



HS-5001NX

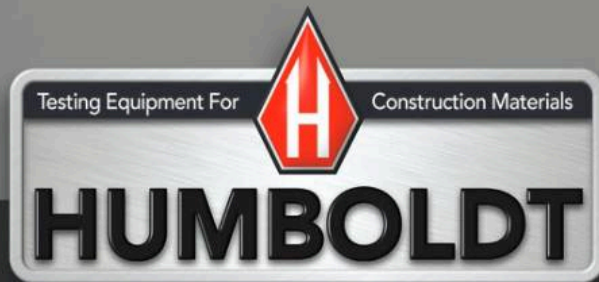
HUMBOLDT
NUCLEAR GAUGES

2.2 V 01-001 PM 100000
FAST SOIL DATA
MODE 0.1 0.1 0.0
LAST MEASUREMENT
0.1 0.1 0.0
ENGINEERING MEASURE

Humboldt Technology, Inc.
1-800-833-1100 | www.humboldtinc.com

SOIL-FIELD

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Nuclear Gauges



HS-5001NX



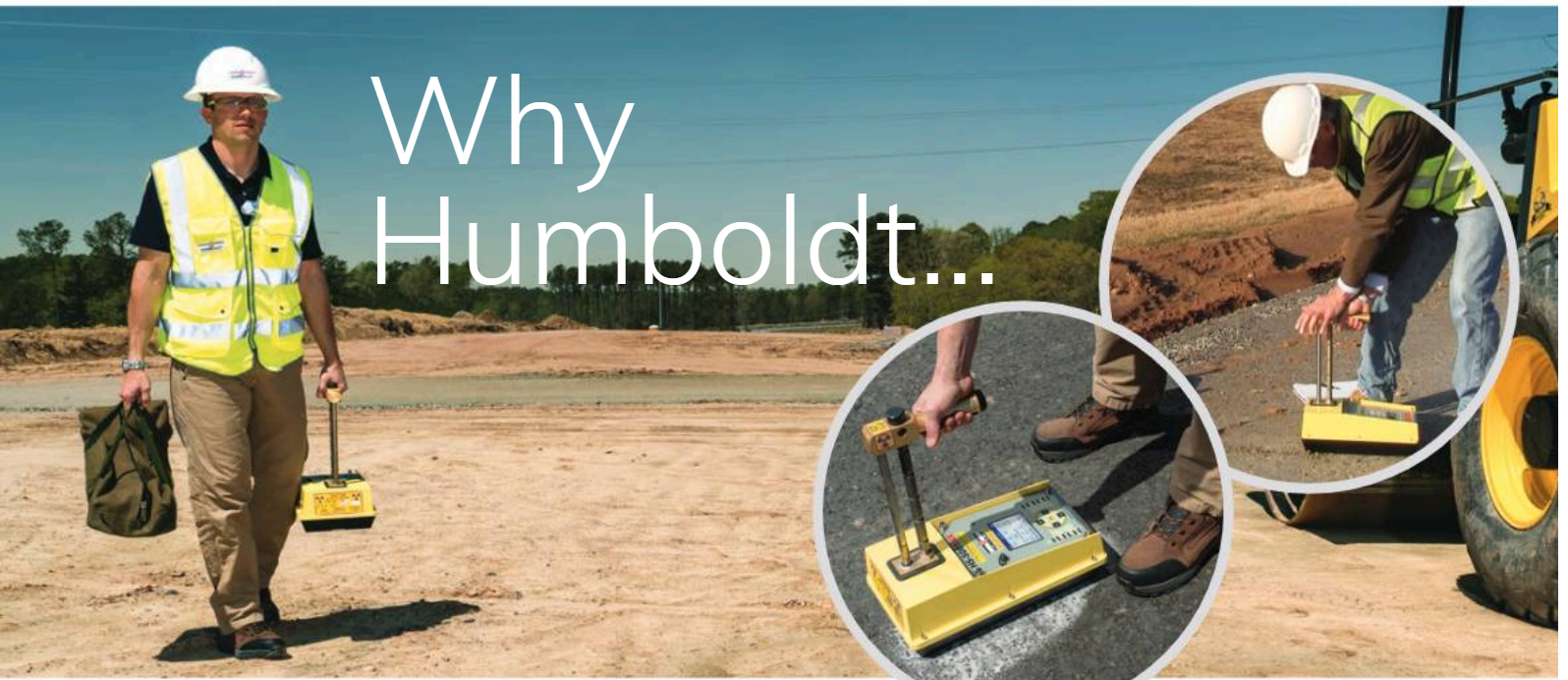
HS-5001EZ-2

Choose from Two,
High-Quality Gauge Models

Humboldt's Moisture/Density Gauges Provide:

- High-quality gauges — built to take a beating
- Truly, field-serviceable with parts readily available
- No added cost from Humboldt for third-party calibration
- Exceptional calibration, leak test and repair services





Why Humboldt...

All Humboldt nuclear gauges are built rugged for the day-to-day rigors of construction projects. These gauges are built to last using high-quality Noryl® PPO material, which is one of the most dimensionally stable thermoplastics available. This produces a gauge housing that is less brittle than the competition resulting in less breakage. Humboldt also pays strict attention to sealing our gauges against dirt and dust, providing a better design and less electronic problems due to dust.

Humboldt gauges are also "Field Serviceable". If you have a problem with your Humboldt gauge, chances are we can quickly get a part out to you, which you can install on your own, saving you lots of time and money. Other manufacturers require you to send your gauge back to the factory for calibration. We don't. You can send your gauge back to us or you can allow a third party to calibrate your gauge without incurring any charges from Humboldt.

With Humboldt, you get:

- High-quality gauges, built to take a beating
- Truly, field serviceable with parts readily available
- No added cost from Humboldt for third party calibration
- Exceptional calibration, leak test and repair services

Humboldt Nuclear Gauges have been used for years in many tough and demanding applications. They have always proven to be: easy-to-operate, easy-to-power, easy-to-service and the most rugged gauges in the industry. They also feature our innovative trigger release handle that eliminates pinched fingers while providing smooth operation. Unlike some competitors, all Humboldt Nuclear Gauges are manufactured with 100% new parts — no refurbished parts, sold as new.

Humboldt Nuclear Gauges are available in two models: the new **NX** Gauge, and the **EZ-2** Gauge.

The **EZ-2** Gauge features a large display screen that can still be seen in bright sunlight, with easy-to-use, built-in test routines and auto features, making testing a quick and accurate operation.

The **NX** Gauge, provides more efficient operation, data collection and processing than any other gauge in its class. Using state-of-the-art technology, the **NX** Gauge brings you a host of features aimed at making your job easier. Featuring an enhanced user interface and color touch-screen, the **NX** Gauge provides intuitive operation of all gauge operations. It also provides touch-pad operation as an alternative control method.



CHOOSE FROM ONE OF THESE FOUR GAUGE CONFIGURATIONS:



8 x 1
200mm 25mm

HS-5001EZ-2-081
HS-5001NX081
Measure to 8" (200mm) depth
in 1" (25mm) increments

8 x 2
200mm 50mm

HS-5001EZ-2-082
HS-5001NX082
Measure to 8" (200mm) depth
in 2" (50mm) increments

12 x 1
300mm 25mm

HS-5001EZ-2-121
HS-5001NX121
Measure to 12" (300mm) depth
in 1" (25mm) increments

12 x 2
300mm 50mm

HS-5001EZ-2-122
HS-5001NX122
Measure to 12" (300mm) depth
in 2" (50mm) increments






HS-5001EZ-2

Humboldt's HS-5001EZ-2 reflects the latest in portable, electronic design for nuclear gauges, featuring a large, backlit LCD display. Humboldt's EZ-2 Moisture/Density Gauge is just that — easy. Easy-to-operate, easy-to-power and easy-to-service. The EZ-2 gauge features a menu-driven control panel with easy-to-use, built-in test routines and auto features, making testing a quick and accurate operation. It also features our innovative trigger release handle that eliminates pinched fingers while providing smooth operation.

The EZ-2's versatility allows it to measure density through direct transmission, backscatter, thin lift and trench modes, as well as providing moisture determinations. The gauge uses an advanced micro-processor-based technology to provide highly-accurate measurements of density and moisture that are automatically computed for direct readouts of wet density, dry density, moisture content, percent of moisture, percent of compaction (Proctor or Marshall), void ratio and air voids. The EZ-2 Gauge complies with all pertinent standards: ASTM D6938, D2950, C1040 and AASHTO T310, T355 and is factory calibrated by the Five-block calibration method ASTM D7013, D7759.



-  **Bright Menu Display**
-  **Direct Readouts**
-  **AA Batteries (1200hrs)**



HS-5001EZ-2



KEY FEATURES:



USB Port —

For fast, test download



Large Display —

Easily readable in bright sunlight
LCD-type, TFT; Normal black



Multi-Language —

Selectable: English, French, Spanish



Micro SD Card —

Auto storage of 2GB of test data,
250 tests per project



Real Time Clock (RTC) —

Multi-date/time formats



Temperature Sensor —

Auto recording of ambient temperature at test



3D Accelerometer —

Auto turn off upon motion
(with movement of the gauge)



Power Source —

6 AA batteries



GPS —

Geographic coordinates and
altitude information








HS-5001NX

Humboldt's New HS-5001NX Moisture/Density Gauge provides more efficient operation, data collection and processing than any other gauge in its class. The HS-5001NX brings you a host of new features aimed at making your job easier. Featuring a color touchscreen, the NX Gauge provides intuitive operation of all gauge operations. It also provides touch pad operation as an alternative control method.

The New NX's versatility allows it to measure density through direct transmission, backscatter, thin lift and trench modes, as well as providing moisture determinations. The gauge uses an advanced microprocessor-based technology to provide highly accurate measurements of density and moisture that are automatically computed for direct readouts of wet density, dry density, moisture content, percent of moisture, percent of compaction (Proctor or Marshall), void ratio and air voids. The New NX Gauge complies with all pertinent standards: ASTM D6938, D2950, C1040 and AASHTO T310, T355 and all other international standards. The gauge is calibrated by the Five-block calibration method ASTM D7013, D7759.

