer has an ice-point which can be used to check the validity of the corrections at any time. Per NIST/SP-819, August 1991, ANY PREVIOUSLY CERTIFIED THERMOMETER WITH A CALIBRATED ICE POINT NEED NEVER BE COMPLETELY RE-CALIBRATED. Complete sets include channel case with compartment holding certificates.

Precision Certified Standard Thermometers						
Description	Fahrenheit		Model	Celsius		
	Range (Min)	(Max)		Range (Min)	(Max)	Model
Complete set of nine certified standard thermometers.	-36°F	761°F	H-2602	-38°C	405°C	H-2606
Set Includes:						
Certified standard thermometer.	-36°F	35.9°F	H-2603.62FFC	-38°C	2°C	H-2607.62CFC
	18°F	89°F	H-2603.63FFC	-8°C	32°C	H-2607.63CFC
	77°F	131°F	H-2603.64FFC	25°C	55°C	H-2607.64CFC
	122°F	176°F	H-2603.65FFC	50°C	80°C	H-2607.65CFC
	167°F	221°F	H-2603.66FFC	75°C	105°C	H-2607.66CFC
	203°F	311°F	H-2603.67FFC	95°C	155°C	H-2607.67CFC
	293°F	401°F	H-2603.68FFC	145°C	205°C	H-2607.68CFC
	383°F	581°F	H-2603.69FFC	195°C	305°C	H-2607.69CFC
	563°F	761°F	H-2603.70FFC	295°C	405°C	H-2607.70CFC

Mercury Spill Clean-up Kit

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.

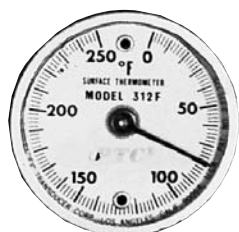
Description	Model
Mercury spill clean-up kit.	H-3632SK

NOTE: ASTM standard thermometer temperature ranges correspond exactly to the suffix of Humboldt model numbers.

ASTM E1 Thermometers									
Application	Fahrenheit			Length		Immersion	Celsius		
	Range	Div. ^o	Model	in.	mm.		Range	Div. ^o	Model
General Use	0 to 302 20 to 580 20 to 760	2	H-2600.1F H-2600.2F H-2600.3F	12-1/2 15-3/8 16-1/4	322 390 413	76mm	-20 to 150 -5 to 300 -5 to 400	1	H-2610.1C H-2610.2C H-2610.3C
Cloud and Pour Low Cloud and Pour	-36 to 120 -112 to 70	2	H-2600.5F H-2600.6F	9-1/8	231	108mm 76mm	-38 to 50 -80 to 20	1	H-2610.5C H-2610.6C
Low Distillation High Distillation	30 to 580 30 to 760	2	H-2600.7F H-2600.8F	15-1/4	386	Total	-2 to 300 -2 to 400	1	H-2610.7C H-2610.8C
Pensky-Martens Low, Tag Clsd. High Pensky-Martens, High	20 to 230 200 to 700	1 5	H-2600.9F H-2600.10F	11-1/4	287	57mm	-5 to 110 90 to 370	1/2 2	H-2610.9C H-2610.10C
Open Flash	20 to 760	5	H-2600.11F	12-1/8	308	25mm	-6 to 400	2	H-2610.11C
Gravity	-5 to 215	1/2	H-2600.12F	16-1/2	420	Total	-20 to 102	1/5	H-2610.12C
Loss on Heat				6-5/8	169	Total	155 to 170	1/2	H-2610.13C
Low Softening Point High Softening Point	30 to 180 85 to 392	1/2 1	H-2600.15F H-2600.16F	15-5/8	397	Total	-2 to 80 30 to 200	1/5 1/2	H-2610.15C H-2610.16C
Saybolt Viscosity	66 to 80 94 to 108 120 to 134 134 to 148 174 to 188 204 to 218	1/5	H-2600.17F H-2600.18F H-2600.19F H-2600.20F H-2600.21F H-2600.22F	10-7/8	275	Total	19 to 27 34 to 42 49 to 57 57 to 65 79 to 87 95 to 103	1/10	H-2610.17C H-2610.18C H-2610.19C H-2610.20C H-2610.21C H-2610.22C
Turpentine Distillation				11-7/8	301	76mm	147 to 182	1/2	H-2610.27C
Kinematic Viscosity	97.5 to 102.5 207.5 to 212.5	1/10	H-2600.28F H-2600.30F	12	305	Total	36.6 to 39.4	1/20	H-2610.28C
Aniline Point	-36.5 to 107.5 194 to 338	1/2	H-2600.33F H-2600.35F	16-1/2	420	50mm	-38 to 42 190 to 170	1/5	H-2610.33C H-2610.35C
Kinematic Viscosity	74.5 to 79.5 119.5 to 124.5 137.5 to 142.5	1/10	H-2600.45F H-2600.46F H-2600.47F	12	305	Total	23.6 to 26.4 48.6 to 51.4 58.6 to 61.4	1/20	H-2610.45C H-2610.46C H-2610.47C
Stormer Viscosity				12	305	65mm	20 to 70	1/5	H-2610.49C
Tag Closed Tester Low Range	-4 to 122	1	H-2600.57F	11-1/4	287	57mm	-20 to 50	1/2	H-2610.57C
Precision	18 to 89 77 to 131	1/5	H-2600.63F H-2600.64F	15	379	Total	-8 to 32 25 to 55	1/10	H-2610.63C H-2610.64C
Kinematic Viscosity	272.5 to 277.5	1/10	H-2600.110F	12	305	Total	133.6 to 136.4	1/20	H-2610.110C
Bituminous Softening Point	30 to 350	1	H-2600.113F	16	406	Total	-1 to 175	1/2	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.									



H-3540 (top), H-3550 (bottom)



H-2628, H-2628H, H-2629



H-2634D



H-3532

Pocket-Type Thermometers

Type	Description	Range	Div.	Model
Glass Tube	6" long stem. Large-bore tempered glass tube, filled with non-toxic liquid, includes pocket case and clip.	0 to 220°F	2°F	H-3540
		-20°C to 105°C	1°C	H-3542
	6"-long stem features copper-plated bulb to resist cutting action. Includes pocket case and clip.	100-450°F	5°F	H-2630
		0-120°F	1°F	H-3547
Field/Spot Checking	5" long stem, 1" (25mm) dia. head thermometer has stainless steel case and bezel. Features external adjustment for recalibrating. Includes pocket case and clip.	-40 to 160°F	2°F	H-3550
		0 to 220°F		H-3552
		25 to 125°F	1°F	H-2633
		50 to 500°F	5°F	H-2639
		0 to 150°C	2°C	H-3553
		0 to 250°C	5°C	H-3554

Surface Thermometer

Description	Range	Div.	Model
Sensing element comes into direct contact with surface to be measured. Dial readout 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

Dual-Scale General Testing Thermometers

Description	Range	Div.	Model
Direct-reading, all metal thermometers for general use include °F and C range. Accuracy .5% full scale. Units have bi-metal element in 8" long x 0.15" dia. (203x4mm) stainless steel stem that actuates pointer over graduated dial. Dial face is 1-3/4" (45mm) dia. External adjustment allows recalibration.	25 to 125°F (0 to 50°C)	1°F .5°C	H-2631D
	0 to 220°F (-10 to 100°C)	2°F 1°C	H-2632D
	50 to 500°F (0 to 260°C)	5°F 2°C	H-2634D

General Purpose Dial Thermometer

Description	Range	Div.	Model
Accurate, durable. Features 1" dial, insulated bezel ring, adjustable pen clip, 12" stainless steel stem.	50 to 500°F	5°F	H-3532

Bi-Metal Oven Thermometers

Description	Range	Div.	Model
All-metal unit is 2.3x3.3", rectangular with black baked enamel finish on bezel and frame. Features bi-metal coil movement and glass lens. Hangs or stands.	100 to 600°F (50 to 315°C)	25°F	H-3568

General-Purpose Laboratory Thermometers

Fahrenheit			Description	Centigrade			
Model	Range	Div.°		Length (in/mm)		Div.°	Model
H-2611	-30 to 120°	1°	Single-scale, mercury-filled, engraved stem thermometers calibrated for total immersion tolerances meet NBS accuracy requirements	12"	305mm	1°	H2612
H-2613	0 to 230°	2°		12"	305mm	1°	H-2614
H-2615	0 to 300°	2°		12"	305mm	1°	H-2616
H-2617	20 to 500°	2°		16"	405mm	1°	H-2618
H-2619	20 to 750°	5°		16"	405mm	2°	H-2620



H-3560



H-3560D

Maximum and Minimum Thermometer

Dual-scale thermometer has U-shaped capillary mounted in plastic 8x2-5/8x1" (203x67x25mm) 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.

Description	Model
Maximum and minimum thermometer, mercury.	H-3560
Maximum and minimum thermometer, mechanical.	H-3560D



H-2727D



H-2270

Electric Stopwatch and Timer

Stopwatch/timer is used in viscosity tests and other laboratory and industrial applications. Timer features push-button reset switch, illuminated start-stop switch, electric brake, synchronous motor, cushioned base, steel housing and 3-wire cord. Overall size: 7x4x4" (178x102x102mm).

Description	Model
Electric stopwatch and timer, range from 0.1 to 9999.9 seconds. 120V. 60Hz. AC. 30W.	H-2270

Hygrometer

Precision hygrometer has temperature gauge and is accurate within ± 3 percent relative humidity from 20 to 85 percent. Unit is tested and calibrated five times in humidity-and-temperature-controlled rooms, monitored by chart recorders. Black metal case is 5-1/4" dia.

Description	Model
Hygrometer.	H-2727D

Mercury Spill Clean-up Kit

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.

Description	Model
Mercury spill clean-up kit.	H-3632SK



H-3557D

Digital Thermo-Timer

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 setpoints. Magnet permits mounting on side of oven. Uses "AAA" battery, not included.

Description	Model
Digital thermo-timer.	H-3557D



H-4292



H-2260



H-4294



H-4296

Universal Lab Timer

Portable electric timer functions as elapsed-time indicator, interval timer and electrical apparatus on-off timer. Features time range of 60 minutes by minutes and seconds, 8-in. 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.

Description	Model
Universal lab timer. 110V. 60Hz. 1ph. AC. 750W	H-4292
Universal lab timer. 220V. 50Hz. 1ph. AC. 375W.	H-4292.5F

Shipping wt. 6 lbs. (2.7kg)

Stopwatch

Used for timing operations and tests, stopwatch is time-out type. 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.

Description	Model
1/5-second movement, 1 revolution of large hand in 60 seconds. Small hand registers up to 30 minutes.	H-2260
1/10-second movement, 1 revolution of large hand in 30 seconds. Small hand registers up to 30 minutes.	H-2261

Bell-Type Timer

Economical manual mechanical timer has 60-minute time range. Signals with clear bell tone at end of set time for manual apparatus shut off.

Description	Model
Bell-type timer.	H-4294

Universal Timer

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features two receptacles and 3-wire cord and plug.

Description	Model
Universal timer. 115V. 60Hz. 10 amps. 1ph. AC.	H-4296
Universal timer. 220V. 50/60Hz. 5 amps. 1ph. AC.	H-4296.4F



H-3575

24-Hour Digital Timer Clock

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.

Description	Model
24-Hour digital timer clock.	H-3575



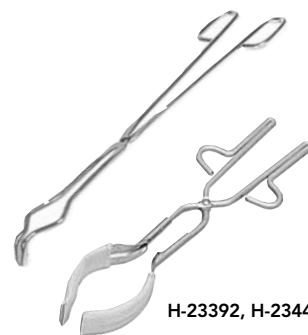
H-30201



H-30202



H-3746



H-23392, H-23440

Muffle Furnaces

Electric muffle furnaces are designed for laboratory and industrial applications. Used in engineering tests of soils and aggregates, cement testing, ashing organic and inorganic samples, gravimetric analysis, ignition tests, etc. Cases are welded steel construction; perforated base case design keeps benchtop cool. Heating elements are embedded in refractory cement for structural strength and long life. Furnace is insulated with Insu-Light molded ceramic fiber insulation; a percentage input controller allows desired temperature to be selected with repeatable results. Features fluorescent digital display. Each unit contains a Chromel/Alumel thermo-couple directly connected to 32-2200°F, 0-1200°C dual scale pyrometer. See specification table on page 178 for models described on this page.