-  Touch Screen Operation
-  Direct Readouts
-  Enhanced User Interface

HS-5001NX

NEW KEY FEATURES:



Touch-Screen or Touch Pad —

Color touch-screen, which provides complete control or you can also use the menu-driven touch pad.



USB Port —

For fast, test download



Multi-Language —

Selectable: English, French, Spanish



Micro SD Card —

Auto storage of 2GB of test data, 250 tests per project



Real Time Clock (RTC) —

Multi-date/time formats



Temperature Sensor —

Auto recording of ambient temperature at test



3D Accelerometer —

Auto turn off upon motion (with movement of the gauge)



Dual Power Source — 6 AA

batteries & rechargeable NiMH pack



GPS —

Geographic coordinates and altitude information



Ambient Light Sensor (ALS) —

Can sense the light and automatically power on backlight



WiFi Enabled —

The NX gauge can connect to your PC for downloading test results wirelessly up to 30 feet.



Easy Self Repairs —

The NX Gauge's modular design enables it to be serviced in the field by you, if necessary. No need to send the gauge in for repair, we'll send you the necessary components and walk you through many of the repair procedures if assistance is needed.



SPECIFICATIONS

Mechanical

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

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

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

Dimensions/Weight

Gauge	
Dimensions (base)	15.75" x 8.66" x 5.5" (400 x 220 x 140mm)
Handle Height	18" or 21.5" (450 or 550mm)
Weight	30 lbs (13.6kg)
Reference Standard	
Dimensions	13.8" x 7.8" x 3" (350 x 200 x 75mm)
Weight	10 lbs (4.5kg)
Transit Case	
Dimensions	31" x 14" x 19.5" (787 x 356 x 495mm)
Weight	31 lbs (11.8kg)
Accessory Case (loaded)	
Dimensions	19.7" x 9.8" x 5" (500 x 250 x 125mm)
Weight	16 lbs (7.3kg)
Total Shipping Weight	90 lbs (41kg)

Radioactive Materials Data Needed for License Application

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

Electrical

Displays:	HS-5001NX	TFT, Normal Color, Sunlight Readable
	HS-5001EZ-2:	TFT, Normal Black, Sunlight Readable
Timer Stability		0.01%
Power Supply Stability		0.10%
Power Source:	HS-5001NX	Six (6) alkaline AA-size batteries and NiMH
	HS-5001EZ-2:	Six (6) alkaline AA-size batteries
Power Consumption:	HS-5001NX	Active—0.9 - 24mA — Battery Life—1200 hours
	HS-5001EZ-2:	
Power Protection:	HS-5001NX	Regulated Supplies—Short Circuit Proof
	HS-5001EZ-2:	Main Batteries—Circuit Breaker
		Regulated Supplies—Short Circuit Proof
Low Battery Condition:		LOBAT Alarm and Auto Shutoff for low and dead battery conditions
Battery Life:		Remaining Battery Life Automatically Estimated at Power-up by activating TEST routine
Language		Selectable - English, French, Spanish
Micro-controller (MCU)		160MHz, 32 Bit
Real Time Clock (RTC)		Multi date/time formats
3D Accelerometer		Auto turn off on motion
Micro SD Card		Auto storage of 2GB of test Data - 250 tests per project
Shutdown		Auto / User selectable

Radiological

Gamma Source	
Material, Type and Amount	Cs-137, 370MBq (10mCi)
Special Form Registration	USA/0356/S-96 Rev 12
ANSI and ISO Class	ANSI 77C66535
Neutron Source	
Material, Type and Amount	Am-241: Be, 1.48GBq (40mCi)
Neutron Yield	70 Knps ±10%
Special Form Registration	CZ/1009/S-96 Rev 1
ANSI and ISO Class	ANSI 77C66545
Source	
Type	Sealed Source, Special Form
Housing	Stainless Steel, Double Encapsulated
Surface Dose Rates	18.7 mrem/hr Maximum (Neutron and Gamma)
Transit (shipping) Case	DOT 7A, Type A, Yellow II Label, 0.2 TI

CALIBRATION and repairs

Fast and EaZy, Full-Service Nuclear Gauge Calibration, Leak Tests and Service

To support our customers and their use of our nuclear gauges, Humboldt maintains a complete service and **ISO/IEC 17025: 2017** accredited calibration facility at Humboldt Scientific in Raleigh, North Carolina. Here we provide repair and calibration services for Humboldt gauges, as well as those of the other manufacturers. All services are performed by experienced and certified technicians with over 25 years of experience. Our services are built upon providing fast and reliable turn-around of your gauge calibration and repairs while maintaining competitive prices. Humboldt nuclear gauge calibration complies or exceeds ASTM and AASHTO standards by providing five-block calibration for all gauge calibrations. We maintain multiple sets of calibration blocks, which are traceable to master NIST standards.

These blocks are set up in isolated, temperature-controlled bays to reduce interference during calibration. Documentation and certificates for calibrations conform to NIST procedures and requirements. We also provide leak test analysis services, gauge rental and disposal services.

EaZy Shipping Program

And, to make using our services as easy as possible, we have designed our EaZy shipping program. Just go to our website and fill out the calibration/repair form and we'll handle the rest. We will send you the completed shipping papers your gauge will need to have for shipping to us and directions on how to prepare and pack your gauge for shipment. We will contact the shipper and have them pick up your gauge from your designated location and ship it back to you when the calibration is completed.



EaZy Shipping



**Need to ship your gauge to us for calibration or service?
Let us handle it!**

Just fill out our online form, and we'll take care of the rest!



HUMBOLDT SCIENTIFIC, INC.
2525 ATLANTIC AVE.
RALEIGH, NC 27604 USA
USA DOT 7A TYPE A



USA DOT 7A TYPE A
RADIOACTIVE MATERIAL
TYPE A PACKAGE
SPECIAL FORM
UN 3332 RQ

Humboldt Scientific, Inc. 2525 Atlantic Ave., Raleigh, NC 27604-0100 919-832-2700



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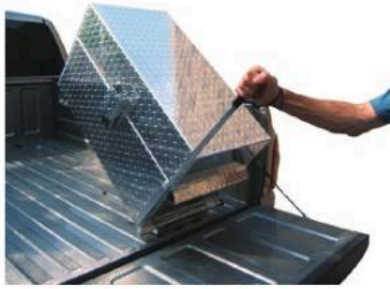
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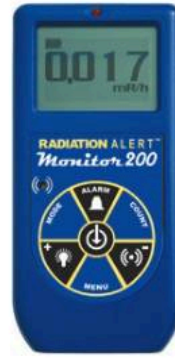
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HS-200800— Containment Boxes include mounting bracket



HS-200820 - Cable only (Does not include Case or Padlocks)



HS-130508



HS-130512

Nuclear Gauge Containment System

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

- NUX Case for Humboldt Gauges HS-200800
- NUX Case for Troxler Gauges 3400 Series HS-200802
- NUX Case for CPN Gauges HS-200803
- NUX Case for T-4640 Series Gauges HS-200805

Ship wt. 65lbs (29.4kg)

Mounting Bracket for all NUX Boxes	HS-200801
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NOTES

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

Security Restraint for Nuclear Gauge Case

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

three padlocks are required, but not included. One padlock on each end of the cable secured to the vehicle and at least one padlock of the hasp of the case securing the cable to the hasp.

Security Restraint for Nuclear Gauge HS-200820
Ship wt. 8.4lbs (3.8kg)

Radiation Alert Monitor 200

The HS-130508 Monitor 200 measures alpha, beta, gamma, and x-rays. Its digital display shows readings in your choice of CPM, CPS, $\mu\text{Sv/hr}$, mR/hr, or in accumulated counts. It has a digital display, a red count light, and a beeper that sounds with each count detected. Other features include an adjustable timer, and selectable alert. With the free Observer USB Software Family, you can set computer alarms, calibrate your instrument, and download your collected data from the internal memory for easy reporting. Includes: Carrying Case, Xtreme Boot, Stand, Mini-USB Cable, Observer USB Software Download, Certificate of Conformance.

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

Monitor 200 HS-130508
Monitor 200, NIST Traceable HS-130508C
Ship wt. 2lbs (0.9kg)

Radiation Survey Meter, Analog

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

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

Survey Meter, Analog HS-130512
Survey Meter, Analog, NIST Traceable HS-130512C
Ship wt. 2lbs (0.9kg)

NOTES

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



RADIATION safety training

Nuclear Gauge Safety Certification Courses Radiation Safety Course and Certification Test

Online Class

Humboldt's Online Narrated Radiation Safety Course covers the same material as our Live Classes. So, if you can't make a live class, this is the perfect alternative to getting your certificate of training. Humboldt's Online Radiation Safety Class is accepted for the purpose of certification required for an operator to handle portable moisture density gauges. Those who successfully complete this class and quiz should possess the necessary knowledge of radiation safety and the operation of nuclear gauges. This satisfies the requirements of the USNRC and the Agreement States, for gauges manufactured by Humboldt and other manufacturers of nuclear gauges (portable moisture/density gauges).

Certification Test

This test can be used as a certification that the operator has successfully passed a nuclear gauge safety certification class, which covers the training criteria of NUREG 1556 and the Agreement States. This certification also includes a U.S. DOT HAZMAT refresher course, which meets the requirements of CFR Title 49, Part 172, Sub-Part "H" (includes IATA requirements) and is eligible for use in every State. A certificate of training will be issued to those who successfully pass the test (scoring above 80%), and includes a signature line for the company's RSO to validate the training and certificate.

We can provide RSO training at any of the currently scheduled Radiation Safety Classes.

Please, contact Humboldt in advance to make necessary arrangements.

Call **1.800.537.4183**

or go to

www.humboldtscientific.com/training.html



NOTES

Hazmat Refresher Training is required at least once every 3 years (see 49CFR 172.704)

This must include function-specific training in the safe transport of portable nuclear gauges. Humboldt courses satisfy this requirement. Hazmat Refresher Training can be taken on either of the Radiation Safety Training or Radiation Safety Officer Training class dates.