Three-Heating-Element Electric Furnace

Unit contains three heating element surfaces, top and both sides. Unit heats to about 1600°F (871°C) in 40 minutes. Door can be used as a work shelf or be latched in various positions to aid ventilation during burn-out procedures. Includes 3-wire cord and plug. **Refer to table on page 184 for specifications.**

Description	Model
Three-heating-element electric furnace, 120V, 50/60Hz.	H-30200
Three-heating-element electric furnace, 230V, 50/60Hz.	H-30200.4F
Three-heating-element electric furnace, 120V, 50/60Hz.	H-30201
Three-heating-element electric furnace, 230V, 50/60Hz.	H-30201.4F

Electric Furnace with Single Setpoint Automatic Controller

Small bench-type muffle furnace has heating elements on both sides of chamber. Unit has high thermal-efficient ceramic insulation surrounding chamber. Maximum operating temperature is 1904°F (1046°C). Door safety interlock disconnects power to heating elements when door is open. Temperature controller is open loop manual-control type. Temperature is measured by thermocouple and displayed on analog meter. Includes ceramic shelf and 3/8" port at rear for injection of atmospheres. Chamber dimensions: 5x4-1/2x6"D (12x11x33cm). **Refer to table on page 184 for specifications.**

Description	Model
Electric furnace with single setpoint automatic controller, 120V, 50/60Hz.	H-30202
Electric furnace with single setpoint automatic controller, 240V, 50/60Hz.	H-30202.4F

Medium Muffle Furnaces

Heating elements on top, bottom and sides and set in refractory cement increase temperature uniformity. High-efficiency ceramic insulation around chamber maximizes energy efficiency. Features top venting; door safety switch cuts power when door is open. Manual models have dual-scale analog meter. Automatic models feature digital temperature display. Pre-punched ports at rear of furnace allow atmosphere injection; order connection tubing separately. Stainless-steel shelf is optional. H-30204.4F includes cord and plug. **See table on page 184 for complete specifications.**

Description	Model
Medium muffle furnace, digital, 230V, 50/60Hz.	H-30204.4F
Medium muffle furnace, single setpoint automatic, 230V, 50/60Hz.	H-30206.4F

Programmable Ashing Furnace

With 14x14x14" chamber, furnace has 1.6 cu. ft. (2,744 cu. in.) of heat-ing area. Unit features high-efficiency ceramic insulation and heating elements on sides, top and bottom of chamber to achieve minimum chamber temperature gradient. Door safety switch cuts power when door is open. Includes two refractory shelves, 1" dia. top vent and 35-amp circuit breaker to protect unit. Pre-punched ports at rear of furnace allow atmosphere injection; order connection tubing separately. **See table on page 184 for complete specifications.**

Description	Model
Programmable ashing furnace, 230V, 50/60Hz.	H-30208.4F

Glove/Tongs

Description	Material	Wire Size	Length	Model
Glove	Heat Resistant	—	Full length	H-3746
Crucible tongs	Stainless Steel	1/4" (6mm)	18" (457mm)	H-23392
Safety tongs	Stainless Steel Fiberglass covered jaws	1/4" (6mm)	13.5" (343mm)	H-23440

HUMBOLDT

Sales or Technical Assistance — 1-800-544-7220



H-30202



H-30204.4F, H-30206.4F



H-30208.4F



H-4924



H-4930

Muffle Furnaces

Controller	Max. Temp. °F (°C)	Chamber and O.D. Dimensions (HxWxD)	Electrical	Shipping Wt. lbs. (kg)	Model
Digital	1904 (1040)	5x4-1/4x6" (127x108x152mm); 10x14-1/2x11" O.D. (254x368x279mm O.D.)	120V, 12.5 amps, 1,500 watts, 50/60 Hz	26 (11.7)	H-30200
			230V, 6.3 amps, 1,500 watts, 50/60 Hz		H-30200.4F
	2192 (1200)	5x6-1/2x10" (127x165x254mm); 19x13-1/4x27" O.D. (482x336x685mm O.D.)	120V, 15 amps, 1,800 watts, 50/60 Hz	60 (27.2)	H-30201
			240V, 7.5 amps, 1,800 watts, 50/60 Hz		H-30201.4F
Single Setpoint Automatic*	1904 (1040)	5x5-1/2x13" (127x139x330mm); 26-1/2x15-1/2x24" (673x381x610mm)	120V, 35 amps, 4,100 watts, 50/60 Hz	197 (89.4)	H-30202
			240V, 17.5 amps, 4,100 watts, 50/60 Hz		H-30202.4F
Digital		12.75x10x6.8" (325x254x172mm) 12.1x29.5x21" O.D. (485x749x533mm O.D.)	230V, 10.0 amps, 2,400 watts, 50/60 Hz	110 (50)	H-30204.4F
Single Setpoint Automatic			230V, 18.3 amps, 4,400 watts, 50/60 Hz		H-30206.4F
Single Setpoint Automatic	1999 (1093)	14x14x14" (355x355x355mm) 25.5x21.5x29.5" O.D. (647x546x749mm O.D.)	230V, 22.9 amps, 5,500 watts, 50/60 Hz	110 (50)	H-30208.4F

*Also available with programmable 8 ramp, 8 dwell and RS232 communications port. Call Humboldt for details.

Nickel Evaporating Dishes

Description	Cap.	Top Dia. in. (mm)	Height in. (mm)	Model
Heavy gauge pure nickel dishes have straight sides, flat bottom, pour lip.	40ml	2-1/4 (57)	1 (25)	H-4924.040
	100ml	2-3/4 (70)	1-3/8 (35)	H-4924.100
	200ml	3-3/8 (86)	1-13/16 (46)	H-4924.200
	300ml	3-7/8 (98)	2-1/4 (57)	H-4924.300

Porcelain Evaporating Dishes

Description	Cap.	Top Dia. mm	Height mm	Model
Shallow porcelain dish has pour lip, glazed inside, partly glazed outside.	120ml	90	37	H-4930.120
	250ml	115	45	H-4930.250
	765ml	185	54	H-4930.765
	1,285ml	215	63	H-4930.M1285



H-32300

H-32343
with optional
oven stand

H-32333

Large Capacity Bench Ovens

Low cost, large capacity bench ovens for shelf processing at temperatures to 400°F. Designed to handle a wide variety of applications, such as baking, curing, drying and preheating. 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. For some applications, such as those involving flammable solvents or hazardous locations, the above organizations require additional safety devices.

Controls

- Analog, thermocouple-actuated, temperature controller
- Motor control push buttons
- On-off heat switch
- Easy-to-see pilot lights

Safety Equipment

- Adjustable, thermocouple-actuated, temperature controller
- Separate heating element control contractor
- Recirculating blower air flow safety switch

Construction

- 430 stainless steel interior
- Explosion venting latches
- 2" of 6 lb/cf density industrial rockwool insulation
- Built-in baffle prevents radiant heat
- Silicone rubber door gasket
- Aluminized steel exterior with enamel finish
- Brushed stainless steel control panel face
- Incoloy sheathed tubular heating elements
- Two (2) nickel-plated wire shelves
- Channel shelf supports prevent shelves tipping
- Adjustable fresh-air intake and exhaust dampers
- High-pressure recirculating blower
- All welded construction
- 1-year warranty

Every oven is fully assembled and individually factory tested.

Standard Electrical Configuration is: 230 volts, 3-phase, 60Hz
(please inquire about other electrical characteristics available.)

Large Capacity Bench Ovens

Work Space		Outside Dimension WxDxH in. (cm)	Max Temp	Blower		Insulation	Doors	Kw	Operating Characteristics			Shpg. Wt.	Model
Volume Cu. ft (cu.m)	Dimensions WxDxH in. (cm)			CFM	HP				Control Accuracy	Oven Uniformity	Rise Time		
15.8 (.447)	36x21x36" (91.4x53.3x91.4cm)	40x28x47" (102x71x119cm)	400°F (204.4°C)	400	1/3°	2"	dbl.	4.4	±5%	±8°F	18 min.	600 (272)	H-32300
27 (.764)	36x36x36" (91.4x91.4x91.4cm)	40x43x47" (102x109x119cm)						6.6			18 min	750 (340)	H-32333
36 (1.01)	36x48x36" (91.4x122x91.4cm)	40x55x47" (102x140x119cm)						6.6			22 min	850 (385)	H-32343



H-30140, H-30145, H-30160.2F



H-30110, H-30120



H-30115



H-30100



H-30145E

Bench Ovens

Fan-forced-air circulation provides even work space temperature in curing, drying, baking finishes, etc. Unit has 7.8 cu. ft. (220L) capacity and features long-life incoloy-sheathed elements, 2" (51mm) thick mineral wool insulation, steel-lined interior, piano-hinged and gasketed doors, adjustable damper control and an ambient temperature range to 300°F (149°C). Includes two adjustable shelves on 1-1/2" (38mm) centers. Features on-off switch, panelboard, thermostat, heat switch, 3-wire cord and plug. **See model chart on page 186.**

Description	Model
Forced-air bench oven, 115V, 60Hz.	H-30140
Forced-air bench oven, 230V, 50/60Hz.	H-30140.4F

High-Temperature-Range Bench Oven

With higher ambient temperature range to 437°F (225°C) and 7.8-cu.-ft. (220L) capacity, other features of this unit are the same as H-30140. Models available with calibrated dial-type, or solid state digital temperature controller. **See model chart on page 186.**

Description	Model
High-temperature-range bench oven, 115V, 60Hz.	H-30145
High-temperature-range bench oven, 230V, 50/60Hz.	H-30145.4F
High-temperature-range bench oven, solid state digital, 115V, 60Hz.	H-30145E
High-temperature-range bench oven, solid state digital, 230V, 50/60Hz.	H-30145E.4F

Maximum-Temperature-Range Bench Oven

For curing, drying, baking finishes, etc., oven has 7.2-cu.-ft. (220L) capacity, calibrated dial-type temperature controller, forced-air recirculation, high-low heat switch, pilot light for heat and fan. Cord and plug not furnished; connect through conduit system. Ambient temperature range to 550°F (287°C). **See model chart on page 186.**

Description	Model
Maximum-temperature-range bench oven, 230V, 60Hz.	H-30160.2F

Laboratory Ovens

Quality fan-forced circulation or gravity-convection method ovens feature double-wall construction and heavy welded steel exterior. Low-watt density incoloy-sheathed elements are used. Includes automatic thermocontrol, pilot light heat indicator, mercury thermometer (0°-300°C), two adjustable shelves and 6', 3-wire cord with plug. Also has scratch-proof rubber feet, full-length piano-hinged door and extruded thermoplastic door handle. **See models H-30100, H-30105, H-30110, H-30115, H-30120, H-30125, H-30128, and H-30131 in chart on page 186.**

Large Capacity Bench Ovens 25.5x30x24"

10.6 cu. ft. (300L), Dial-type and solid state digital Fan forced-air circulation. Same features as H-30145, with even greater volume capacity. **See models H-30135, and H-30137 in chart on page 186.**



Bench Ovens				
	Specifications		Model	
Description	Maximum Temp.	Inside Dimensions (W x H x D)	Gravity Convection	Forced Air
.7 cu. ft. (20L) capacity. Features bi-metal temperature controller, ±2° sensitivity. 115V, 60 Hz. 800 watts minimum. Shipping wt. 50 lbs. (22.6kg)	392°F (200°C)	12x10x10" (305x254x254mm) Overall 14x17x12" (355x431x304mm)	H-30100	H-30105
Same as above, except 230V, 50/60 Hz.			H-30100.4F*	H-30105.4F
1.27 cu. ft. (35L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz. 1000 watts minimum. Shipping wt. 60 lbs. (27.2kg)	518°F (270°C)	13x13x13" (330x330x330mm) Overall 20x20-1/2x14" (508x520x355mm)	H-30110	H-30115
Same as above, except 230V, 50/60 Hz.			H-30110.4F*	H-30115.4F*
2 cu. ft. (56L) capacity. Features bi-metal temperature controller, ±2° sensitivity. 115V, 60 Hz. 1600 watts min. Shipping wt. 70 lbs. (31.7kg) for H-30120 and 85 lbs. (38.5kg) for H-30125.	392°F (200°C)	18x16x12" (457x406x305mm) Overall 18-3/4x12-3/4x21-1/2" (476x324x546mm)	H-30120	H-30125
Same as above, except 230V, 50/60 Hz. Shipping wt. 70 lbs. (31.7kg) for H-30120.4F and 85 lbs. (38.5kg) for H-30125.4F.			H-30120.4F*	H-30125.4F*
3.5 cu. ft. (98L) capacity. Features hydraulic temperature controller, ±1° sensitivity. 115V, 60 Hz 1000 watts min. .Shipping wt. 60 lbs. (27.2kg)	437°F (225°C)	18x24x14" (457x609x355mm) Overall 20x33x16" (508x838x406mm)	H-30128	H-30131
Same as above, except 230V, 50/60 Hz.			H-30128.4F	H-30131.4F
7.8 cu. ft. (220L) capacity. Features calibrated dial-type temperature controller, 115V, 60 Hz. 1110 watts min. Shippng wt. 170 lbs. (68kg).	300°F (149°C)	26x20x26" (660x508x660mm) Overall 33x24x32" (838x610x813mm)	—	H-30140
Same as above, except 230V, 50/60 Hz.				H-30140.4F
Same as H-30140, except high-temperature and wattage. 2110 watts.	437°F (225°C)	26x20x26" (660x508x660mm) Overall 33x24x32" (838x610x813mm)		H-30145
Same as above, except 230V, 50/60 Hz.				H-30145.4F
7.8 cu. ft. (220L) capacity. Features solid state digital temperature controller, 115V, 60 Hz. 2110 watts. Shipping wt. 170 lbs. (68kg).	437°F (225°C)	26x20x26" (660x508x660mm) Overall 33x24x32" (838x610x813mm)		H-30145E
Same as above, except 230V, 50/60 Hz.				H-30145E.4F
7.2 cu. ft. (200L) capacity. Features calibrated dial-type temperature controller, 230V, 60 Hz. 3110 watts. Shipping wt. 175 lbs. (77.1kg).	100 to 550°F (27.8 to 287°C)	26x20x24" (660x508x610mm) Overall 33x24x33" (838x610x838mm)		H-30160.2F*
10.6cu.ft. Capacity (300L) Large Capacity Bench Ovens Dial-Type and Solid State Digital				
10.6 cu. ft. (300L) capacity. Features clairbrated dial-type temp. controller. 115V, 60 Hz. 2110 watts. Shipping wt. 200 lbs. (90.7kg).	437°F (225°C)	25.5x30x24" (648x762x610mm) Overall 33x34x32" (832x864x813mm)	—	H-30135
Same as above, except 230V, 50/60 Hz.				H-30135.4F
10.6 cu. ft. (300L) capacity. Features solid state digital temperature controller. 115V, 60 Hz. 2110 watts. Shipping wt. 200 lbs. (90.7kg)	437°F (225°C)	25.5x30x24" (648x762x610mm) Overall 33x34x32" (838x864x813mm)		H-30137
Same as above, except 230V, 50/60 Hz.				H-30137.4F
Bench Oven Accessories				
Oven floor stand for use with H-30140 and H-30145. Has one fixed shelf. Shipping wt. 12 lbs. (5.44kg)	—	33" (838mm) work height	H-30150	—
Encloses oven exhaust and allows venting into standard 3" (76mm) stove pipe. For use with H-30135, H-30137, H-30140, H-30145, H-30160 only. Shipping wt. 10 lbs. (4.5kg)	—	23-1/2x4-1/2x4-1/2" (597x114x114mm)	H-30181	
*Cord and plug are not furnished; unit should be connected through conduit system.				

*Cord and plug are not furnished; unit should be connected through conduit system.



H-30360 Series

Heavy-Duty Forced 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

Despatch Model No.	Chamber Size WxDxH in. (cm)	Capacity Cu. feet	Overall Size WxDxH in. (cm)	Operating Range	Electrical	Cord and Plug	No. of Doors	Shpg. Wt. Lbs. (kg)	Model
LBB1-69	30x18x22" (77x46x56cm)	6.9 (196)	36x24.5x36.5" (92x63x93cm)	40 to 204°C	50/60Hz, 1ph, 120V 21.6 amps, 2.4KW heater	none	2	320 (146)	H-30360
					50/60Hz, 1ph, 240V 10.8 amps, 2.4KW heater				H-30360.4F
LBB2-12	30x20x35" (77x51x89cm)	12.1 (340)	36x26.5x51.5" (92x68x131cm)		50/60Hz, 1ph, 240V 16.4 amps, 3.6KW heater			385 (175)	H-30364.4F
LBB2-18	37x24x35" (94x61x89cm)	18 (510)	43x30.5x51.5" (110x78x131cm)		50/60Hz, 1ph, 240V 16.4 amps, 3.6KW heater			485 (221)	H-30366.4F
LBB2-27	37x37x35" (94x94x89cm)	27 (765)	43x43.5x51.5" (110x111x131cm)		50/60Hz, 1ph, 240V 21.4 amps, 4.8KW heater			635 (289)	H-30368.4F

200 lb Capacity Shelves for Heavy-Duty Laboratory Ovens

For Model H-30360.	H-30360S
For Model H-30364.	H-30364S
For Model H-30366.	H-30366S
For Model H-30368.	H-30368S

**Extra Shelves & Accessories
Available. Call 1-800-544-7220**



H-30328.4F

H-30320, H-30322, H-30324, H-30326

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

Despatch Model No.	Chamber Size WxDxH in. (cm)	Capacity cu. feet (liters)	Overall Size WxDxH in. (cm)	Operating Range w/20°C Ambient	Electrical, Single Phase	Exhaust Dia. (on Chamber Back)	Cord and Plug	No. of Doors	Shpg. Wt. lbs. (kg)	Model
LAC1-10	14x12x12" (36x30x30cm)	1.1 (28)	23x21x30" (58x53x76cm)	35-260°C (95-500°F)	50/60Hz, 120V, 10 amps, 1 KW heater	1"	incl.	1	95 (43)	H-30320
LAC1-38A	19x18x19" (48x46x48cm)	3.8 (108)	28x28x37" (36x30x42cm)		50/60Hz, 120V, 16 amps, 1.6 KW heater	2"	incl.	1	165 (75)	H-30322
LAC1-38B	19x18x19" (48x46x48cm)	3.8 (108)	28x28x37" (36x30x42cm)		50/60Hz, 240V, 9.2 amps, 1.8 KW heater	2"	incl.	1	165 (75)	H-30322.4F*
LAC1-67	24x20x24" (61x51x61cm)	6.7 (190)	36x30x42" (91x76x107cm)		50/60Hz, 240V, 11.7 amps, 2.4 KW heater	2"	incl.	1	203 (92)	H-30324.4F
LAC2-12	24x24x36" (61x61x90cm)	12 (340)	36x33x54" (91x84x137cm)	50-260°C (122-500°F)	50/60Hz, 240V, 18.4 amps, 3.6 KW heater	2-2-1/2"	none	1	535 (243)	H-30326.4F
LAC2-18	36x24x36" (90x61x90cm)	18 (510)	48x31x54" (122x79x137cm)		50/60Hz, 240V, 23.4 amps, 4.8 KW heater	2-2-1/2"	none	2	720 (284)	H-30328.4F



H-30170



H-30174

Heavy-Duty Laboratory Ovens

- Heavy-duty, 200lb. (90.7 kg) capacity shelf design.
- Excellent temperature stability and uniformity performance
- Digital PID control system
- 8 and 12.5 cu. ft. capacity models available

Thermolyne heavy-duty ovens are designed for today's material testing laboratory. The horizontal airflow of the oven results in excellent temperature stability and uniformity performance. These large capacity ovens are able to take on big heavy loads. The heavy-duty shelves are designed to hold up to 200 lbs. (90.7kg) each. Spilling materials on the bottom of the ovens are not a problem since the heating elements and fans are designed into the top of the ovens. A digital PID controller allows for precise temperature control. As the temperature nears the setpoint, the controller maintains the maximum heat-up rate without overshooting. Using this type of temperature control provides the stability and uniformity necessary to meet the most demanding procedures.

Built-in hydraulic controlled over-temperature protection ensures that the oven temperature does not exceed the preset limits. To meet the latest industry standards, the ovens feature a temperature uniformity of $\pm 3^{\circ}\text{C}$ at 150°C and a temperature range of $+10^{\circ}$ above ambient to 250°C .

Heavy-Duty Laboratory Oven with Internal Thermocouple Probes

This 18 cubic foot capacity oven comes equipped with (3) stainless steel thermocouple probes inside the oven chamber, which allow you to monitor the temperature of your mix inside the Gyratory molds. Each probe corresponds with a digital display on the control panel, allowing the user to monitor compaction temperature without opening the oven door. Includes built-in timer for programmable start-up and shut-down of oven. Single set-point digital PID controller provides excellent temperature stability and control.

Heavy-Duty Laboratory Ovens

Capacity Cu. feet (liters)	Chamber Size WxDxH in. (cm)	Overall Size WxDxH in. (cm)	Operating Range	Stability	Uniformity	Electrical	No. of Shelves	Shpg. Wt. Lbs. (kg)	Model
8 (227)	26x26x21" (66x66x53.3cm)	34.5x31x35" (87.6x78.7x88.9cm)	+10° above Ambient to 250°C	±0.2° at 150°C	±0.3° at 150°C	50/60Hz 220-240V 12.5 amps 3,000 watts	2	200 (91)	H-30170
12.5 (354)	26x26x32.5" (66x66x82.5cm)	35x34x53.75" (88.9x86x136.5cm)				50/60Hz 220-240V 20.5 amps 4,900 watts	3	275 (125)	H-30172
Laboratory Oven with Thermocouple Probes									
18	26x46x26"	35x75x34"	+10° above Ambient to 250°C	±0.1° at 150°C	±0.3° at 150°C	50/60Hz 220/240 17.1 amps 4100 watts	2	350 (159)	H-30174

For Technical Assistance or Professional Sales Service, Call Humboldt: 1-800-544-7220



H-4962



H-4960



H-4164



H-4947

Desiccab Desiccator

Stainless steel cabinet with Clear-View 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: 13x13x13-1/4" (330x330x336mm).

Description	Model
Desiccab desiccator.	H-4962

Shipping wt. 25 lbs. (11.3kg)

Desiccator Jars

Heavy walled annealed jar has finely ground flanges and cover knob. Includes plate.

Description	Model
Desiccator jar. Inside diameter 5" (128mm), inside height 5-1/4" (134mm). Shipping wt. 8 lbs (3.6kg)	H-4960
Desiccator jar. Inside diameter 8" (203mm), inside height 8 (203mm)". Shipping wt. 13 lbs (5.9kg)	H-4961

Description	Model
Desiccator plate for use with H-4960 desiccator.	H-4960P
Desiccator plate for use with H-4961 desiccator.	H-4961P

Field Stove

Features two fully adjustable wafer-type self-cleaning stainless steel burners that distribute heat evenly and will not rust or burn out. Includes nickel-chrome grate, built-in pump and wind shields in collapsible case for easy transport. Uses lead-free gasoline. Fuel tank capacity: 3-1/2 pints (1.7L). Closed dimensions: 22x13-3/4x6-1/4" (559x349x159mm).

Description	Model
Field stove.	H-4164

Shipping wt. 15 lbs. (6.8kg)

Gas Hot Plates

Light, portable, economical. Universal gas valves, adjustable for propane or natural gas. General use, adjustable burners.

Description	Model
Gas hot plate, 2-burner. 19-1/2x11x6-1/4" (495x279x159mm)	H-4947

Shipping wt. 10 lbs. (4.5kg)

Description	Model
Gas hot plate, 3-burner. 27-1/2x11x6-1/4" (699x279x159mm)	H-4948

Shipping wt. 14 lbs. (6.4kg)

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H-4950, H-4951



H-4949



H-4952, H-4953



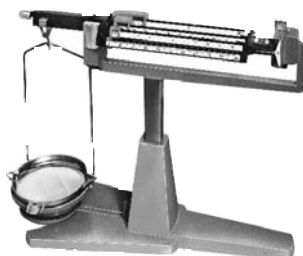
H-4959



H-4947, H-4948

Hot Plates

Description	Applications	Size	Temperature Range	Shpg. Wt.	Model
Gas hot plates. Light, portable, economical. Universal gas valves, adjustable for propane or natural gas. See photos on page 183.	General use	19-1/2x11x6-1/4" (495x279x159mm)	Adjustable burner	10lbs. (4.5kg)	H-4947
		27-1/2x11x6-1/4" (699x279x159mm)		14lbs. (6.4kg)	H-4948
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, 2 red	General use with tubular elements.	Both heating elements: 6-1/2" (16.5cm) dia. Overall: 20-1/2x8-3/4x4" (52x22x10cm)	Warm-simmer-rolling boil with adjustable controls.	9lbs. (4.1kg)	H-4949
Electric hot plate. Extra-sensitive thermostat power unit input automatically adjusts to size and temperature of load placed on top. Cast aluminum top plate with integral ribs will not warp or buckle. Stainless steel case; phenolic feet. Includes dovetail socket, pilot light, 3-wire cord and plug. 120V. 50/60Hz. 6.3 amps. 750W. AC.	General laboratory, soil analysis, shop, etc.	Top plate: 6-1/4x6-1/4" (15.9x15.9cm) Overall: 6-5/8x4-3/8x7-5/8" (16.8x11.1x29.4cm)	Automatic stepless control holds within 5°F (3°C) to 200°F (93°C); within 2°F (1.1°C) from 200 to 700°F (93 to 371°C).	6lbs. (2.7kg)	H-4950
Same as H-4950 except 240V. 50/60Hz. 3.15 amps. 750W. AC.					H-4950.4F
Electric hot plate. Heats slow or fast, as needed. Machined cast-iron top plate provides best heat transfer. Stainless steel 2-section case is separated by insulation. Includes 3-wire cord and plug. 120V. 50/60Hz. AC. 8.32 amps. 200 to 1080W. AC.	Heating asphaltic products, limestone analysis, heavy-duty industrial jobs, production line use. Supports heavy loads.	Top plate: 9x9" (23x23cm) Overall: 9"x6-1/4x10" (23x16x25cm)	4-position switch selects input and temperature range: 425°F (224°C) 600°F (316°C) 675°F (357°C) 900°F (482°C)	21lbs. (9.5kg)	H-4951
Same as H-4951 except 240V. 50/60Hz. 4.16 amps. 1000W. AC.					H-4951.4F
Electric hot plate. Cast aluminum top plate with integral ribs will not warp or buckle. Perforated stainless steel case supports heavy loads. Includes 3-wire cord and plug. 120V. 50/60Hz. 13.3 amps. 1600W. AC.	Distillation of liquids, drying aggregates, bituminous paving samples, soil analysis, etc.	Top plate: 12x12" (30x30cm) Overall: 12x6-1/8x13" (30x13x33cm)	Variable temperature control from ambient to 700°F (371°C).	26lbs. (11.8kg)	H-4952
Same as H-4952 except 240V. 50/60Hz. 6.7 amps. 1600W. AC.					H-4952.4F
Similar to H-4952; Not supplied with cord and plug due to high-wattage consumption requirements—must be connected through electrical conduit fittings. 120V. 50/60Hz. 26.6 amps. 3200W. AC.		Top plate: 12x24" (30x61cm) Overall: 24x6-1/8x13" (61x13x33cm)	Variable temperature control from ambient to 700°F (371°C).	50lbs. (22.7kg)	H-4953
Same as H-4953 except 240V. 50/60Hz. 13.3 amps. 3200W. AC.					H-4953.4F
Electric hot plate. Solid-state controls; porcelain coated stainless steel top plates. Low-profile design. Includes 3-wire cord and plug. 120V. 50/60Hz. 7.0 amps. 840W. AC.	Laboratory, shop, office, etc.	Top plate: 7x7" (18x18cm) Overall: (28x9x18cm) 11x3-1/2x7-1/4"	Demand-type thermostatic control from ambient to 700°F (371°C)	8lbs. (3.6kg)	H-4959
Same as H4959 except 240V, 50/60Hz. 3.5 amps. 840W. AC.					H-4959.4F