Radiation Safety Course

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

Course Subjects:

- Atomic Theory
- Radiation Safety
- Dose/Shielding Calculations
- Accidents/Storage
- Operation
- Field Applications
- Transportation
- Risk
- ALARA
- Maintenance

Radiation Safety Officer Course

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

Course Subjects:

- RSO Duties and Responsibilities
- Radiation Safety Practices
- Regulatory Requirements
- Dose/Shielding Requirements
- Accidents/Storage
- Regulatory Guidance (NUREG-1556, Vol. 1)
- Transportation
- Risk
- ALARA
- Radiation Measurement
- Operating and Emergency Procedures
- Maintenance
- Record Keeping



Tablet not included.

HUMBOLDT
EDGe



Electrical Density Gauge-Model E H-6500.3F

Humboldt's NEW Electrical Density Gauge Model E (EDGe) is used for determining the density and moisture content of aggregate, soil aggregate compacted type I or II base, or native soil materials that are suitable for shallow foundations, such as secondary roads or base aggregate that is compacted in-place prior to the asphalt or concrete placement at the final grade. The EDGe quality assurance / quality control (QA/QC) system is lightweight, easy to use, and nuclear free.

The EDGe consists of two independent units, one for use in the lab and one for field use, which work together with the use of the EDGe Gauge app to ensure precise and accurate measurements. The EDGe provides a direct correlation between the Proctor test data of a representative aggregate/soil sample in the lab and readings of the same material in the field.

The lab unit provides you with the tools to take readings directly from six-inch Proctor molds, while performing standard or modified Proctor tests. The field unit is lightweight and comes with a ruggedized field case for easy transport and storage. Both units are nuclear free, which eliminates the need for radiation safety compliance regimens and transportation restrictions. The EDGe is simple to use.

The Advantages of Using the EDGe Are:

- Complies with AASHTO T399 and is an enhancement of ASTM D7698 that includes a laboratory aggregate calibration procedure
- Nuclear-free device
- Accurate and repeatable results that correlate to either ASTM D1557 or ASTM D698 standard Proctor tests
- Does not require highly trained or licensed technicians
- Does not require special handling for shipping or regulatory compliance for hazardous materials
- Easy-to-learn and easy-to-use with its step-by-step menu
- Lightweight and easily transportable
- Eliminates costs associated with nuclear gauges

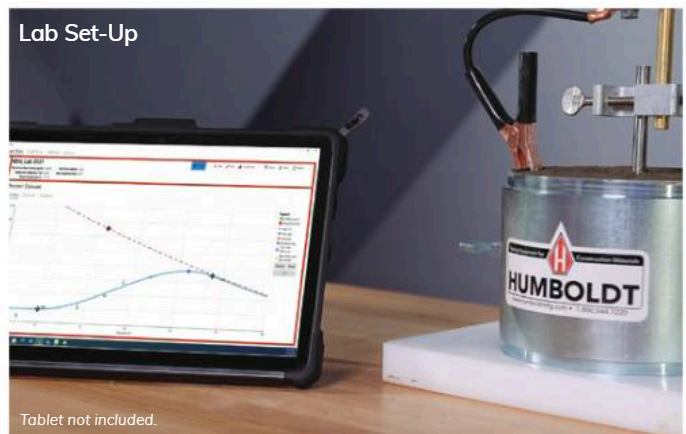


EDGe Gauge App

The EDGe App is available free from the Microsoft App Store. This app allows you to operate both the Lab and Field units of the EDGe, as well as provides the field unit with the lab Proctor data. In the field, the app will record dry density, wet density, percent moisture content, relative compaction, date; time, GPS coordinates and generate a location map. This data is routinely used for construction QA/QC certification reporting. The app can generate the reports in a PDF format, which can be saved or shared with others. **Computer/Tablet Required, but not included**

EDGe Gauge Software Features:

- Download job data
- Save and share customized reports in PDF format
- Operate both the Lab and Field Unit
- Provide the Field Unit with Proctor Data
- Time/Date, GPS stamps for each test
- Generate a location map



Lab Set-Up

Tablet not included.



EDGe Lab Unit - H-6500L.3F

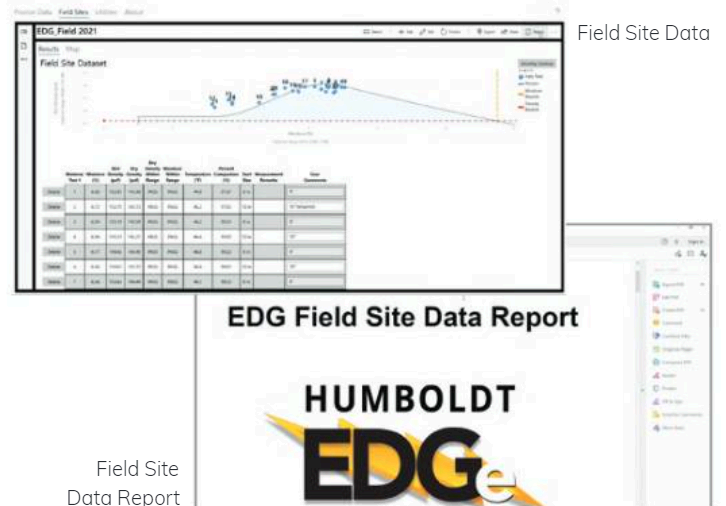
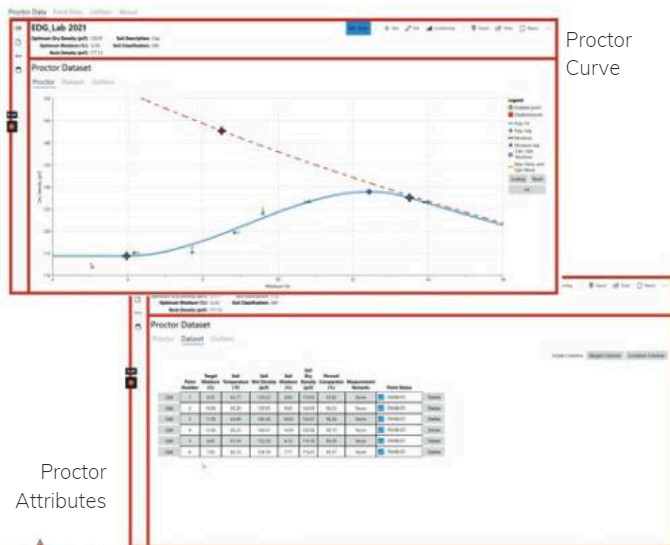
The laboratory aggregate calibration procedure involves electrical testing of a representative sample of the construction aggregate or soil materials while performing either an ASTM D1557 Standard Test Method for Laboratory Compaction using a Modified Effort of 56,000 ft-lbf/cubic foot or the ASTM D698 Standard Test Method for Laboratory Compaction using a Standard Effort of 12,000 ft-lbf/cubic ft. The EDGe lab unit provides you with the tools to take readings directly from six-inch Proctor molds, while performing standard or modified Proctor tests.

During the laboratory test, the EDGe lab-sensor and a Windows 11 laptop or tablet are used to collect and manage the physical and electrical data during the Proctor test. The software generates a Proctor curve that displays the maximum dry density at the calculated optimum moisture content and is saved and typically printed for client reports. The empirically derived correlations relate the electrical and physical properties of the aggregate or soil that is scheduled for placement and compaction on construction project sites, such as road construction or other shallow foundation. The physical and electrical data from the Proctor test is saved on the laboratory laptop computer. This data can then be transferred to a ruggedized field Windows 11 tablet by USB stick, a cloud service, or via wireless connection for use with the EDGe field equipment for quality assurance/quality control (QA/QC) testing and construction quality certification.

EDGe Field Unit - H-6500F.3F

The EDGe Field Unit is a portable, battery-powered instrument capable of being used anywhere without the concerns and regulations associated with nuclear devices. It uses a lightweight, ruggedized field case for easy transport and storage. Just grab the case and you're off to your testing site.

During the field quality assurance/quality control testing, the EDGe field-sensor and a ruggedized Windows 11 tablet or computer manages the project data. The EDGe field hardware is used along with the EDGe field sensor and a tablet to test the density and moisture of the construction materials. In the field, the EDGe measures the electrical properties of the aggregate and calculates physical properties by utilizing the established relationship of the electrical and physical characteristics from the Proctor calibration test of the same aggregate performed in the laboratory. Field tests take a few minutes to perform, and the material properties are displayed in real-time, as well as being saved for reports. The EDGe field reports provide the user and/or client with quality assurance/quality control data that includes the compacted material dry density, wet density, the percent moisture content, relative compaction, date, time, GPS coordinates and a location map. The client reports can include additional project information such as the project name and number, the EDGe field sensor's unique identification number, the EDGe operator's name, the company name, and other information in the remarks section, such weather conditions, if needed.



Specifications



EDGe Starter Unit - H-6500.3F (includes)

Description	Qty	Part #
EDGe Field Unit	1	H-6500F.3F
EDGe Lab Unit	1	H-6500L.3F



EDGe Lab Unit - H-6500L.3F (includes)

Description	Item #	Qty
Soil Sensor, Lab Version	H-6500.500	1
Temperature Probe	H-6500.700	1
Temperature Probe Spike	H-4114.040	1
Proctor Center Dart, 4"	H-6500.6	1
Lab Dart Adapter	H-6500.550	1
Hammer	H-4890A	1
Dart Seating Tool	H-6500.8	1
HDPE Proctor Mold Base	H-6500.7	1
AC/DC Wall Mount Adapter (Charger)	H-6500.02	1

Shipping Weight: 11lbs (4.9Kg)
Shipping Dims: 16" x 16" x 6" (406 x 406 x 152 mm)



EDGe Field Unit - H-6500F.3F (includes)

Description	Item #	Qty
Soil Sensor, Field Version	H-6500.100	1
Temperature Probe	H-6500.700	1
Temperature Probe Spike	H-4114.040	1
Field Case	H-6500.800	1
Field Dart Template	H-6500.200	1
6" Field Darts	H-4114.6	4
Field Dart Adapter	H-6500.300	1
Hammer	H-4890A	1
AC/DC Wall Mount Adapter (Charger)	H-6500.02	1

Shipping Weight: 22lbs (9.9Kg)
Shipping Dims: 24" x 14" x 14" (609 x 355 x 355 mm)

Accessories:

- 4" Dart— H-4114.4
- 6" Dart— H-4114.6
- 8" Dart— H-4114.8
- 10" Dart— H-4114.10
- 12" Dart— H-4114.12
- 4" Proctor Center Dart - H-6500.6



Darts are designed in various lengths to correspond to different lift heights. They can be sold individually.