H-4825



H-4830



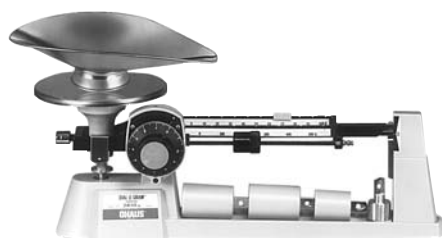
H-4605



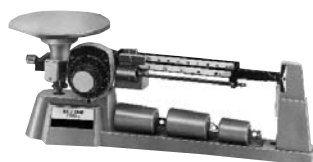
H-4603, H-4604



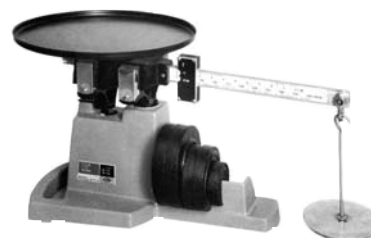
H-4785



H-4837



H-4835



H-4660, H-4665

Ohaus Mechanical Balances

Description	Ohaus Model	Capacity	Readability	Tare	Platform Type/Size	Shpg. Wt.	Model
Cent-O-Gram®	311-00	311g	0.01g	—	Stainless steel pan. 3.5 diam. x 0.5" deep	5.5lbs (2.49kg)	H-4825
Dial-O-Gram®	310-00	310g	0.01g	—	Stainless steel pan. 3.5 diam. x 0.5" deep	5.5lbs (2.49kg)	H-4830
Triple Beam Series 700 (includes attachment weight set H-4609)	750-SW (707)	2610g	0.1g	—	Stainless steel plate. 6" diam.	8.8lbs (3.99kg)	H-4603
Triple Beam Series 700 (includes attachment weight set H-4609)	760-OO (707)	2610g	0.1g	225g	Stainless steel plate. 6" diam.	8.3lbs (3.76kg)	H-4604
Triple Beam Series 700 (includes attachment weight set H-4609)	720-SO (707)	2610g	0.1g	—	Stainless steel scoop. 12x6x3"	8.3lbs (3.76kg)	H-4605
Dial-O-Gram®	1650-WO (707)	2610g	0.1g	225g	Stainless steel plate. 6" diam.	9.9lbs (4.49kg)	H-4835
Dial-O-Gram® (includes stainless steel scoop and counterweight)	1650-WO (703-SO)	610g	0.1g	225g	Stainless steel plate. 6" diam.	10lbs (4.5kg)	H-4837
Heavy Duty Field scales, metric	2400-11	16kg	5.0g	—	Epoxy-coated steel. 10" diam.	23lbs (10.45kg)	H-4665
Heavy Duty Field scales, English	2400-12	36lbs	0.01lbs	—	Epoxy-coated steel. 10" diam.	23lbs (10.45kg)	H-4660
Heavy Duty Solution Balance	1119-DO	20kg	1.0g	2270g	Stainless steel. 11" diam.	44lbs (19.96kg)	H-4785

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H-4603CC



H-4615S



H-4886



H-4876

Accessories for Ohaus Mechanical Balances

Description	Ohaus Model	For Use With Model:		Model	Description	Includes	Model
Vinyl Dust Cover.	706-OO	750-SW 760-OO 720-SO 1650-WO 1610-DD	H-4603 H-4604 H-4605 H-4835 H-4837	H-4603C	Metric brass weight set, 1 to 1,000g. In box without lid.	1; 2; 3; 5; 10; 30; 50; 100; 200; 500g	H-4876
					Metric brass weight set, 1 to 1,000g. In box with lid.	1; 2; 3; 5; 10; 30; 50; 100; 200; 500g	H-4886
Attachment weight set. Extends weighing range to 2610g. * Included with balance.	707	750SW 760-OO 720-SO	H-4603* H-4604* H-4605*	H-4609	Metric brass weight set, 1 to 2,000g. In box without lid.	1; 2; 3; 5; 10; 30; 50; 100; 200; 500; 1,000g	H-4877
Rod & clamp assembly for under-balance weighing.	—			H-21170	Metric brass weight set, 1 to 2,000g. In box with lid.	1; 2; 3; 5; 10; 30; 50; 100; 200; 500; 1,000g	H-4887
Polypropylene scoop & counterweight.	703			H-4615P	Calibration weight set, 100g x 2kg	100; 200; 500g; 1kg; 2kg	H-4882
Stainless steel scoop & counterweight. * Included with balance	703-SO	1650-WO	H-4837*	H-4615S	Field scale replacement weights	Avoirdupois for H-4600 1 lb (1 required) 2 lb (2 required) 5 lb (2 required) 10 lb (2 required)	H-4660.1 H-4660.2 H-4660.5 H-4660.10
Aluminum scoop & counterweight. 22x11-1/2x6"	126-OO	119-DO	H-4785	H-4616	Field scale replacement weights	Metric for H-4665 500g (1 required) 1kg (1 required) 2kg (2 required) 5kg (2 required)	H-4665.1 H-4665.2 H-4665.3 H-4665.4
Steel carrying case.	—	750-SW 760-OO 720-SO 1650-WO 1610-DD	H-4603 H-4604 H-4605 H-4835 H-4837	H-4603CC	Attachment weight set for triple beam balances, 500g.	—	—
Attachment weight set for triple beam balances, 1,000g	—	750-SW 760-OO 720-SO 1650-WO 1610-DD	H-4603 H-4604 H-4605 H-4835 H-4837	H-4601	Attachment weight set for triple beam balances, 1,000g	—	—



H-4720, H-4724, H-4726

Ohaus Scout Pro Series

New, easy-to-use, easy-to-calibrate, easy-to-clean, easy-to-carry portable units offer many features at very competitive prices:

- Large, easy-to-read display, LCD display
- Quick calibration
- Full-capacity tare
- Auto shut-off
- Large stainless steel platform
- Sealed front panel, plus spill ring
- Weigh-below for specific gravity density
- Selected weighing units.
- Programmable auto shut-off for prolonged battery life
- USB interface or RS232



H-4780

Digital Portable Solution Balance

Lightweight and portable, the electronic solution balance provides a much faster and accurate means of weighing materials in the field than traditional mechanical solution balances offer.

- 20kg x 1g (44 lbs. x 0.002 lbs.) capacity
- Built-in rechargeable battery good for 120 hrs. after charge
- Large, 5-digit digital readout system
- Kg/lb selectable via a touch of a single button
- Taring up to full capacity, plus counting function
- Waterproof keyboard and stainless steel weighting platform
- Supplied complete with AC power adapter and carrying case

Ohaus Scout/Portable Advanced Electronic Balances

Description/Capacity	Ohaus Model	Readability	Weighing Modes	Repeatability (Std. Dev.)	Linearity	Power	Masses Needed for Calibration		Platform Size	Shipping Wt.	Model
Scout Pro 200g	SP202	0.01g	Kg, lb, g, oz, ozt, dwt, Parts counting	0.01g	±0.01g	4 AA batteries; 120, 220V AC; 50/60Hz	200g*	100/200g	4" diam. (10.2cm)	7 lbs (3.2kg)	H-4720
Scout Pro 400g	SP402	0.01g		0.01g	0.01g		200g*	200/400g	5x5.75" (12.7x14.6cm)	7 lbs (3.2kg)	H-4724
Scout Pro 600g	SP601	0.1g		0.1g	0.1g		300g*	300/600g		7 lbs (3.2kg)	H-4726

Digital Portable Solution Balance

Capacity	Readability	Weighing Modes	Power	Platform Size	Shipping Wt.	Model
20kg (44 lbs.)	1g (0.002 lb)	Kg/g Lbs. counting	Rechargeable battery or AC power using 115-230V power adapter	8.25x9.84" (210x250mm)	8 lbs. (3.6kg)	H-4780

Description, Replacement Parts & Accessories

Replacement carrying case.	H-4780C
Yoke for specific gravity measurements with hook.	H-4780Y
RS232 Interface.	H-4780RS
Footed plastic scoop.	H-4615P



H-4500V



H-4502V, H-4504V

Ohaus Voyager Series

Full-featured unit for advanced applications, combines high precision with simple operation.

- General weighing
- Differential weighing
- Density determination
- Quick check
- Statistics
- Formulation
- Large, high-resolution backlit display with brightness & contrast control
- Custom menus with help text
- Pop-up windows for easy menu operation
- Ergonomically engineered leveling system
- Includes RS232 bi-directional computer interface
- Application library
- Contoured for easy cleaning
- All models equipped with built-in weigh-below hook
- UL and CSA certified
- 5-year manufacturer's warranty on both parts & labor

Ohaus Voyager Electronic Balances

Description/Capacity	Ohaus Model	Readability	Weighing Modes	Repeatability (Std. Dev.)	Linearity	Power	Masses Needed for Calibration		Platform Size	Shipping Weight	Model
							Span	Linearity			
Voyager 410g	VO4130	0.001g	g, mg, kg, lbs, oz, ozt, ct, dwt, tares (3), mommes, gn, ti, N, custom unit	0.0005g	0.002g	115V, 60Hz	400g	200/400g	4.75" diam. (120mm)	23 lbs (10.5kg)	H-4500V
Voyager 4,100g	VOD120	0.01g		0.005g	0.02g		4,000g	2,000/4,000g	6.875x6.875" (172x172mm)	18 lbs (8.2kg)	H-4502V
Voyager 8,100g	VOH110	0.1g		0.05g	0.1g		8,000g	4,000/8,000g	8x8" (203x203mm)		H-4504V

Description, Accessories

Model

Foreign voltage power pack and cord set, 220V, 50/60Hz.
For use with Voyager Models.

H-4520PK

ASTM Class 1 Calibration Masses

Mass Value	Shape	Model
200g*	Cylindrical	H-4888.200G
300g*		H-4888.300G
400g*		H-4888.400G
500g*		H-4888.500G
1000g*		H-4888.1KG
2kg*		H-4888.2KG
4kg*		H-4888.4KG
5kg*	Grip handle style	H-4888.5KG
10kg		H-4888.10KG
20kg		H-4888.20KG
30kg		H-4888.30KG

*includes carrying case



H-4500E



H-4502E, H-4504E



H-4506E, H-4508E, H-4510E

Ohaus Explorer Series

Ideal easy-to-use workhorse unit for most general weighing applications. All models in Explorer series feature:

- Custom LCD display with seven alphanumeric characters Dot Matrix Display
- Ergonomically engineered leveling system
- Contoured for easy cleaning
- All models equipped with built-in weigh-below hook
- 5 languages: English, Spanish, German, Italian and French
- Includes RS232 bi-directional computer interface
- UL and CSA certified
- 5-year manufacturer's warranty on both parts & labor.

Ohaus Explorer Electronic Balances

Description/Capacity	Ohaus Model	Read-ability	Weighing Modes	Repeatability (Std. Dev.)	Linearity	Power	Masses Needed for Calibration		Platform Size	Shipping Weight	Model
							Span	Linearity			
Explorer Pro, 100/210g	EP214D	0.1/1mg	g, mg, kg, lbs, oz, ozt, ct, dwt, tales (3), mommes, gn, ti, N, custom unit	0.1 / 0.5mg	0.2 / 0.5mg	100-120VAC 220-240VAC 50/60Hz 115V, 60Hz	400g	200/400g	4.75" dia. (120mm)	23 lbs (10.5kg)	H-4500E
Explorer Pro, 410g	EP413	0.001g		0.0005g	0.002g		400g	200/400g	4.75" dia. (120mm)	23 lbs (10.5kg)	H-4500E
Explorer Pro, 100g	EP4102	0.01g		0.005g	0.02g		4,000g	2,000/4,000g	6.875x6.875" (172x172mm)	18 lbs (8.2kg)	H-4502E
Explorer Pro, 100g	EP8101			0.05g	0.1g		8,000g	4,000/8,000g	8x8" (203x203mm)		H-4504E
Explorer Pro, 12,000g	EP12001	0.1g	g, kg, lbs, oz, ozt, ct, dwt, tales (3), mommes, gn, ti, N, custom unit	0.1g	0.4g		10kg	5/10kg	11x14" (280x356mm)	31 bs 14.1kg	H-4506E
Explorer Pro, 22,000g	EP22001						20kg	10/20kg			H-4508E
Explorer Pro, 32,000g	EP32001						30kg	15/30kg			H-4510E

ASTM Class 1 Calibration Masses

Mass Value	Shape	Model
200g*	Cylindrical	H-4888.200G
300g*		H-4888.300G
400g*		H-4888.400G
500g*		H-4888.500G
1000g*		H-4888.1KG
2kg*		H-4888.2KG
4kg*	Grip handle style	H-4888.4KG
5kg*		H-4888.5KG
10kg		H-4888.10KG
20kg		H-4888.20KG
30kg		H-4888.30KG

*includes carrying case

Description, Accessories

Description, Accessories	Model
Foreign voltage power pack and cord set, 220V, 50/60Hz. For use with Explorer Models.	H-4520PK

HUMBOLDT

Sales or Technical Assistance — 1-800-544-7220



H-4868



H-4864

Ohaus Navigator Portable Balances

All the power of a laboratory balance in a portable version. In addition to general weighing applications, the Navigator series offers functions like animal weighing, parts counting, check weighing and more. Supplied with AC adapter or can be used with standard alkaline batteries.