Recommended Computers:

- Laboratory Use: Any Windows 11 Laptop or Tablet with Bluetooth® LE 4.0 or higher (e.g. MS Surface Pro or MS Surface Go)
- Field Use: MS Surface Go 3 Tablet with Ruggedized Shell with Bluetooth® LE 4.0 or higher (recommended: Urban Armor Gear Shell & Screen Shield for Surface Go 3)
- Microsoft compatible pen for laboratory and field use, optional mouse for laboratory use
- A keyboard is recommended for laboratory use

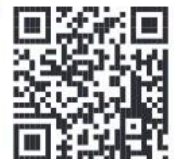
EDGe Sensor Electrical Specifications:

Description	
Sensor RF Output Signal	<1 Vpp or 354 mV RMS
Maximum Sensor RF Output Power	<0.32 mW
Frequency Range	10 kHz – 40 MHz
Internal Batteries	3x AAA NiMH, Rechargeable
Charging Voltage	7.5V – 9V DC
Charging Current	500 mA
Maximum Charging Time	2 hours
Charging Indicator	Green LED
Battery Life	Approx. 40 Tests



For Technical Assistance:

Web: www.humboldtmg.com/support
Email: support@humboldtmg.com





Humboldt Plate Bearing Tester

ASTM D1195, D1196

The Humboldt Plate Bearing Tester is a field test used for determining the bearing capacity of soil under varying loading conditions. It can also be used to evaluate designs of airport and highway pavements.

This Plate Bearing Tester consists of a hydraulic jack complete with hand pump and rubber; fast-connect hose, large pressure dial gauge; seat plate; (3) precision dial gauges (2.5" dia.-1" x 0.0004 (25 x 0.01mm); 8' (2.4m) complete mounting hardware for gauges, Plate Set (HD-4605) and case for gauges, pump and jack.

The Plate Bearing Tester is available in three (3) capacities: 100kN, 200kN and 500kN.

Features:

- Long piston travel to accommodate setup of reaction loading system
- Double-delivery hand pump for fast approach in setup with reaction loading system
- High-precision dial gauges
- Heavy-duty, rigid measuring bridge

Plate Bearing Tester, 100kN	HD-4600
Plate Bearing Tester, 200kN	HD-4601
Plate Bearing Tester, 500kN	HD-4602

Ship wt. 70lbs (31.7kg)

Plate Bearing Plate Set

ASTM D1195, D1196

ASTM plate set includes: 6", 12", 18" 24" and 30" (152, 305, 457, 610, 762mm) steel plates with eye bolts for transporting and placement of plates with a steel rod.

Plate Bearing Plate Set	HD-4605
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Ship wt. 65lbs (29.4kg)

Static, Plate Load Tester

DIN 18134; BS1377

The Static Plate Load Test can be utilized in earth-works and foundation engineering, as well as road construction in order to determine load settlement lines and by this to evaluate the deformability and the load capacity of the soil.

When using the static load tester to evaluate a soil layer, the circular load plate is repeatedly loaded and relieved by means of a load device, a hydraulic pump and pneumatic cylinder. This load is applied to the plate in 6 to 8 equal loading steps. Settlement of the plate is measured by the tester consisting of a carrier frame with a sensing arm and dial gauge. As a counterbalance, a heavy-weight vehicle is used.

The indentation of the load plate into the soil, generated with every load step, is indicated via the dial gauge. The settlement of every load step and the corresponding mean normal stress below the load plate appear as test values. Subsequent to the last load step the relief and a second loading similar to the first loading takes place. For the test evaluation these values are shown in a corresponding diagram as load settlement lines.

The modulus of deformation E_v is determined from the load settlement line of the first load (E_{v1}) and the second load (E_{v2}). By comparing the initial deformation from E_{v1} and the subsequent deformation of E_{v2} provides an indication of the compaction attained.

The test results and the load settlement lines can be read with the HD-4139.3F Plate Load tester directly on the display and can be printed out immediately at the site via thermal printer or be reviewed later in the office on a PC.

The HD-4139.3F Plate Load Tester Features:

- Handy measuring instrument with extra large illuminated display, which is easily viewed in all light conditions and a thermal printer within an aluminum case
- Automatic data transfer, Data-Secure, error-free automatic interpretation intuitive menu navigation with a clearly arranged display
- Evaluation, displaying and printout immediately at the site shows E_{v1} , E_{v2} , E_{v1}/E_{v2} and settlement curve
- PC-connection, Software for creation of professional test protocols
- USB interface for easy data transfer, GPS for accurate localization of the measuring point-modular design provides flexibility in use

Static Plate Load Tester **HD-4139.3F**

Ship wt. 244lbs (17.4kg)

Printer Paper

Replacement paper for use with Plate Load Tester and LWD.

Printer Paper **HD-4129.5**

Shipping wt. 2 lbs (0.9kg)

HD-4139.3F shown with transport cases, which are included.





LIGHTWEIGHT Deflectometer

Fast, accurate and easy compaction control!

Areas of application:

- Quality control in road and railway construction
- Quality assurance in earth works and canal construction
- Compaction monitoring in pipe trenches and cable ducts
- Testing of pavement bedding, foundation backfill

Lightweight Deflectometers

ASTM E2835-11; TP BF-StB B8.3; TB 10102-2004
 Lightweight Deflectometers (LWDs) are increasingly being used to determine overall compaction quality of all types of earthworks through their use as a QC/QA field test. LWDs provide a rapid determination of elastic modulus, which is an essential factor in mechanistic design and can be used as an accurate assessment of compaction. An LWD is used for measuring the bearing capacity (deflection) of subgrade/subsoils and unbound base layers, granular layers and backfilling materials, according to ASTM E2835-11. Based on the static plate load test requiring a load vehicle, the LWD provides a simple, fast and repeatable test providing an accurate assessment of compaction parameters. Applications for this non destructive method of testing include bearing capacity and compaction include road construction, pipeline and cable backfill, railway track beds, airport runway/taxiways, dam construction, embankments, foundations and other earthworks.

HD-4129.3F



Humboldt offers two models, a 10kg and a 15kg, in two versions a deluxe and a standard, of Lightweight Deflectometers from HMP— a deluxe models, the HD-4129.3F or HD-4159.3F and a basic models, the HD-4130.3F or HD-4149.3F.

Both units are the same mechanism and differ only in the controller used with each one.

The HD-4129.3F and the HD-4159.3F feature a deluxe controller that includes:

- A large, 3.5" colorful display
- Light sensor-controlled back lighting that provides the optimum readability even in bright sunlight
- Easy menu navigation

- Integrated GPS
- Integrated WIFI-enabled
- Interface for a thermal printer and USB
- Help function
- Efficient and fast 32-bit processor

The graphic interface of the deluxe controller provides an intuitive menu, which guides the user through the testing procedure and provides real-time test results. Measured data is presented in tabular, as well as curve formats with date, time and GPS location clearly depicted.



HD-4130.3F

HD-4129.05A
(case only)



HD-4129.05P
(case only)



HD-4129.01A
(cart only)

This data can be exported from the control unit via USB or wirelessly directly into the Cloud or to your PC for archiving and further processing. This allows personnel in any office to have access to data while you are still on site testing. It is also possible to print out results to a small portable printer on site. Use of the web-based evaluation software: HMP report, provides the ability to produce professional reports for each measuring point, which can include your logo and contact details. This software allows you to work with your data from the Cloud or your PC. The software also enables you to store the data in a database with easy-to-use search and editing options.

Units Include:

The LWD; magnetic base plate; portable printer (USB); GPS; PC Software and Android App (HD-4129.3F and HD-4159.3F only) Units are 120/220V 50/60Hz.

- Light Weight Deflectometer, 10kg, Deluxe HD-4129.3F
 - Light Weight Deflectometer, 10kg, Standard HD-4130.3F
 - Light Weight Deflectometer, 15kg, Deluxe HD-4159.3F
 - Light Weight Deflectometer, 15kg, Standard HD-4149.3F
- Ship wt. 127lbs (57.6kg)

Transport Cart

Cart allows for easy moving of LWD.

- Transport Cart HD-4129.01A
Shipping wt. 20 lbs (9kg)

Transport Case

Wooden case for storage and transport.

- Transport Case HD-4129.05A
Shipping wt. 40lbs (18kg)

Transport Case

Heavy-Duty Transport Box for LWD with wheels.

- Transport Case HD-4129.05P
Shipping wt. 25 lbs (11.5kg)

Printer Paper

Replacement paper for use with Plate Load Tester and LWD.