- User interface with cursor keys to navigate menus and functions
- High contrast LCD displays weight and text messages
- AC powered or battery operated
- Large stainless steel weighing pans
- RS232 bi-directional interface
- User selectable stability levels and filters
- Calibration lock-out switch

Ohaus Navigator Electronic Balances

Description/Capacity	Ohaus Model	Readability	Weighing Modes	Repeatability (Std. Deviation)	Linearity	Power	Masses Needed Span Linearity		Platform Size	Shipping Weight	Model	
Navigator 200g	N02120	0.01g	g, mg, kg, oz t, lb, GN, N oz, tals (3), dwt, ct, ti, M, tola, custom	0.01g	0.01g	120V 50/60 Hz or 8-AA batteries	200g	100/200g	4.75" dia. (12cm)	7 lbs. (3.2kg)	H-4868	
Navigator 200g w/cal.	N12120						—	—			H-4868C	
Navigator 410g	N04120						400g	200/400g			H-4867	
Navigator 410g w/cal	N14120						—	—			H-4867C	
Navigator 810g	N08110	0.1g		0.1g	0.1g		0.1g	800g	400/800g		5.5x6" (14x15cm)	H-4866
Navigator 810g w/cal	N18110							—	—			H-4866C
Navigator 2,100	N0B110							2kg	1kg/2kg			H-4865
Navigator 2,100 w/cal	N1B110							—	—			H-4865C
Navigator 4,100	N0D110	0.5g		0.5g	0.5g		0.5g	4kg	2kg/4kg			H-4864
Navigator 4,100 w/cal	N1D110							—	—			H-4864C
Navigator 8,100	N0H110							8kg	4kg/8kg			H-4863
Navigator 8,100 w/cal	N1H110							—	—			H-4863C

Description, Accessories

Model

Foreign voltage power pack and cord set, 220V, 50/60Hz.
For use with Navigator Models.

H-4520PK

ASTM Class 1 Calibration Masses

Mass Value	Shape	Model
200g*	Cylindrical	H-4888.200G
300g*		H-4888.300G
400g*		H-4888.400G
500g*		H-4888.500G
1000g*		H-4888.1KG
2kg*		H-4888.2KG
4kg*		H-4888.4KG
5kg*	Grip handle style	H-4888.5KG
10kg		H-4888.10KG
20kg		H-4888.20KG
30kg		H-4888.30KG

*includes carrying case



H-4761



H-4770

Ohaus General Purpose Electronic Bench Scales

For weighing applications up to 200 lbs., durable stainless steel platform scale weighs in user-selectable lb., kg, oz or g units. Features auto-calibration, auto-zero tracking, adjustable averaging and stability levels, auto-off timer, programmable menu lockout, factory reset, sealed front panel, battery or adapter operation and five-year warranty. Indicator has anodized aluminum housing.

Ohaus ES Series Low Profile Bench Scales

Utility and economy come together in the ES Series all-purpose bench scale. 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.

Ohaus General Purpose Bench Scales

Description/Capacity	Ohaus Model	Readability Non type approved	Weighing Modes	Repeatability (Std. Dev.)*	Power AC (Adapter)	Power (Battery)	Platform Size	Shipping Weight	Model
Stainless Steel Platform 25 lb (25 kg)	CQ10R11	0.002 lb (0.001 kg)	oz, lb, g, kg	± 0.01%	120, 220V 50/60Hz	6 Alkaline "C" cells	12x12x3.3" (300x300x97mm)	18 lbs (18.2kg)	H-4761
Stainless Steel Platform 50 lb (25 kg)	CQ25R11	0.005 lb (0.002 kg)							H-4760
Stainless Steel Platform 100 lb (50 kg)	CQ50L11	0.01 lb (0.005 kg)					18x18x3.75" (450x450x95mm)		H-4762
Stainless Steel Platform 200 lb (100 kg)	CQ100L11	0.02 lb (0.01 kg)						36 lbs (16.3kg)	H-4764
Stainless Steel Platform 500 lb (150 kg)	CQ250XL11	0.05 lb (0.02 kg)					24x24x5" (600x600x127mm)		H-4767

* Specifications are given as a percentage of the rated load.

Ohaus ES Series Low Profile Bench Scales

Description/Capacity	Ohaus Model	Readability	Weighing Modes	Power AC (Adapter)	Power (Battery)	Platform Size	Shipping Weight	Model
Stainless Steel Platform 110 lb (50kg)	ES50R	0.05 lb (0.02kg)	Lb, kg oz, lb:oz	120V 50/60Hz	6 Alkaline AA batteries	12.2x10.8x1.5" (310x270x40mm)	8.8 lbs (4kg)	H-4770
Stainless Steel Platform 220 lb (100kg)	ES100L	0.1 lb (0.05kg)				20.5x15.7x3" (520x400x75mm)	38 lbs (17kg)	H-4771
Stainless Steel Platform 440 lb (200kg)	ES200L	0.2 lb (0.1kg)				20.5x15.7x3" (520x400x75mm)	38 lbs (17kg)	H-4772

Description, Accessories	Model
Foreign voltage power pack and cord set, 220V, 50/60Hz. For use with all ES Series Bench Scales.	H-4520PK

HUMBOLDT

Sales or Technical Assistance — 1-800-544-7220



H-4732

Full-Capacity Double-Beam Platform Scale (with Carrying Handle)

Full-capacity counter beam scales are portable. Positive platform and beam locks secure the lever system, maintaining the scale in balance between moves between weighing locations. Locking devices also eliminate annoying rattles and vibration wear during transport. Carrying handle doubles as a beam guard and allows convenient hanging from wall brackets, freeing bench and counter space.

Featuring 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: 12x16" (305x406mm).

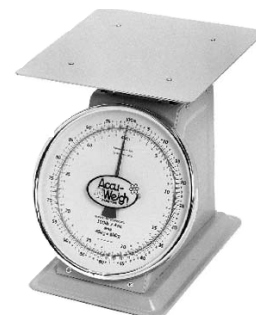
Description	Model
Double-beam platform scale, lbs. only, 131 lbs. Mainbeam, 125 lbs. by 5 lb. subgraduations; second beam, 5 lbs x 0.1 lb.; tare blank, 0.01-1 lb.	H-4732
Double-beam platform scale, metric, 52kg. Mainbeam, 50kg. by 2kg. subgraduations; second beam, 2kg x 0.02kg.; tare blank, 0-2kg.	H-4732M

Shipping wt. 26 lbs. (12.3kg)

Description	Model
Stainless steel cover for H-4732, H-4732M.	H-4732SC



H-4748



H-4484

Heavy-Duty Portable Platform Scale

Designed for accuracy, durability and precision in the field or lab, portable scale provides greater linear accuracy. Features permanently attached sliding weights, hardened tool steel pivots and bearings. Angled mirror device behind indicators makes obtaining precise readings more convenient. Includes locking device and carrying handle, which protects the beam assembly during use and transport. Platform: 16-1/4x21-3/4" (41.3x55.3cm). Choice of lbs. or kg.

Description	Model
Heavy-duty portable platform scale, lbs. only, 301 lb. Main beam, 295 lbs by 5 lb subgraduations; second beam, 1 lb by 0.01 lb.; tare blank, 34 lbs.	H-4748
Heavy-duty portable platform scale, metric, 150kg. Main beam, 140kg by 10kg subgraduations; second beam, 10kg by 100gm; tare blank, 15.5kg.	H-4748M

Shipping wt. 45 lbs. (20kg)

Heavy-Duty Universal Dial Scales

Dial scale has 70 lbs. by .2 lb (30kg by 100g) capacity and features slanted dial with lb. and kg graduations, Plexiglas dial chart cover protected by metal scroll and mild steel painted base.

Description	Model
Heavy-duty universal dial scales.	H-4484

Shipping wt. 12 lbs. (6kg)



H-4621

U.S./Metric Suspension Scale

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.

Specifications		
Weighing Range	0-250 lbs.	0-113.4kg
Resolution	.01 lbs.	.01kg
Accuracy	$\pm .01\%$	$\pm .01\%$

Description	Model
Suspension scale, English/metric.	H-4621



H-4480



H-4490

Spring Scale

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: 8x1-5/8x16" (203x41x406mm).

Description	Model
Spring scale.	H-4480

Shipping wt. 8 lbs. (3.6kg)

Straight Spring Balance

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: 2x1-3/4x11" (51x45x279mm).

Description	Model
Straight spring balance.	H-4490

Shipping wt. 8 lbs. (3.6kg)



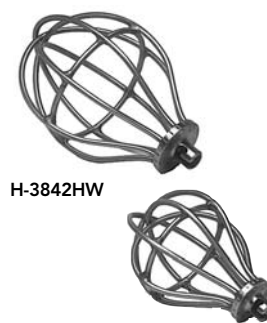
H-3841



H-3842



H-3843



H-3842HW

H-3841HW

5-Qt. Mixer

For mixing hydraulic cement pastes and mortars of plastic consistency. Hobart Model No. N-50A operates on principle of planetary action—beater or whip reaches every part of the batch, rotating on its axis in opposite direction 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. Includes 5-qt. (4.73L) stainless steel bowl and 1 flat stainless steel beater for mixing heavy materials. Base dimensions: 10-3/8x15" (264x381mm). Height: 17" (432mm). Features U/L listed cord and plug. Model H-3841 meets ASTM C227, C305; AASHTO T162.

Description	Model
5-Qt. mixer. 115V. 60Hz. 1ph. AC. 1/6HP. 124W.	H-3841
5-Qt. mixer. 230V. 60Hz. 1ph. AC. 1/6HP. 124W, (non-ASTM).	H-3841.2F
5-Qt. mixer. 230V. 50Hz. 1ph. AC. 1/6HP. 124W, (non-ASTM).	H-3841.5F

Shipping wt. 55 lbs. (25kg)

Description	Model
Bowl positioning adapter bracket for H-3841; provides proper clearance between bottom of mixing bowl and paddles. Meets ASTM C305; AASHTO T162.	H-3844
Plexiglass bowl lid fits over top of bowl with covered opening for planetary action.	H-3846L
Flat-type stainless steel beater.	H-3841.1
Stainless steel bowl, 5 qt.	H-3841.2
Stainless steel wire loop whip for H-3841.	H-3841WW
*Custom heavy-duty 1/4" diam wire stainless steel whip.	H-3841HW

*Custom Heavy-Duty 1/4" Wire Stainless Steel Whips

Made to order to fit your existing whip hub. For information/price quotation, call 1-800-544-7220.

12-Qt. Laboratory Bench Mixer

Hobart Model A-120's bowl has 12-qt. (0.401 cu. ft.) mixing capacity and 15-minute motor-driven timer. Planetary action of 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: 14-3/4x20x29-9/16" (375x508x750cm).

Description	Model
12-Qt. Laboratory bench mixer. 115V. 60Hz. 1ph. AC. 1/3HP. 373 W.	H-3842
12-Qt. Laboratory bench mixer. 230V. 50/60Hz. 1ph. AC. 1/3HP. 373 W.	H-3842.4F

Shipping wt. 185 lbs. (83.9 kg)

Description	Model
Aluminum beater.	H-3842.1
12-Qt. Stainless-steel bowl.	H-3842.2
Aluminum dough hook.	H-3842DH
Stainless-steel wire loop whip.	H-3842WW
*Custom heavy-duty 1/4" diam wire stainless steel whip.	H-3842HW

20-Qt. Laboratory Bench Mixer

With 20-qt.-capacity (0.6684 cu. ft.) bowl, Hobart A-200 mixer has 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: 21x21-1/2x41-1/4" (533x546x1048cm).

Description	Model
20-Qt. Laboratory bench mixer. 115V. 60Hz. 1ph. AC. 1/2HP. 373 W.	H-3843
20-Qt. Laboratory bench mixer. 230V. 50/60Hz. 1ph. AC. 1/2HP. 373 W.	H-3843.4F

Shipping wt. 226 lbs. (102kg)

Description	Model
Aluminum flat-type grid beater.	H-3843.1
Stainless-steel bowl, 20-qt.	H-3843.2
Aluminum dough hook.	H-3843DH
Stainless-steel wire loop whip.	H-3843WW
*Custom heavy-duty 1/4" diam wire stainless steel whip.	H-3843HW



H-3860

Los Angeles Abrasion Machine

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, set of 12 standard abrasion charges. Dimensions: 39x29x37" (991x737x940mm). Meets ASTM C131, C535; AASHTO T96.

Description	Model
Los Angeles abrasion machine. 115V. 60Hz. 1 ph. AC.	H-3860
Los Angeles abrasion machine. 230V. 50Hz. 1 ph. AC.	H-3860.5F

Shipping wt. 1060 lbs. (485kg)

Abrasion Charges

Same as furnished with H-3860, set of 12 abrasion charges. Size and weight meet specifications.

Description	Model
Abrasive charges.	H-3865

Shipping wt. 20 lbs. (9kg)



H-3872B

Micro-Deval Apparatus

The Micro-Deval Apparatus is used to test the resistance of fine and coarse aggregates to degradation by means of abrasion. This test is used to determine the aggregates abrasive loss in the presence of water and an abrasive charge. The test furnishes information useful in judging the suitability of fine/coarse aggregates subjected to weathering and abrasive action when adequate information is not available. The apparatus is available in single, two tier and three tier models. Supplied complete with 5.03-liter stainless steel jar(s), 2.5kg of 9.5mm stainless steel balls and a 15-hour timer.

Description	Model
Micro-Deval apparatus with single tier and jar. 115V, 60Hz, 1ph.	H-3872A
Micro-Deval apparatus with single tier and jar. 230V, 50Hz, 1ph.	H-3872A.5F
Micro-Deval apparatus with two tiers and jars. 115V, 60Hz, 1ph.	H-3872B
Micro-Deval apparatus with two tiers and jars. 230V, 50Hz, 1ph.	H-3872B.5F
Micro-Deval apparatus with three tiers and jars. 115V, 60Hz, 1ph.	H-3872C
Micro-Deval apparatus with three tiers and jars. 230V, 50Hz, 1ph.	H-3872C.5F

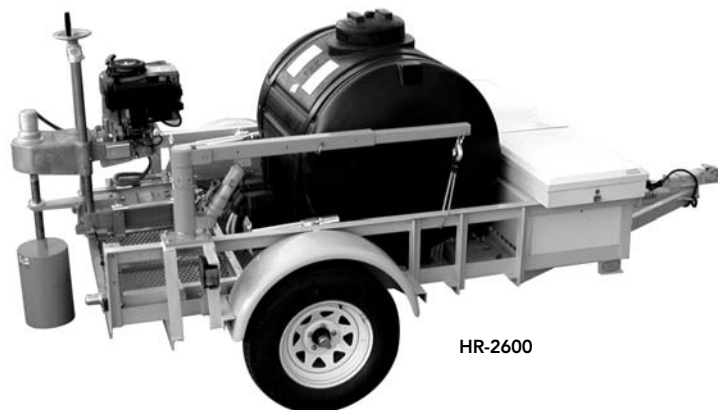
Description	Model
Extra 9.5mm stainless steel balls.	H-3872.1
Extra 5.03-liter jar.	H-3872.2



HR-2500



HR-2504



HR-2600

Portable Diamond Core Drilling Machines

Compact core drilling machines for obtaining cores from concrete, paving, foundations, runways and similar hard materials. Lightweight, reliable, powerful, easily operated unit on base wheels can be moved anywhere. Leveling screws, located in corners of base, allow machines to be set into position quickly by one person. High-quality cores can be obtained with diamond core barrel bits at a fast penetration rate.

Electric Core Drill

The electric model offers full feature flexibility, adapting to a wide range of drilling applications in addition to pavement core sampling. Features include two-speed (450-900 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 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. When snapping cores and adding extension rods, motor and carriage can be removed/attached without changing drill location. For wall drilling, base and column are attached to the wall by the vacuum, then the carriage and motor are added. When working in limited space areas, drilling is possible with the 10" base removed. Adding the optional Angle Drilling Attachment allows the column to tilt up to 45 degrees from vertical. Requires water supply, if none is available order HR2516 portable water pressure tank separately. Order diamond bits and expansion adapters separately.

Description	Model
Electric core drill, 18 amps, 115V, 50/60Hz.	HR-2500
Electric core drill, 9 amps, 230V, 50/60Hz.	HR-2500.4F

Shipping wt. 130 lbs. (59kg).

Gasoline-Powered Core Drill

Drill twice as fast as electric with a gasoline-powered core drill. Features include a 10.5 HP, 4-cycle, pull-start, gasoline motor (electric start optional), 8-inch diameter bit capacity, and an effortless ball-screw feed system for single operator use. Can be carried in pick-up or van for easy transport. Quick set up, dead weight machine requires no anchor bolts or mounting hardware. Requires water supply, if none is available order HR2516 portable water pressure tank separately. Order diamond bits and expansion adapters separately. Also available is a 16-inch diameter bit capacity unit with a 13 HP, 4-cycle, electric start gas motor.

Description	Model
Gasoline-powered core drill, 8" drill bit capacity.	HR-2503
Gasoline-powered core drill, 16" drill bit capacity.	HR-2504

KOR-MOBILE Trailer System

This complete stand-alone core drill rig offers field independence, versatility, dependability, and easy single person operation. Features include; HR-2504 Core Drill Machine, a variable positioning system, which allows for approximately 48-inches side-to-side and 12-inches fore and aft drill head movement for accurate hole placement, a hydraulic assisted machine lift allows single operator removal and replacement of drill head for remote drilling applications, a 200-gallon water tank and 12 VDC water pump for a full day of drilling, and a lockable weather-resistant toolbox is added for storage of tools and drill bits. All mounted on a 5 ft. by 8 ft. (approx. bed size) steel construction trailer, equipped with electric brakes and Order diamond bits and expansion adapters and auger blades separately.

Description	Model
KOR-MOBILE Trailer System.	HR-2600

Description	Model
Extension rod, 9" (229mm), for drilling holes deeper than 12" (305mm).	HR-2510
Water trapping assembly confines wastewater on the surface, and electric pump moves water into container.	HR-2511
Diamond bit edge dresser.	HR-2512
Replacement wheel for HR-2512.	HR-2513

Description	Model
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 the surface.	HR-2515
Portable water pressure tank. Hand-operated, 4 gal. (15 liter), delivers water under pressure when tap water is not available.	HR-2516



HR-2508

HR-2554
HR-2556
w/HR2554H

HR-2540

Hand-Held, Gasoline Powered Drill

For fast, economic drilling—either vertical or horizontal—of concrete/asphalt and/or auger drilling into soil. Easy-to-handle, 22 lbs. overall weight. Quick set-up, easy-to-use, reliable. 2.5 HP, 2-cycle gasoline engine, high performance water swivel, KOR-IT Bit Locator. Accepts up to 6-1/4" dia max. bit.

Description	Model
Hand-held gasoline powered drill.	HR-2508

Shipping wt. 30 lbs. (13.6kg)

CoreSnap

The CoreSnap, (handle not included) 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.

Description	Model
CoreSnap for 4" Samples.	HR-2554
CoreSnap for 6" Samples.	HR-2556
Handle for CoreSnap.	HR-2554H

Economical Replacement Bits

Ever notice how your bits always seem to break, get dull, or turn up lost just when you need 'em the most? You can beat "Murphy's Law" by buying Replacement Bits now to have on hand at those moments when you can least afford downtime. And, you can \$ave with our discounts by ordering in multiple quantities! Call 1-800-544-7220.

Core Bits, Diamond Tip, for Expander Set.

Diamond tip bits are designed for fast, economical drilling of concrete, moderately reinforced concrete, brick, asphalt and other masonry materials. Bits cut holes approximately 1/16" (2mm) larger than the nominal bit size used. Expander set is designed for quick, easy attachment of 2 to 6-1/2" (51 to 165mm) dia. bits. Two beveled plates tighten expander ring firmly against inside of bit barrel.

Description	Model
Core bits, diamond tip, for expander set. See chart for sizes.	HR-2520 series

Core Bits, Diamond Tip, Permanent Head

Same as HR-2520 series, except HR-2530 has permanently attached head.

Description	Model
Core bits, diamond tip, permanent head. See chart for sizes.	HR-2530 series

Core Bits, Diamond Tip

Bit Size		Diamond Bits	Expander Sets (for attaching bits)	Diamond Bits Permanently Attached Head
in.	mm	Bits require expander sets. Order bits and expander sets separately		Does not require expander sets
2	51	HR-2520.2	HR-2540.2	HR-2530.2
2-1/2	64	HR-2520.25	HR-2540.25	HR-2530.25
3	76	HR-2520.3	HR-2540.3	HR-2530.3
3-1/2	89	HR-2520.35	HR-2540.35	HR-2530.35
4	102	HR-2520.4	HR-2540.4	HR-2530.4
4-1/4	108	HR-2520.42	HR-2540.42	HR-2530.42
4-1/2	114	HR-2520.45	HR-2540.45	HR-2530.45
5	127	HR-2520.5	HR-2540.5	HR-2530.5
5-1/2	140	HR-2520.55	HR-2540.55	HR-2530.55
6	152	HR-2520.6	HR-2540.6	HR-2530.6
6-1/4	159	HR-2520.62	HR-2540.62	HR-2530.62
6-1/2	165	HR-2520.65	HR-2540.65	HR-2530.65

H-4158.1, H-4460, H-4462,
H-4463, H-4464

H-4461



H-4470



HM-4469 Series

Dial Indicators

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. Low contact pressure and sensitivity enable the contact point to react immediately in either direction. All dial indicators have continuous graduations and revolution counters that show revolutions of the indicator hand. Dials listed are clockwise rotation; counter-clockwise rotation is available on request.

Dial Indicators, Inches					
Range	Division	Diameter	Brake	Counter-clockwise Model	Model
0.200"	0.0001"	2-1/4"	No	H-4460CC	H-4460
0.200"	0.0001"	2-1/4"	Yes	H-4461CC	H-4461
0.300"	0.0001"	2-1/4"	No	H-4462CC	H-4462
0.500"	0.0001"	2-1/4"	No	H-4471CC	H-4471
1.000"	0.0010"	2-1/4"	No	H-4158.1CC	H-4158.1
2.000"	0.0010"	2-3/4"	No	H-4463CC	H-4463
3.000"	0.0010"	2-3/4"	No	H-4464CC	H-4464
* Models include two revolution counters					

Dial Indicators, Metric					
Range	Division	Diameter	Brake	Counter-clockwise Model	Clockwise Model
8mm	0.002mm	57mm	No	H-4465.08CC	H-4465.08
12mm	0.002mm	57mm	No	H-4465.12CC	H-4465.12
25mm	0.010mm	57mm	No	H-4465.25CC	H-4465.25
50mm	0.020mm	70mm	No	H-4465.50CC	H-4465.50

Magnet Holder with Swivel Adapter Yoke

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 6x1/4" (154x6.4mm) and set in hardened ball socket so indicator may be mounted in almost any position.

Description	Model
Magnet holder with swivel adaptor yoke.	H-4470

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 replacement indicator for H-4454-series proving rings—see page 30, 119 and 172.

Brake is available for most model dial indicators, call 1-800-544-7220

Electronic Digital Indicators				
Range	Division Inches (mm)	Dimension	Peak Hold	Model
0.2500" (6.250mm)	0.0001 (0.002)	2-9/32" diam (72mm)	Yes	HM-4469.02
0.6000" (15.000mm)	0.0001 (0.002)	2-9/32" diam (72mm)	Yes	HM-4469.05
1.0000" (25.400mm)	0.0001 (0.002)	2-9/32" diam (72mm)	Yes	HM-4469.10
2.0000" (50.800mm)	0.0001 (0.002)	1-9/16x9-3/4" (40x146mm)	Yes	HM-4469.20
4.0000" (101.600mm)	0.0001 (0.002)	1-9/16x9-7/4" (40x248mm)	Yes	HM-4469.40

Extension Contact Points		
Length in (mm)	Description	Model
1/4 (6) 1/2 (13) 1 (25)	For applications requiring longer contact points, hardened steel points have polished tip to prevent scratching. Points fit all standard dial indicators.	H-4466.2 H-4466.5 H-4466.10
1-1/2 (38) 2 (51) 3 (76)		H-4466.15 H-4466.20 H-4466.30



H-4915, H-4916P



H-4911, H-4912P



H-4913



H-4917

Graduated Cylinders

Type	Description	Cap. ml	Model
Glass	Graduated circular divisions, double-numbered, reading up and down. Calibrated to deliver the indicated capacities. Includes plastic guard on 10 to 100ml sizes. Packed one cylinder to a carton.	10	H-4915.010
		25	H-4915.025
		50	H-4915.050
		100	H-4915.100
		250	H-4915.250
		500	H-4915.500
Plastic	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.	1,000	H-4915.1M
		2,000	H-4915.2M
		10	H-4916P.010
		25	H-4916P.025
		50	H-4916P.050
		100	H-4916P.100
		250	H-4916P.250
		500	H-4916P.500
		1,000	H-4916P.1M
		2,000	H-4916P.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 ($\pm 5\%$).	50	H-4912P.050
	100	H-4912P.100
	250	H-4912P.250
	400	H-4912P.400
	600	H-4912P.600
	1,000	H-4912P.1M
	2,000	H-4912P.2M

Glass Beakers

Description	Cap. ml	Grad. Range ml	Grad. Interval ml	Model
Griffin low-form beakers for general laboratory use have pourout lip. Design provides greater strength via heavier uniform walls.	50	10-40	10	H-4911.050
	100	20-80	10	H-4911.100
	250	25-200	25	H-4911.250
	400	25-325	25	H-4911.400
	600	50-500	50	H-4911.600
	800	50-750	50	H-4911.800
	1,000	50-950	50	H-4911.1M
	2,000	50-1950		H-4911.2M
	3,000	50-2950		H-4911.3M
	4,000	50-3950		H-4911.4M

Erlenmeyer Flasks

Description	Capacity ml	Vented Model	Unvented Model
Narrow-mouth flasks feature heavy-duty rim, volume graduations, tubulation and matte spot for temporarily identifying contents.	250	H-4913.250	H-4917.250
	500	H-4913.500	H-4917.500
	1,000	H-4913.1M	H-4917.1M
	2,000	H-4913.2M	H-4917.2M
	4,000	H-4913.4M	H-4917.4M

Special Rubber Stoppers for Erlenmeyer Flasks

Description	Fits Flask Size ml	Model
Rubber stopper with brass hose fitting for use with Erlenmeyer Flasks.	250	H-4913.250S
	500	H-4913.500S
	1,000	H-4913.1MS
	2,000	H-4913.2MS
	4,000	H-4913.4MS



H-4920, H-4921



H-4922



H-4922C



H-4923

Aluminum Beakers

Description	Capacity ml	Model
Low-form aluminum laboratory beakers with pour spout. One-piece construction eliminates breakage.	60	H-4920.060
	125	H-4920.125
	250	H-4920.250
	500	H-4920.500
	1,000	H-4920.1M
	2,000	H-4920.2M