- Printer Paper HD-4129.5
Shipping wt. 2 lbs (0.9kg)

Lightweight Deflectometers	HD-4129.3F HD-4159.3F	HD-4130.3F HD-4149.3F
Electronic Settlement Measuring Instrument:		
Settlement measuring range 0.1 bis 2.0 mm ± 0.02 mm	√	√
Measuring range E _{vd} < 225 MN/m ²	√	√
Temperature range 0 to 40 °C	√	√
Very robust, splash-water proof, connection cable with high-quality LEMO connectors	√	√
Graphic display	2.2" x 2.87" (56 x 73mm)	2.2" x 2.87" (38 x 68mm)
Colorful, light sensor-controlled and illuminated	√	
Black/white		√
Help function	√	
Fast, efficient 32-bit processor	√	
WIFI-enabled, USB, thermal printer interface	√	√
GPS	√	
Dimensions	210x100x31mm	211 x 100 x 26mm
Storage capacity, internal in measurement series	1000	500

Lightweight Deflectometers	HD-4129.3F HD-4159.3F	HD-4130.3F HD-4149.3F
Power Supply:		
High-performance rechargeable lithium-polymer-battery 3.7 V, 6300 mAh	√	
(4) R6 Batteries		√
Menu navigation (18 languages available)	√	√
Loading Mechanism		
Total weight: 15kg (HD-4129 & HD-4130)		
Drop weight: 10kg (HD-4129 & HD-4130)		
Total weight: 20kg (HD-4159 & HD-4149)		
Drop weight: 15kg (HD-4159 & HD-4149)		
Max. impact force 7.07 kN	√	√
Duration of impact 17.0 ± 1.5 ms	√	√
Material: zinc coated/hard-chrome plated steel	√	√
Spring element 17 disk springs	√	√
Load plate		
Diameter 300 mm, Plate thickness 20.0 mm	√	√
Total weight 15kg Material: zinc coated steel	√	√





H-4140 with Case

GeoGauge

ASTM D6758

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

The GeoGauge is the perfect companion instrument for density measuring devices such as nuclear gauges and the electrical density gauge. Density measuring devices can be used to ensure that proper compaction is achieved and the GeoGauge can be used to verify that the stiffness/modulus values assumed in the design specifications of new or rehabilitated pavement structures

are met. Compacting and monitoring pavement layers directly to design requirements of structural layer stiffness or material modulus in addition to percent compaction during the construction process establishes the means to effectively control structural uniformity, strength and deflection, as well as enabling the monitoring and control of the construction quality of various materials. This leads to better smoothness and longer lasting pavement surfaces at lower cost.

The GeoGauge works by applying a vibrating force at 25 specific frequencies, which produce small deflections in the material. The resulting displacement is measured by the GeoGauge and displayed as stiffness determined by the ratio of the force to deflection. The GeoGauge produces stress and strain levels common for pavement, bedding and foundation applications. In addition, Young's and shear modulus can be determined from GeoGauge measurements if a Poisson's ratio is assumed. This dynamic technology used by the GeoGauge simulates real in-use conditions. This factor allows the GeoGauge to directly measure in-place engineering properties during the construction process. The GeoGauge supports and

directly links the in-place engineering properties of compacted materials with Mechanistic-Empirical Design for effective QC/QA. Successful control of compaction creates a quality functional structure with the desired engineering properties for the application and life intended.

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

GeoGauge

H-4140

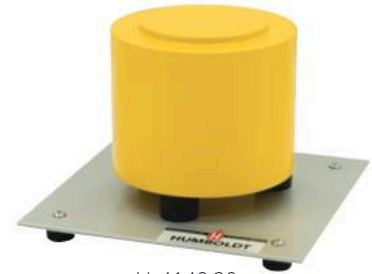
Shipping wt. 40 lbs (18.1kg)



H-4140 Face Detail



H-4140.12



H-4140.20



H-4140.C

Features Include:

- Dynamically measures in-place engineering properties using structural layer stiffness, MN/m (klbf/in) and Young's modulus of a material, MPa (kpsi)
- In-place QC/QA links compaction and material performance directly to design requirements while advancing mechanistic-empirical pavement design
- Enables maximum lift stiffness with minimum compactive effort
- Facilitates uniform stress transmission and distribution from pavement to subgrade resulting in longer pavement life, reduced maintenance costs and longer lasting surface smoothness.
- Enables reduced structural variability in construction
- In-place QC/QA of the strength gain of stabilized materials
- Data base development supporting mechanistic-empirical design and performance specifications
- Portable, fast, simple, reliable, non-invasive

- Other compaction applications include: lime, cement, fly-ash and polymer stabilized materials, cement-treated and rehabilitated bases, large particle aggregate bases, as well as underground utility backfills
- Gauge includes simple, easy-to-use software application, which provides download and storage of test data. Application allows printing of data reports, as well as saving information in other formats (.pdf, .csv and rich text) for importing data into other programs

Specifications	
Layer Stiffness	17 to 400 klbf/in (3 to 70 MN/m)
Young's Modulus (in-place)	4 to 90 kpsi (26 to 610 MPa)
Measuring Depth	9 to 12 inches (230 to 310 mm)
Measuring Duration	75 seconds
Power	6 D-cell batteries (1000 to 1500 measurements)
Dimensions	gauge only: 11" dia. x 10.5" high (280 mm x 270 mm) carrying case: 18.5" x 16.5" x 13" (470 x 420 x 330 mm)
Net Weight	gauge only: 22 lbs. (10 kg) with case: 34 lbs. (15.5 kg)

Verifier Mass

10kg Mass used to verify calibration of gauge.

Verifier Mass **H-4140.20**
Shipping wt. 25.7 lbs (11.7kg)

Calibration Platen

10kg Platen used to allow gauge to self-calibrate. Gauge is bolted onto platen with a torque wrench, which is included.

Calibration Platen **H-4140.C**
Shipping wt. 30 lbs (13.6kg)

Data Cable, Infrared

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

Data Cable, Infrared **H-4140.12**
Shipping wt. 2 lbs (0.9kg)





Sand Cone Apparatus Set, 6.5" (165mm)

ASTM D1556; AASHTO T191

The sand cone apparatus determines the in-place density of soils having a maximum particle size of up to 2" (51mm) using test hole volumes of approximately 0.1ft³ (2.8L). The set is comprised of a 1-gal. (3.79L) threaded plastic jar; a COE detachable double cone, which is threaded on one end; and, has a 6.5" (165mm) dia. flanged opening on the other, which fits the opening of the H-4246 sand cone plate. (Order separately.) The cone has a brass cylindrical valve with a 0.5" (12.7mm) dia. orifice and stops that prevent the valve from rotating past the completely open or completely closed positions.

Sand Cone Apparatus Set, 1 gal. Jar H-4245

Sand Cone Apparatus Set, 5L Jar H-4245M

Shipping wt. 3 lbs (4.5kg)

Sand Cone Apparatus Set, 4.5" (114mm)

ASTM D1556; AASHTO T191

The 4.5" sand cone apparatus can be used when it is desired to collect a smaller sample or when gathering a sample is difficult due to extremely hard compacted soil. The cone also determines the in-place density of soils having a maximum particle size of up to 2" (51mm) using test hole volumes of approximately 0.1ft³ (2.8L). The set is comprised of a 1-gal. (3.79L) threaded plastic jar; a detachable double cone, which is threaded on one end for attaching the threaded plastic jar; and, has a 4.5" (114mm) dia. flanged opening on the other, which fits the opening of the H-4249P sand cone plate.

(Order separately.) The cone has a brass cylindrical valve with a 0.5" (12.7mm) dia. orifice and stops that prevent the valve from rotating past the completely open or completely closed positions.

Sand Cone Apparatus Set H-4249

Shipping wt. 6 lbs (4.5kg)

Sand Cone Plate

ASTM D1556; AASHTO T191

Used with sand cone apparatus to simplify removal of soil from test hole and act as template to control hole diameter. Cast aluminum alloy. Both plates have an overall dimension of 12 x 12" (305 x 305 mm). The H-4246 has a 6.5" hole and the H-4249P has a 4.5" hole.

Sand Cone Plate, 6.5" (165mm) Hole H-4246

Sand Cone Plate, 4.5" (114mm) Hole H-4249P

Shipping wt. 4.5 lbs (2.1kg)

Replacement Jar for Sand Cone

ASTM D1556; AASHTO T191

1-gal (3.79L) capacity, threaded-plastic replacement jar is the same as furnished with the H-4245 and H-4249 sand cone apparatus set.

Replacement Jar for Sand Cone, 1 gal. Jar H-4238

Replacement Jar for Sand Cone, 5L H-4238M

Shipping wt. 1.5 lbs (0.5kg)

Replacement Lid for Plastic Sand Cone Jar

Replacement lid for use with 1-gal (3.79L) capacity, threaded-plastic jar.

Replacement Lid for Sand Cone Jar H-4238L

Shipping wt. 0.6 lbs (7.3kg)

Sand Cone, Large, 12" (165mm)

ASTM D1556; AASHTO T191, COE

For determining in-place density of gravel and coarse soils. Features two identical cones with a

large valve between them and a circular density plate for support on the bottom. A clear plastic cover on the top cone allows for viewing sand flow. The unit also has handles for easier carrying. Flange that fits the lower cone allows apparatus to be used on holes up to 12" (305mm) dia. Complies with U.S. Army Corps of Engineers specifications.

Sand Cone, Large, 12" (165mm) H-4248

Shipping wt. 50 lbs (23kg)

Density Sand

ASTM D1556; AASHTO T191, COE

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. Comes in a 50lb. box with a heavy reinforced inner bag.

Density Sand H-3821

Shipping wt. 55 lbs (25kg)

Sand Cone Accessory Kit

Accessory kit for use with sand density cones and volumessels. Includes: 100 plastic, 10" x 18" Sample bags and ties, a pocket dial thermometer, a bristle brush, a stainless steel spoon, a steel chisel and a rubber mallet. Does not include sand.

Sand Cone Accessory Kit H-4117

Shipping wt. 9.5 lbs (4.3kg)

Sample Bags and Ties

100 plastic, 10" x 18" Sample bags and ties.

Sample Bags and Ties H-4201

Shipping wt. 6 lbs (4.5kg)

**Voluvelsel**

ASTM D2167; AASHTO T205

Voluvels determine the in-place density of compacted or firmly-bonded soils using a rubber balloon apparatus viewed through a graduated, direct-reading clear plastic cylinder. Humboldt's voluvelsel is designed with a plastic cylinder, which screws into the density plate with the pump assembly mounted on top. Both voluvels include a pressure-vacuum pump assembly, pressure gauge, quick-coupler valve, double-graduated cylinder, 10 balloons and a density plate. Voluvels are not suitable for soft soils that deform under a slight pressure or where the volume of the hole cannot be maintained at a constant value. The Voluvels are individually calibrated before leaving the factory to ensure direct readings on the scale are accurate without the need for calculations. H-4166 is used with max.-sized soil particles of 0.5" (13mm) and H-4167 is used with max.-sized soil particles of 1" (25mm).