Nickel Crucibles

Description	Capacity ml	Model
Nickel crucibles from pure heavy sheet nickel. Suitable for fusions, including those with sodium peroxide, and highly resistant to dilute alkalis.	20	H-4922.020
	30	H-4922.030
	50	H-4922.050
	75	H-4922.075
	100	H-4922.100
	250	H-4922.250
	500	H-4922.500

Nickel Beakers

Description	Capacity ml	Model
Low-form nickel laboratory beakers with pour spout. One-piece construction eliminates breakage.	60	H-4921.060
	125	H-4921.125
	250	H-4921.250
	500	H-4921.500
	1,000	H-4921.1M
	2,000	H-4921.2M

Nickel Crucible Covers

Description	Capacity ml	Model
Flat-style nickel crucible covers with depression in center for centering on crucibles. Extension on one side for handle.	20	H-4922C.020
	30	H-4922C.030
	50	H-4922C.050
	75	H-4922C.075
	100	H-4922C.100
	250	H-4922C.250
	500	H-4922C.500

Stainless Steel Measures

Description	Capacity ml	Model
Measures feature convenient handle and graduations in milliliters and ounces on inside.	500	H-4923.500
	1,000	H-4923.1M
	2,000	H-4923.2M



H-4926, H-4928, H-4929



H-4924



H-4930



H-4184



H-4914 Series

Aluminum Moisture Boxes

Description	Dia. in. (mm)	Height in. (mm)	Model
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.	2 (51)	7/8 (22)	H-4926
	2-1/2 (64)	1-3/4 (44)	H-4927
	3 (76)	1 (25)	H-4928
	3-1/2 (89)	2 (51)	H-4929

Plastic Jars with Caps

Description	Capacity oz (g)	Model
White plastic jar with cap; 12 per pack.	4 oz (113.4g)	H-4914.04
	8 oz (226.8g)	H-4914.08
	16 oz (453.6g)	H-4914.16

Nickel Evaporating Dishes

Description	Cap.	Top Dia. in. (mm)	Height in. (mm)	Model
Heavy gauge pure nickel dishes have straight sides, flat bottom, pour lip.	40ml	2-1/4 (57)	1 (25)	H-4924.040
	100ml	2-3/4 (70)	1-3/8 (35)	H-4924.100
	200ml	3-3/8 (86)	1-13/16 (46)	H-4924.200
	300ml	3-7/8 (98)	2-1/4 (57)	H-4924.300

Sample Can

For storing and transporting sample materials, 1qt.-capacity (.87L) can has friction-type cover. Dimensions: 4-1/8" dia. x 4-7/8" (105x124mm)

Description	Model
Sample can.	H-4184

Field Can

For receiving, transporting and storing samples, 1 gal.-capacity (3.48L) can adequately holds all material from average-size density hole. Has friction-type lid. Dimensions: 6-1/2" dia. x 7" (165x178mm).

Description	Model
Field can.	H-4183

Porcelain Evaporating Dishes

Description	Cap.	Top Dia. mm	Height mm	Model
Shallow porcelain dish has pour lip, glazed inside, partly glazed outside.	120ml	90	37	H-4930.120
	250ml	115	45	H-4930.250
	765ml	185	54	H-4930.765
	1,285ml	215	63	H-4930.M1285



H-4308, H-4309



H-3967S



H-3996S



H-3725



H-1702

Moisture and Immersion Pans

Applications	Description	Size	Shpg. Wt. lbs. (kg)	Specifications	Model
Air drying wet coal test samples	Galvanized iron with wire-bound rolled top edges. Features 2 drop handles, straight sides.	18x18x1-1/2" deep (457x457x38mm)	10 (4.5)	ASTM D2234, D2961	H-3700
	Same as above, without handles.				H-3707
General lab work	Same as H-3700, except with tapered sides for nesting.	18x18x3" deep (457x457x76mm)	12 (5.4)	—	H-3705
Total moisture determination	Same as H-3700	24x24x4" deep (610x610x102mm)	20 (9)	ASTM D346, D2013, D2234	H-3710
		24x24x6" deep (610x610x152mm)			H-3712
Oven drying asphalt samples	Same as H-3700, except with tapered sides for nesting.	10x20x3" deep (254x508x76mm)	9 (4.1)	—	H-3723
Slump tests, storage, etc.	Same as H-3700, except with tapered sides for nesting.	24x24x3" deep (610x610x76mm)	18 (8.2)	ASTM C192	H-3725
Aggregate and soil samples	Welded steel construction with open chute end simplifies transfer or bag loading. Front swing-down handle folds inside pan to permit criss-cross stacking. Tapered scoop section controls flow.	15x30x4" (381x762x102mm)	14 (6.4)		H-4308
		12x20x4" (305x508x102mm)	9 (4.1)	—	H-4309

Stainless Steel Rectangular Pans

Dimensions	Ship. Wt.		Model
	lbs.	kg.	
8x5-1/4x4-1/2"D (203x133x114mm)	3	1.4	H-3981S
10-1/2x5-1/2x4-1/2"D (267x40x114mm)	4	1.8	H-3986S
13-1/2x6-3/4x5"D (343x71x127mm)	5	2.3	H-3967S
22x6-1/2x5-1/4"D (559x165x133mm)	6	2.7	H-3993S
15-1/2x8x7"D (394x204x178mm)	6	2.7	H-3996S

Description

Model

Material Handling Scoop. 8"H x 15"W x 23"L.

H-1702



H-4936



H-4940



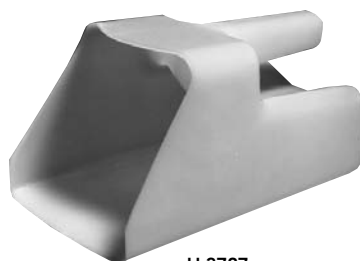
H-4352 Series

Round Mixing Bowls and Pans

Material	Size and Volume (Dia. x H)	Model
	7-1/4x3" (198x76mm); 1-1/2 qt. (1.4L)	H-4936
	9-1/2x3-1/2" (241x89mm); 3 qt. (2.8L)	H-4937
Stainless	12-1/2x5-1/2" (318x140mm); 8 qt. (7.6L)	H-4938
	10-3/4x4-3/4" (273x121mm); 5-1/2 qt. (5.2L)	H-4939
	17-1/2x6-1/2" (444x165mm); 16 qts. (13.9L)	H-4939.5
	9x1-1/2" (228x38mm)	H-4940.2
Aluminum	10x1-1/2" (254x38mm)	H-4940.4
	12x1-1/2" (304x38mm)	H-4940.6
	15x1-1/2" (381x38mm)	H-4940.8

Rectangular Mixing Pans

Material	Size (LxWxD)	Model
Stainless	10-3/8x6-3/8x2-1/2" (264x162x64mm)	H-3969
Tin	8x5-1/4x4-1/4" (203x133x108mm)	H-3981
Stainless	20-3/4x12-3/4x2-1/2" (527x323x63mm) 20-3/4x12-3/4x4" (527x324x102mm) 20-3/4x12-3/4x6" (527x324x152mm)	H-4352.2 H-4352.4 H-4352.6
Stainless	13-7/8x12-3/4x2-1/2" (346x323x63mm) 13-7/8x12-3/4x4" (346x323x102mm) 13-7/8x12-3/4x6" (346x323x152mm)	H-4353.2 H-4353.4 H-4353.6
Stainless	10-3/8x12-3/4x2-1/2" (264x342x64mm) 10-3/8x12-3/4x4" (264x342x102mm) 10-3/8x12-3/4x6" (264x342x152mm)	H-4354.2 H-4354.4 H-4354.6
Stainless	6-7/8x12-3/4x2-1/2" (174x342x64mm) 6-7/8x12-3/4x4" (174x342x102mm) 6-7/8x12-3/4x6" (174x342x152mm)	H-4355.2 H-4355.4 H-4355.6
Stainless	14-7/8x10-1/4x2" (376x269x50mm) 16-1/8x11-1/8x2-1/4" (409x282x57mm) 18-1/8x12-3/8x2-3/8" (460x314x60mm)	H-4356.2 H-4356.4 H-4356.6
Aluminum	15-3/8x10-7/8x2-3/8" (390x276 x60mm) 17-5/8x11-3/4x2-3/8" (447x298x60mm) 25-3/4x17-3/4x3-1/2" (654x450x89mm) 8x8x2" (203x203x51mm)	H-4351.2 H-4351.4 H-4351.6 H-4941
Tin	8-1/2x4-1/2x2-1/2" (216x114x64mm)	H-4934
Bakalon	18x13x1-7/8" (457x330x47mm)	H-4359



H-3727



H-3730

H-3729, H-3731,
H-3732, H-3734

H-3735

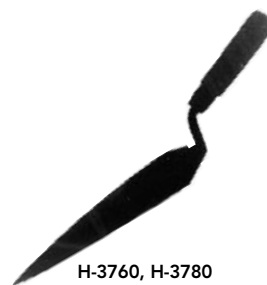
Scoops

One-piece heavy-duty die-cast aluminum, stainless steel and plastic scoops are designed to handle concrete, sand, soils, etc. in laboratory or field.

Scoops									
Scoop No.	Nose	Material	Bowl Vol./ Water (oz/cu. in.)	Bowl Dimensions			Overall Length	Teflon® Coated Model	Model
				Length	Width	Depth			
—	Flat	Plastic	67 (115.5)	9" (228mm)	4" (102mm)	5-1/2" (139mm)	9" (228mm)	—	H-3727
1	Round	Aluminum	13.5 (24.4)	6-3/4" (172mm)	4" (102mm)	2-1/2" (64mm)	10" (254mm)	H-3729TC	H-3729
—	Square	Aluminum	6.7 (12.2)	6" (152mm)	3-3/4" (95mm)	2" (51mm)	9-1/4" (235mm)	H-3730TC	H-3730
2	Round	Aluminum	20 (36.6)	8-1/4" (210mm)	5-1/4" (133mm)	3" (76mm)	12-1/4" (311mm)	H-3731TC	H-3731
3	Round	Aluminum	33 (61.02)	10-1/4" (260mm)	5-3/4" (146mm)	3-1/2" (89mm)	14-1/2" (368mm)	H-3732TC	H-3732
—	Round	Stainless steel	3.3 (6.1)	5" (114mm)	2-1/2" (63mm)	1" (25.4mm)	9" (228mm)	H-3734TC	H-3734
—	Flat	Stainless steel	6.6 (12.2)	5-1/2" (139mm)	3" (76mm)	1-1/2" (38mm)	9.3" (236mm)	H-3735TC	H-3735
—	Flat	Stainless steel	29 (53)	8" (203)	5-1/2" (139mm)	2-1/2" (63mm)	13-1/2" (343mm)	H-3736TC	H-3736
—	Curved	Stainless steel	—	2-1/2" (635mm)	2-1/2" (635mm)	—	9" (228mm)	H-3738TC	H-3738

Trowels

Description	Size (W x L)	Model
Plasterer-type trowel's flat rectangular blade is fastened to the mounting and wood handle with stainless steel pins.	4-1/2x10" (114x254mm)	H-3762
Forged steel trowel for mixing cement batches, filling molds, etc., has flat pointed blade and wood handle.	2-3/4x5" (70x127mm)	H-3760
	5-1/4x10" (133x254mm)	H-3780
Forged steel trowel for striking off molds, etc., has edges ground straight. Meets ASTM C109; AASHTO T106.	2-3/4x5" (70x127mm)	H-3761



H-3760, H-3780



H-3738



H-2727D



H-3570



H-3740

H-3745, H-3746



H-4973



H-4974

Hygrometer

Precision hygrometer has temperature gauge and is accurate within ± 3 percent relative humidity from 20 to 85 percent. Unit is tested and calibrated five times in humidity-and-temperature-controlled rooms, monitored by chart recorders. Black metal case is 5-1/4" dia.

Description	Model
Hygrometer.	H-2727

Rain Gauge

Heavy-duty plastic rain gauge is designed to be wall-, fence- or post-mounted (bracket included) or pushed into the ground using the sharp point at the bottom of the inverted cone. Measures to 5.5" (140mm) in .02" gradations for the first 1/2", .05" gradations from 1/2 to 2" and .10 gradations from 2 to 5.5" (.1 to 50mm and .2mm from 50 to 140mm).

Description	Model
Rain gauge.	H-3570

Rubber Gloves

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.

Description	Model
Rubber gloves.	H-3740

Heavyweight Terrycloth Glove

Heavyweight terrycloth glove; one size.

Description	Model
Heavyweight terrycloth glove.	H-3745

Heat-Resistant Gloves

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.

Description	Model
Heat-resistant gloves.	H-3746

Heavy-Weight Heat-Resistant Gloves

Made from heavy-weight hot mill, kevlar cotton blend. Cotton acrylic liner with nitrile N-coating. Reversible.

Description	Model
Heavy-weight heat-resistant gloves.	H-3742

Preparation Knife

Used for sample preparation and general lab work, knife has 6"-long thin, sharp blade and wood handle.

Description	Model
Preparation knife.	H-4973

Spoon

For mixing and transferring soils, handling corrosive chemicals, etc., stainless steel spoon is 13" (330mm) long.

Description	Model
Spoon.	H-4974

Rubber Mallets

For use with unit weight or air entrainment meters. Rubber-headed mallets have wood handles. Meets ASTM C138, C231; AASHTO T121, T152.

Rubber Mallets				
ASTM Weight	Head		Handle Length	Model
	Length	Face dia.		
2.10 lbs (0.95 kg)	5" (127mm)	2-1/2" (64mm)	12-3/4" (324mm)	H-4975
1.30 lbs (0.59 kg)	3-3/4" (95mm)	2-1/4" (57mm)	11" (280mm)	H-4976



H-4891

H-4892

H-4893



H-4899



H-4900

H-4904, H-4906,
H-4907, H-4908,
H-4910

Tools

Description	Model
14 oz. Rock pick with pointed tip; nylon-vinyl grip	H-4891
22 oz. Rock pick with pointed tip; leather grip	H-4892
20 oz. Rock pick with chiseled edge; nylon-vinyl grip	H-4893
22 oz. Rock pick with pointed tip, 16-1/4" long	H-4894
3 lb. Crack hammer with painted finish and nylon-vinyl grip	H-4895
Rock chisel 1/2x12", for pockets; vinyl-cushion grip	H-4896
Rock chisel 5/8x9", for wedging and prying; vinyl-cushion grip	H-4897
Rock chisel 1-1/4x8", for splitting.	H-4898
Pry bar, 18" long, with forged I-beam construction	H-4899
Clear safety goggles with soft vinyl frame and replaceable lens	H-4900
Chisel, 1-1/4 x 9"	H-4970

Spatula

Flexible stainless steel blades with straight edges and rounded ends. Blade is riveted into wooden handle. H-4907 meets ASTM C185, C780; AASHTO T137.

Description	Model
3/4" (19mm) wide x 4" (102mm) long, straight-edge spatula.	H-4904
7/8" (22mm) wide x 6" (152mm) long, straight-edge spatula.	H-4906
1/2" (13mm) wide x 6" (152mm) long, straight-edge spatula.	H-4907
1-1/4" (32mm) wide x 8" (204mm) long, straight-edge spatula.	H-4908
1-1/4" (32mm) wide x 10" (254mm) long, straight-edge spatula.	H-4910

Digital Calipers

May be used for outside, inside, depth and step measurements. Switchable from inches to millimeters.

Description	Model
Digital Caliper, 0-8" (0-200mm), Range: ± 0.001 " accuracy.	H-2816.8
Digital Caliper, 0-12" (0-300mm), Range: ± 0.0015 " accuracy.	H-2816.12

Stainless Steel Dial Caliper

Stainless steel dial caliper may be used for outside, inside, depth and step measurements up to 6" in .1" increments. Caliper delivers direct .001" reading and is adjustable to 0.

Description	Model
Stainless steel dial caliper.	H-2817



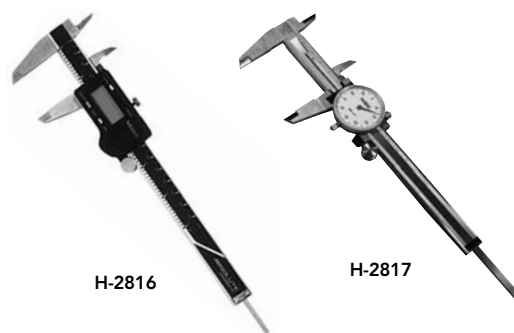
H-4894

H-4895



H-4897

H-4970



H-2816

H-2817



H-4982



H-4983



H-3397



H-3398, H-3399



H-4222 Series

Round-Point Shovel

Heat-treated high-carbon steel round-pointed blade has 27" (69cm) D-grip handle and full wooden yoke with steel casing.

Description	Model
Round-point shovel.	H-4982

Square-Point Shovel

Heat-treated high-carbon steel 9-3/8x11-1/2" (24x29cm) square-pointed blade with 48" (122cm) handle.

Description	Model
Square-point shovel.	H-4983

Durometers (D Scale)

As required by ASTM D4318, 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. Meets ASTM D4318, D2240.

Durometers			
Type	Applications	Meets ASTM	Model
Type A	Soft rubber, plastics, elastomers, printer's rolls.	D2240	H-4222A
Type B	Harder elastomers, plastics, paper, fibrous materials. Use above 93 Duro A.	D2240	H-4222B
Type C	Medium hard elastomers, plastics Useful to avoid surface marks.	D2240	H-4222C
Type D	Hard rubber, plastics, such as floor materials & bowling balls.	D2240	H-4222D

Guth Wash Bottle

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.

Description	Model
Guth wash bottle.	H-3397

Polyethylene Dispensing Bottles

Easy-to-squeeze, resilient bottle is leak-proof dispensing unit. Heavier flow is accommodated by cutting back dispenser tip.

Description	Model
8-oz. (250ml) Polyethylene dispensing bottle.	H-3398
16-oz. (500ml) Polyethylene dispensing bottle.	H-3399

Mercury Spill Clean-up Kit

For recovery and disposal of mercury spills up to 500 grams. Includes all items needed in a critical spill situation in one box: gloves, mercury collector to swab spill, two plastic spatulas for cleaning spill area, absorbent and activator to absorb remaining mercury, plastic bag for disposal and step-by-step instructions.

Description	Model
Mercury spill clean-up kit.	H-3632SK

WARNING: Inhalation of mercury vapor is hazardous to your health. Do not breathe mercury vapor. Use mercury only in area with adequate ventilation. When mercury must be left exposed to the atmosphere during use, cover exposed mercury with a layer of water to inhibit mercury vaporation. Clean up spills immediately. Wash hands thoroughly after handling mercury. Store mercury in a strong, well-closed container.



H-4206



H-2937, H-2937M



H-2819

Sample Bags

High-count drill cloth bags have sewn seams and cord drawstring. Used to transport samples from field to laboratory.

Description	Model
Sample bag 10x18" (254x457mm).	H-4206
Sample bag 17x32" (432x813mm).	H-4207

Plastic-Lined Sample Bags

Vinyl plastic liner inside outer bag of high-count drill cloth with sewn seams and drawstring is ideal for fine-grained soils, cement and wet material.

Description	Model
Plastic-lined sample bag, 10x18" (254x457mm).	H-4208
Plastic-lined sample bag, 17x32" (432x813mm).	H-4209

Straightedge

For striking-off samples in containers, measures or molds. Ground steel with beveled edge. Meets ASTM C185, D558, D559, D560, D698; AASHTO T137.

Description	Model
Straightedge, 8". 1/8x1-1/4x8" (3x32x203mm)	H-4144.8
Straightedge, 12". 1/8x1-1/4x12" (3x32x305mm)	H-4144
Straightedge, 16". 1/8x1-1/4x16" (3x32x406mm)	H-4144.16
Straightedge, 24". 1/8x1-1/4x24" (3x32x610mm)	H-4144.24

Pi Tape

Manufactured with the precise accuracy as a micrometer, periphery, or Pi, tape is a fast, reliable method for measuring diameter of concrete, soil and asphalt cores and cylinders. One reading provides round and out-of-round diameters within accuracy of .001" (.03mm on metric model) by means of special graduations and vernier scale. Tape is spring steel; graduations and numerals are engraved and acid etched on a ground surface. Tape has diameter range of 2 to 12" (50 to 300mm on metric model). Includes certificate of calibration.

Description	Model
Pi tape.	H-2937
Pi tape, Metric .	H-2937M

Stepdown Transformers

Allows 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.

Description	Model
250-watt transformer. Shipping wt. 10 lbs. (4.5kg)	H-1042
500-watt transformer. Shipping wt. 12 lbs. (5.4kg)	H-1042.5
750-watt transformer. Shipping wt. 16 lbs. (7.3kg)	H-1042.7
1,000-watt transformer. Shipping wt. 17 lbs. (7.7kg)	H-1042.10
1,500-watt transformer. Shipping wt. 21 lbs. (9.5kg)	H-1042.15
2,000-watt transformer. Shipping wt. 28 lbs. (12.7kg)	H-1042.20

Hand-Held Laser Distance Measuring Device

Measures distances from 0.7 to 650 ft. (0.2 to 200m) with an accuracy of $\pm 0.1"$ (3mm). Unit has an easy-to-operate keypad, which calculates area and volumes. Large graphic display is backlit and displays current and previous readings for easy reference. It also provides timed and continuous measuring. The unit displays measurements in ft/inches-decimal, ft/inches-fractions, inches, decimal inches and metric. Comes complete with AA batteries, belt pouch, wrist strap and user manual.

Deluxe model adds calculator keys to add and subtract readings, memory, a built-in level bubble and 2x telescopic viewer, remote measuring functions and automatic corner and level readings.

Description	Model
Hand-Held Laser Distance Measuring Device.	H-2819
Deluxe Hand-Held Laser Distance Measuring Device.	H-2829



H-17150

Aluminum Moisture Dish

Developed in accordance with specifications for determining moisture in grain, malt, flour, and dried milk. 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.

Description	Model
Aluminum moisture dish.	H-17150

Mortar & Pestle (Plattner's)

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 (25x76mm).

Description	Model
Mortar & pestle (Plattner's).	H-17270

Mortar & Pestle

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,

Description	Model
Mortar & pestle.	H-17280

Shipping. wt.: 8 Lbs



H-17270



H-17280



H-17300

Mortar & Pestle For Crushing Hard, Tough Substances

Made of hardened alloy tool steel. Pestle has ball-end to fit bottom of mortar cavity. Mortar: 3x3x4-1/2"H (76x76x114mm); bore: 2" dia x 3" deep (51x76mm). Pestle: 9-1/2" (241mm) overall length.

Description	Model
Mortar & pestle for crushing hard, tough substances. Shipping. wt. 16 lbs. (7.3kg).	H-17300
Pestle only. Shipping. wt. 6 lbs (2.7kg).	H-17301
Mortar only. Shipping. wt. 11 lbs (5kg).	H-17302



H-1675

Mortar and Pestle Compaction Mold

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, knock-out button and ring support are C.R. steel. Meets dimensions in Fig. 3 of ASTM E28.

Description	Model
Mortar and pestle compaction mold.	H-1675



Brushes

Complete line of brushes for any application.

Brushes					
Description	Handle	Bristle	Bristle Length	Overall Dimension	Model
Table Brush	Wood	Horsehair	2-1/4" x 2" x 8" (57mm x 51mm x 203mm)	13-1/2" (343mm)	H-3776
Wire Scratch Brush*	Wood	Wire No. 26 gauge flat	2" x 2" x 7" (51mm x 51mm x 178mm)	7-3/4" x 2-5/8" (197mm x 67mm)	H-4259
General Cleaning Brush	Plastic	Palmyra barbs	2" x 3" x 4" (51mm x 76mm x 102mm)	8-1/4" (210mm)	H-3639
Mold Cleaning Brush	Wood	Brass Wire	2" x 7/8" x 5-1/4" (25mm x 22mm x 133mm)	10 1/4" (360mm)	H-3800
Sieve Brush, Fine Mesh	Wood	Horsehair	1-1/2" x 1-1/4" diam. (38mm x 32mm)	5-1/4" (133mm)	H-3774
Sieve Brush, Oval Shaped	Wood	Horsehair	2-3/4" x 1-1/8" x 3/4" (70mm x 29mm x 19mm)	10 1/2" (267mm)	H-3799
Sieve Brush, Fine Mesh	Wood	Horsehair	2-1/2" x 1" x 3/8" (64mm x 25mm x 10mm)	10-1/2" (267mm)	H-3770
Sieve Brush, Coarse Mesh	Wire Loop	Wire	1-1/2" x 3/4" x 1/8" (38mm x 19mm x 3mm)	5 1/2" (140mm)	H-3772
*Meets ASTM D559, D560, AASHTO T135, T136, CRD-C593, C594					



H-3204

Portable Skid Resistance Tester

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 & 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): 31x25.5x9" (787x648x229mm). Meets ASTM E303.

Description	Model
Portable skid resistance tester.	H-3204

Shipping wt. 75 lbs. (34.0kg)

Description, Replacement Parts & Accessories	Model
Rubber slider for H-3204, 1-1/4" (lab use).	H-3207
Rubber slider for H-3204, 3" (field use).	H-3208
Laboratory base plate for H-3204.	H-3206



How-To Books

Humboldt "How To" Books Make It Easy for You to Get More Accurate Test Results

You'll get greater accuracy of your test results when you follow the test procedure with greater precision. These seven valuable booklets from Humboldt make it easy. Each subject clarified and uncomplicated—with everything you need to know, plus easy-to-follow procedures outlined for you step by step.

Description	Model
"HOW TO TEST AGGREGATES Sampling, Sample Reduction and Sieve Testing," 8-pages.	HT-900
"HOW TO Test the Liquid limit, Plastic Limit and Plasticity of Soils," 22-pages.	HT-902
"HOW TO Test the Slump of Fresh Concrete," 8-pages.	HT-904
"HOW TO Make a Quantitative Determination of Bitumen Content in Hot-Mixed Paving Mixtures with Vacuum Extraction," 12-pages.	HT-906
"PROCEDURES FOR MARSHALL TESTING OF Asphalt Paving Mixtures." "THE SUPERPAVE METHOD for the Design and Control of Asphalt Paving Mixtures." Two books combined.	H-1328A
"RADIATION SAFETY MANUAL for Users of Moisture and Density Measuring Devices Containing Sealed Sources of Radioactive Materials Emitting Gamma and Neutron Radiation," 40-pages.	HT-910
"5001 Series Compaction Control Gages INSTRUCTION MANUAL" for Moisture/Density Gages, 79-pages.	HT-912

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Official publications are available through Humboldt. Current editions will be shipped.

- ASTM, "Annual Book of ASTM Standards," Available in complete 15-section, 67-volume set with subject and alpha indexes, or separate individual volumes.
- AASHTO, "AASHTO Materials Specifications and Tests," Available in 2-volume set, or separate individual volumes. Published every four years.

For information, or to order, call 1-800-544-7220

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