Voluvelsel, 1/20 ft³ (1600ml) H-4166**Voluvelsel, 1/13 ft³ (2230ml) H-4167**

Shipping wt. 15.7 lbs (7.3kg)

Voluvelsel Saddle Weights

ASTM D2937

Weights used to ensure uniform and repeatable weight is applied during testing for accurate readings. Can be used with all Voluvels.

Voluvelsel Saddle Weights H-4166S

Shipping wt. 72 lbs (33kg)

Balloons, 10pk

Package of 10 balloons for Voluvelsel.

Balloons, 10pk**H-4168**

Shipping wt. 0.2 lbs (0.09kg)

Pump Assembly, Replacement

Rubber-bulb, pump assembly for all Voluvels.

Pump Assembly, all units**H-4166.10**

Shipping wt. 0.6 lbs (0.27kg)

Voluvelsel Base

ASTM D2167; AASHTO T205

Base for Voluvels, H-4166 and H-4167. Cast aluminum alloy. Plate has an overall dimension of 12 x 12" (305 x 305 mm), and a 4.5" hole.

Sand Cone Plate, 4.5" (114mm) Hole H-4249P

Shipping wt. 4.5 lbs (2.1kg)

Voluvelsel Cylinder Seal Gasket

Replacement seal gasket for Voluvels.

Voluvelsel Base, H-4166 & H-4167 H-4166.5

Shipping wt. 3 lbs (4.5kg)

Voluvelsel w/ Metal Guard

ASTM D2167; AASHTO T205

This Voluvelsel features a base-mounted pump and a metal guard for the graduated plastic cylinder which provides an integral metal handle. Each unit includes a double-graduated cylinder, base plate, pressure/vacuum pump assembly with quick-coupler, ten balloons, and an integral gauge for controlling pressure during calibration and testing. The H-4116 Voluvelsel is used with max.-sized soil particles of 0.5" (13mm).

Voluvelsel, 1/20 ft³ (1600ml) H-4116

Shipping wt. 14 lbs (6.8kg)

Density Drive Sampler

ASTM D2937

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

Density Drive Sampler, 3" (76.2mm) H-4203.3**Density Drive Sampler, 4" (101.6mm) H-4203.4**

Shipping wt. 20 lbs (11kg)

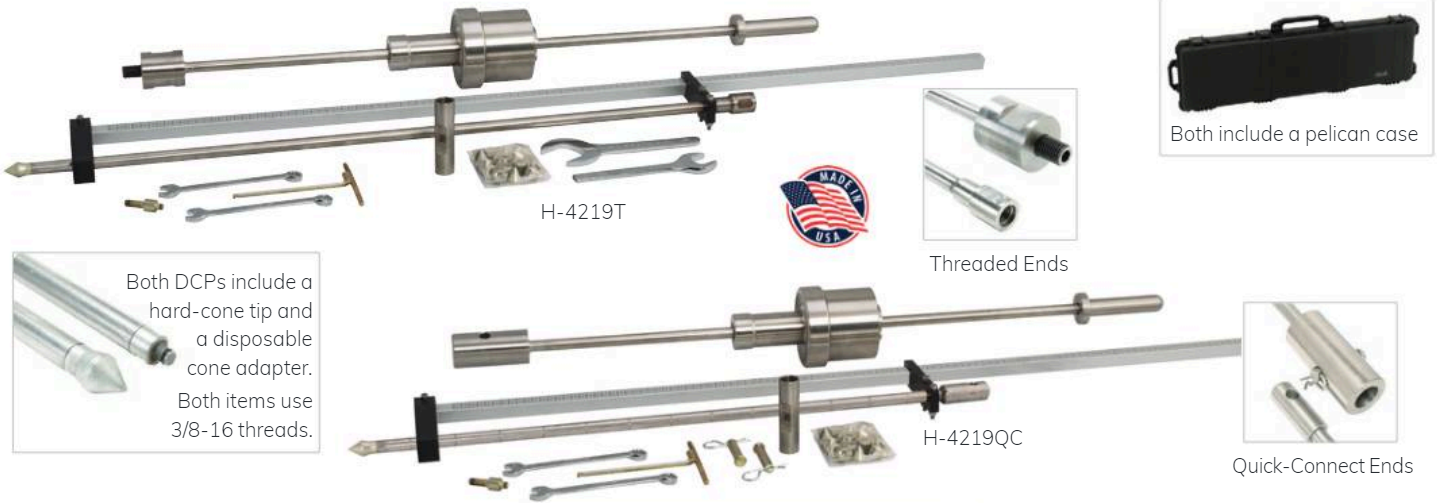
Drive Tubes for Density Drive Sampler

ASTM D2937

Individual drive tubes for use with the density drive sampler. Tubes are available in two sizes: 3" (76.2mm) x 2.75" (69.9mm) length, (3" x 0.01 ft³) for use with the H-4203.3 drive sampler and 4" (101.6mm) x 5" (127mm) length, (4" x 0.033 ft³) for use with the H-4203.4 drive sampler.

Density Drive Tube, 3" (76.2mm) H-4203DT.3**Density Drive Tube, 4" (101.6mm) H-4203DT.4A**

Shipping wt. 0.6 lbs (0.6kg)



Both DCPs include a hard-cone tip and a disposable cone adapter. Both items use 3/8-16 threads.

Threaded Ends



Quick-Connect Ends

Dual-Mass Dynamic Cone Penetrometers

ASTM D6951

Developed by the Army Corps of Engineers, Dual-Mass Dynamic Cone Penetrometers (DMDCPs) provide a low-cost, efficient test method for quickly determining in-situ CBR values of pavement base, sub base and sub grades. DMDCPs are primarily used to determine in-place soil shear strength in road construction with CBR values from less than 0.5 to 100% and bearing values ranging from 430 to 10,800 psf. They can readily be used for depths from 30 inches to 6 foot with optional drive rods and extensions. All Humboldt DMDCPs comply with ASTM D6951 specifications and come with a chart in the manual to compute CBR values, as well as an internet link to an Excel spreadsheet template, which automatically charts the test results.

Humboldt's DMDCPs are known for their high quality manufacturing and reliability, and, are available with either threaded connections or a quick-connect design. Both Humboldt DMDCPs feature our exclusive easy-grip hammer that provides a finger grip machined into the back side of the hammer flange, which provides easy, non-slip lifting when performing a test.

Humboldt DMDCPs consist of a drive hammer and steel extension shaft assembly with a 60° hardened cone tip attached at one end. The cone tip is driven into the pavement or sub grade by means of a sliding dual-mass hammer. The diameter at the base of the cone is 20 millimeters, which is 8 millimeters larger than that of the extension shaft. Hammer weight is 17.7 lbs and the hammer drop distance is 22.6" (574mm). Humboldt DMDCPs can also quickly convert to a single-mass unit for use in weaker soils having low CBR values or foundation evaluations by removing the outer sleeve from the dual-mass hammer.

Dual-Mass DCP, Quick-Connect Ends H-4219QC

Ship wt. 60lbs. (29.5kg)

Dual-Mass DCP, Threaded Ends H-4219T

Ship wt. 66lbs. (29.5kg)

Included with the H-4219QC DCP:	
Description	Model
Dual-Mass DCP Hammer, Quick-Connect Connection	H-4219QC.1
Drive Rod, Quick-Connect, 37.75" (959mm)	H-4219QC.2
Quick-Connect Pins (2)	H-4219QC.18
Disposable Cone Adapter	H-4219.5
Hard Cone Tip	H-4219.4
Disposable Cones (pkg of 25)	H-4219.25
Scale, 48"	H-4219.2
Single-User Scale Guide Set	H-4219.17
Wrench Set (Quick-Connect)	H-4219QC.7
User Manual	H-4219.MAN
Go, No-Go Gauge	H-4219.3
Pelican Case	H-4219.16

Accessories	Model
Drive Rod, 12" Threaded	H-4219T.12
Drive Rod, 12-inch Quick-Connect	H-4219QC.12
Extension Rod, 24" Threaded (For use with both Quick-Connect and Threaded models)	H-4219.8
Disposable Cones (100 pk.)	H-4219.100
Disposable Cones (25 pk.)	H-4219.25
Disposable Cone Adapter	H-4219.5
Hard Cone Tip	H-4219.4

DCP Extractor Jack

Extractor Jack provides easy, one-man operation for extracting DCP Rods out of the ground.

DCP Extractor Jack

H-4219.40

Ship wt. 25lbs. (11.3kg)

Included with the H-4219T DCP:	
Description	Model
Dual-Mass DCP Hammer, Threaded Connection	H-4219T.1
Drive Rod, Threaded, 37.75" (959mm)	H-4219T.2
Disposable Cone Adapter	H-4219.5
Hard Cone Tip	H-4219.4
Disposable Cones (pkg of 25)	H-4219.25
Scale, 48"	H-4219.2
Single-User Scale Guide Set	H-4219.17
Wrench Set (Threaded)	H-4219T.7
User Manual	H-4219.MAN
Go, No-Go Gauge	H-4219.3
Pelican Case	H-4219.16







Dynamic Cone Penetrometer for Shallow In-situ Tests

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

This penetrometer is used to determine a penetration resistance relationship with the standard penetration resistance of virgin soils. As with all field tools used in foundation evaluations, this method should never be used as the sole means for determining foundation conditions. It should be used in conjunction with previously established field and laboratory data, such as the split-spoon standard penetration test, density, shear strength or consolidation data.

The H-4202A set includes: (1) standard hammer assembly (H-4202.1), (1) heat-treated 45° cone penetrometer point with a 1 ft. adapter rod (H-4202.3), (4) 2.5 ft. E drill rod extensions (H-4202.225), (1) auger head (H-4202.6), (1) auger T-handle (H-4202.4), (4) 36" auger extensions (H-4202.5).

The 4202A DCP test set is also available with a H-4202.1A sleeved drive hammer for easier and safer operation.

Dynamic Cone Penetrometer Test Set H-4202A
DCP Test Set with Sleeved Hammer H-4202AS

Ship wt. 78lbs. (36kg)

Sleeved Hammer for Dynamic Cone Penetrometer

Alternate hammer for H-4202 DCP test set. Hammer provides a safer and easier alternative to the standard hammer.

Sleeved Hammer for DCP H-4202.1A

Ship wt. 30.2lbs. (15kg)

Dynamic Cone Penetrometer Individual Items

Description	Model
Standard drive hammer	H-4202.1
Sleeved drive hammer	H-4202.1A
E drill rod extension 1 ft.	H-4202.21
E drill rod extension 2 ft.	H-4202.22
E drill rod extension 2.5 ft.	H-4202.225
E drill rod extension 5 ft.	H-4202.25
Drive point (45° cone), 1 ft. Rod	H-4202.3
Drive point (45° cone), No Rod	H-4202.3DP
Auger assembly: (Head, (2) pins, T-handle, (1) extension	H-4202.6A
Auger T-handle	H-4202.4
Auger T-handle, SS	H-4202.4SS
Auger extension, 36"	H-4202.5
Auger extension, SS, 36"	H-4202.5SS
Auger head, standard 3.25"	H-4202.6
Auger head, SS, 3.25"	H-4202.6SS
Windowed auger head, 3.25" (heat-treated carbon steel)	H-4202.6W
Windowed auger head, standard (stainless steel) 3.25"	H-4202.6WSS
Shelby Tube Drive Head, 3" E Rod	H-4202.7A
Replacement connector pin	H-4202.8
Replacement connector pin, SS	H-4202.8SS

E drill rod is 1-15/16" in diameter

DCP Test Set without Augers

The H-4202X DCP test set without the augers includes: (1) standard hammer assembly (H-4202.1), (1) heat-treated 45° cone penetrometer point with a 1 ft. adapter rod (H-4202.3), (4) 2.5 ft. E drill rod extensions (H-4202.225). This set is also available with the H-4202.1A sleeved hammer.

DCP Test Set without Augers H-4202AX

Sleeved Hammer for DCP, No Augers H-4202SX

Ship wt. 65lbs. (29.5kg)

Shelby Tube Drive Head

Drive head for Shelby tubes for use with H-4202.1 or H-4202.1A drive hammers with 3" "E" rod connection. (See page 38 for Shelby tubes.)

Sleeved Hammer for DCP H-4202.7A
 Ship wt. 5.9lbs. (2.7kg)

Proctor Penetrometer Set

ASTM D1558

Establishes the moisture-penetration resistance relations of fine-grained soils. Includes these interchangeable needles (area in sq. in. or sq. cm): 12" (6.45cm²), 3/42" (4.84cm²), 1/22" (3.22cm²), 1/32" (2.15cm²), 1/52" (1.29cm²), 1/102" (.65cm²), 1/202" (0.32cm²) 1/302" (0.22cm²) and 1/402" (0.16cm²). Replacement needles available below.

Proctor Penetrometer H-4139
 Ship wt. 17lbs. (7.7kg)

Proctor Penetrometer Needles

Description	Model
Resistance Needle Set	H-4143N
1 2" (6.45 cm ²) needle	H-4143.1
3/42" (4.84 cm ²) needle	H-4143.75
1/22" (3.22 cm ²) needle	H-4143.50
1/32" (2.15 cm ²) needle	H-4143.33
1/52" (1.29 cm ²) needle	H-4143.20
1/102" (0.65 cm ²) needle	H-4143.10
1/202" (0.32 cm ²) needle	H-4143.05
1/302" (0.22 cm ²) needle	H-4143.033
1/402" (0.16 cm ²) needle	H-4143.025



H-4212MH



H-4212



H-4205



H-4200

H-4200M



H-4195



H-4200F
H-4195F

Pocket Shear Vane, Metal

The Humboldt H-4212MH pocket shear vane Tester provides a quick and efficient method for determining shear strength values of cohesive soils. The pocket shear vane is widely used for taking on-site measurements of excavations, including trenches and test pits. It is also used for taking readings from thin-wall or split core soil samples. It can also be used in the laboratory for evaluations. The device is widely used by safety and OSHA inspectors, back hoe operators, field testing technicians, consulting engineers, etc.

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

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

Pocket Shear Vane, Metal H-4212MH
Ship wt. 0.8lb (0.4kg)

Pocket Shear Vane, Plastic

The H-4212 pocket shear vane tester provides a quick and efficient method for determining shear strength values of cohesive soils. The pocket shear vane is widely used for taking on-site measurements of excavations, including trenches and test pits. It is also used for taking readings from thin-wall or split core soil samples. It can also be used in the laboratory for evaluations. The device is

widely used by safety and OSHA inspectors, back hoe operators, field testing technicians, consulting engineers, etc. This device comes with three vanes, which are easily attached or removed. The torvane shear tester is molded plastic and comes in a plastic molded case.

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

Pocket Shear Vane, Plastic H-4212
Ship wt. 1.3lbs (0.6kg)

Soil Penetrometer, Dial-Type

A sophisticated pocket penetrometer offering greater capacity and sensitivity than others. Maximum value is retained on the dial until released via push-button. Inner dial scale 0 to 6.0, with 0.1 divisions in tsf and kg/cm². Outer scale gives load strength over 0 to 11.0 with 0.1 divisions in kg. This reading is used with charts (included) to estimate safe bearing pressures, depending on plunger used and soil type. Values indicated relate to the standard 0.25" dia. plunger. In addition, readings with four other included plungers (10, 15, 20, 25mm) indicate safe bearing pressures for foundations in consolidated soils over a range of sandy to clay-type soils. The 2.5" (63mm) dia. dial can be easily recalibrated using register plates (included) and any readable scale of 10-15 lbs. capacity. Includes data tables, register plates, instructions, and carrying case.

Soil Penetrometer, Dial-Type H-4205
Ship wt. 1lb (0.5kg)

Humboldt Soil Penetrometer (Tire-Gauge Design)

For use by field personnel to check visual classification of soils. Verifies whether excavation side walls require shoring, based on OSHA cohesive soils classifications. Indicates consistency, shear strength, and approximate unconfined shear strength. Both models provide a direct-reading scale, which corresponds to equivalent unconfined compressive strength. The H-4200 measuring range of 0 to 4.5 ton/ft.² and the H-4200M measuring range of 0-45ton/m². High-quality construction. Includes belt-loop style carrying case and operating instructions. Should not replace laboratory testing or field analysis, or be used to produce foundation design data.

Humboldt Soil Penetrometer, 0-4.5 ton/ft² H-4200
Humboldt Soil Penetrometer, 0-45 ton/m² H-4200M
Ship wt. 0.4lb (0.2kg)

Soil Penetrometer, Pocket-Type

For use by field personnel to check visual classification of soils. Verifies whether excavation side walls require shoring, based on OSHA cohesive soils classifications. Indicates consistency, shear strength, and approximate unconfined shear strength. Direct-reading scale—in tons/ft², or kg/cm²—corresponds to equivalent unconfined compressive strength. Indicator sleeve retains reading after piston is released.

Soil Penetrometer, Pocket-Type H-4195
Ship wt. 0.8lb (0.4kg)

Penetrometer, Low-Strength Soil Adapter Foot

Adapter foot is recommended when testing extremely low strength cohesive soils. 1" (25mm) dia. foot, compared to the 0.25" (6.35mm) penetrometer piston, increases the effective area measured by 16 times. Divide by 16 to obtain correct unconfined compressive strength when the reading in tons per square foot or kilograms per square centimeter is on the low-load side.

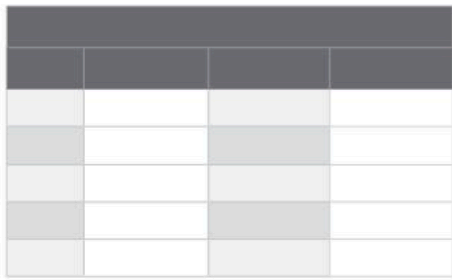
Adapter Foot for H-4200 and H-4200M H-4200F
Adapter Foot for H-4195 H-4195F
Ship wt. 0.4lb (0.2kg)



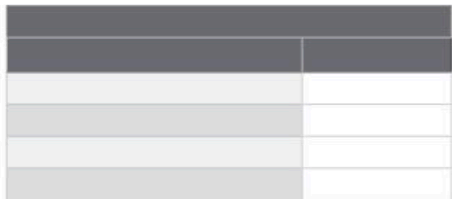




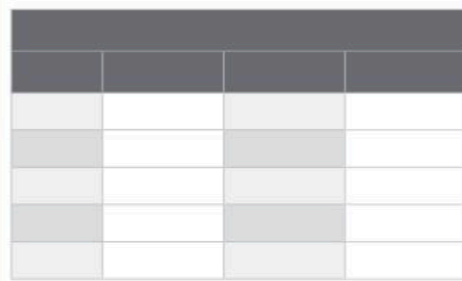




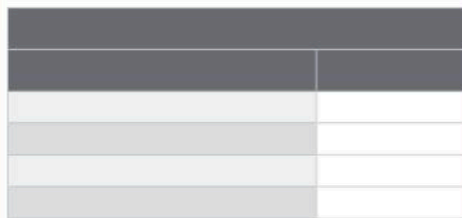
6a



6a



6a



6a



6b

6b



H-4418.23



H-4419.23



H-4416.2



H-4449



H-4451



H-4452

Basic Soil Sampling Kits, 5/8" Threaded

Basic sampling kits provide everything you'll need to auger to a target depth as deep as 12ft and obtain a relatively undisturbed soil core sample. The kits are used worldwide by construction companies, consultants and engineering firms for site investigations. They are available with 5/8" threaded components with either 2.25" or 3.25" augers. Each kit comes with (1) regular, (1) mud, and (1) sand auger. The kits also include (3) 4' extensions, (1) 18" rubber-coated cross handle, (1) regular slide hammer, (1) core sampler (1.5" x 6" or 2" x 6"), (1) plastic liner, (2) plastic end caps, (1) cleaning brush, (1) universal slip wrench, and (2) adjustable wrenches. All the components fit securely in a foam-lined, poly-reinforced deluxe carrying case with handles and wheels for added portability.

2.25" Basic Soil Sampling Kit H-4416.2

3.25" Basic Soil Sampling Kit H-4416.3

Ship wt. 56lb (26kg)

Soil Auger Kits, Threaded

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

2.25" Augers with (4) 3' Extensions H-4419.23

2.25" Augers with (4) 4' Extensions H-4419.24

3.25" Augers with (4) 3' Extensions H-4419.33

3.25" Augers with (4) 4' Extensions H-4419.34

Ship wt. 22lb (8.2kg)

Soil Auger Kits, Quick-Connect

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

2.25" Augers with (4) 3' Extensions H-4418.23

2.25" Augers with (4) 4' Extensions H-4418.24

3.25" Augers with (4) 3' Extensions H-4418.33

3.25" Augers with (4) 4' Extensions H-4418.34

Ship wt. 21lb (8.6kg)

Rock Breaker Set

Pair of rock breaking attachments for auger sets. 5/8" threaded-end for attaching to extensions and slide hammers. Used to split or chip rocks and stones found in an augered hole. These rock breakers are alloy-steel, sharp-edged chisels designed for use with slide hammers. Used to break up obstructions in augered holes.

Rock Breaker H-4449

Ship wt. 31lb (1.3kg)

Slide Hammers

Slide hammers are used for easier penetration and extraction of soil samplers and probes. The Hammer consists of steel tubing that slides over a hardened steel rod, which is threaded to 5/8" NC to accommodate drive rods and extensions. Soft, baked-on rubber coating and ball-grip handle reduces shock to operator's hands and increases comfort.

Regular Slide Hammer, 5/8" Threaded H-4451

Compact Slide Hammer, 5/8" Threaded H-4452

Ship wt. 9lb (4.1kg)



H-4208

H-4209



H-4206

H-4207

Universal Slip (Strap) Wrench

Great tool for the field. Can be used to loosen or uncouple auger and penetrometer extensions, as well as any other round or irregular-shaped tools and test apparatus.

Universal Slip (Strap) Wrench H-4453

Ship wt. 3lb (1.3kg)

Sample Bags, Plastic-Lined

Heavy-duty material, plastic-lined sample bag. Bag has draw-cord closure and can be used for various applications involving soils, aggregates, sands and similar materials.

Sample Bags, 10" x 18" (254 x 457mm) H-4208

Sample Bags, 17" x 32" (432 x 813mm) H-4209

Ship wt. 0.7lbs. (0.31kg)

Sample Bags

Heavy-duty material, unlined sample bag. Bag has draw-cord closure and can be used for various applications involving soils, aggregates, sands and similar materials.

Sample Bags, 10" x 18" (254 x 457mm) H-4206

Sample Bags, 17" x 32" (432 x 813mm) H-4207

Ship wt. 0.5lbs. (0.22kg)





Soil Sampling Auger, Spiral-Type

ASTM D1452

For use in sampling soils, auger has 1.5" dia. x 4" long (38mm x 102mm) spiral-type auger bit. Features graduation marks every 6" (152mm). Overall length is 36" (914mm), including handle. Screw-on handle permits attachment of H-4251 extension for sampling beyond 36" depths.

Soil Sampling Auger, Spiral-Type **H-4250**
 Ship wt. 5lbs (2.7kg)

Description	Model
Auger Extension, 36" (914mm)	H-4251

Auger Set, Quick-release Handle and Bucket

Set includes a 3.25" windowed, auger head of zinc-plated steel, auger T-handle, 36" (914mm) auger extension and (2) Quick-release connector Pins.

Auger Set, QR Handle and Bucket **H-4202.6A**
 Ship wt. 8lbs (2.2kg)

Description	Model
Auger Extension, 36" (914mm) with Connect Pin for H-4202.6A	H-4202.5
Attachment Pins	H-4202.8

T-Handle Auger, Iwan-Type

ASTM D1452

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).

- Auger, Iwan-Type- 2" Dia. (51mm)** **H-4252.2**
- Auger, Iwan-Type- 3" Dia. (76mm)** **H-4252.3**
- Auger, Iwan-Type- 4" Dia. (102mm)** **H-4252.4**
- Auger, Iwan-Type- 6" Dia. (152mm)** **H-4252.6**

Ship wt. 8lbs (3.2kg)

Description	Model
Auger Extension, 36" (914mm), includes coupling for H-4252.2	H-4252.2E
Auger Extension, 36" (914mm), includes coupling for H-4252.3, H-4252.4 and H-4252.6	H-4252E

Soil Sampling Auger Tube Set

Set contains auger and sampling tube. Components are plated steel to resist abrasive action of soil. Includes 1.25" (25mm) dia. by 12.5" (318mm) long auger, 1" (approx. 25mm) OD by 12.5" (318mm) long sampling tube, two 12" (305mm) extension rods, handle and a fiberboard carrying case.

Soil Sampling Auger Tube Set **H-4268**
 Ship wt. 5.4lbs (3.2kg)

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) ID sampling tube, handle and carrying case.

Soil Sampling Tube Set **H-4269**
 Ship wt. 2.7lbs (1.4kg)

Footstep Soil Sampler

Footstep Soil Sampler is a 36" one-piece soil sampler with a welded-on footstep. It has a 12" soil tube, which uses replaceable, screw-on soil tips. A 5" handle is welded on to the probe for convenience. The 36" height makes it easy on your back. The sampler provides a 9" x 0.75" sample. The tube is marked in 6" intervals and provides easy unloading of the sample.

Soil Sampling Tube **H-4261**
 Ship wt. 4.2lbs (2.2kg)

Classic Soil Sampler

Soil Sampler is a 36" one-piece soil sampler, with an 8" handle. It provides a 9" x 0.75" sample. The tube is marked in 6" intervals and provides easy unloading of the sample. It has a 12" soil tube, which uses replaceable, screw-on soil tips.

Soil Sampling Tube **H-4362**
 Ship wt. 4.2lbs (2.2kg)

Soil Sampler Replacement Tips

Soil tips are replaceable and work on the following Sampling Tubes: H-4261, H-4362, H-4268 and H-4269. Buying extra tips for your soil sampling tool can be a convenient and economic way to increase the lifespan of your equipment. Tips are 0.75" in diameter and nickel plated to add extra strength and resist corrosion.

The Regular Soil Tip was specially designed for use in areas with many different soil and moisture types. This is an "all purpose" tip, so if you aren't sure which tip to get, this is a great option.

Dry Soil Tip was specially designed for use in areas with sand or very dry soil.

Wet Soil Tip was designed for use in clay, mud, or very wet soil and moisture types. It has a thicker ridge on the inside to help hold onto the wet soil better.

The Heavy Duty Soil Tip was designed for use in areas with hard soil, gravel or other difficult soil types.

- Regular Soil Tip** **H-4268.1**
- Dry Soil Tip** **H-4268.2**
- Wet Soil Tip** **H-4268.3**
- Heavy-Duty Soil Tip** **H-4268.4**

Ship wt. 1lbs (0.45kg)



**Probe Rod, Steel**

Ideal for locating buried pipes, tanks and utility lines. Zinc-plated steel, 36" (914mm) x 0.5" (12.7mm) shaft.

Probe Rod, Steel**H-4188**

Ship wt. 8lbs (2.2kg)

Probe Rod, Fiberglass

Ideal for locating buried pipes, tanks and utility lines. Light, non-conductive fiberglass 48" (1219mm) x 0.5" (12.7mm) shaft.

Probe Rod, Fiberglass**H-4188F**

Ship wt. 8lbs (2.2kg)

Power Mechanical Earth Drill

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 1.5" to 6" dia., maximum depth is 18' (38 to 152mm, 5.5m deep).

Power Mechanical Earth Drill, 5hp**H-4050****Power Mechanical Earth Drill, 8hp****H-4051**

Ship wt. 225lb (102 kg)

Snap-On Augers, 42"

Description	Model
1.5" (38mm) Snap-On Auger	H-4052A.1
2" (51mm) Snap-On Auger	H-4052A.2
3" (76mm) Snap-On Auger	H-4052A.3
4" (102mm) Snap-On Auger	H-4052A.4
6" (152mm) Snap-on Extension	H-4052A.6

42" Long augers dig a 36" deep hole.

Full-flighted Snap-On Extensions, 36"

Description	Model
1.5" (38mm) Snap-On Extension	H-4053.1
2" (51mm) Snap-On Extension	H-4053.2
3" (76mm) Snap-On Extension	H-4053.3
4" (102mm) Snap-On Extension	H-4053.4
6" (152mm) Snap-On Extension	H-4053.6

Tube Extensions

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

Replacement Points & Blades

Description	Model
Point, Screw-on, 1.5" (38mm)	H-4055.1
Point, Screw-on, 2" (51mm)	H-4055.2
Point, Screw-on, 3" (76mm)	H-4055.3
Point, For 4" (102mm) and 6" (152mm) Blades	H-4055
Blade, 4" (102mm)	H-4056
Blade, 6" (152mm)	H-4057

**Shelby Tubes**

ASTM D1587

Shelby tube samplers are thin-walled, hollow steel tubes, which are driven into the ground to extract a relatively undisturbed soil sample for use in laboratory tests used to determine density, permeability, compressibility and strength. Each tube has one end that is chamfered to form a cutting edge and the upper end includes holes for securing the tube to a drive head. Shelby tubes are useful for collecting soils that are particularly sensitive to sampling disturbance, including fine cohesive soils and clays. The tubes can also be used to transport samples back to the lab as well. **Note: Size is OD. All tubes are 16 gauge steel.**

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

* galvanized

Shelby Tubes

See Table



Ship wt. See Table





Caps for Shelby Tubes

Plastic end caps for protecting tube and sample.

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

Caps for Shelby Tubes

See Table

Ship wt. See Table

Expansion Packer for Shelby Tubes

Expanding plugs to seal samples in Shelby tubes for transport.

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

Expansion Packer for Shelby Tubes

See Table

Ship wt. See Table

Sealing Wax

ASTM D109, D4943

Sealing wax to seal ends of shelby tubes for transport. 10 lb. box.

Sealing Wax

H-4210W

Ship wt. 11lb (5.4 kg)

Shelby Tube Head, 3" Tubes

Shelby Tube Head for 3" shelby tubes for use with H-4202.1 or H-4202.1A drive hammers with "E" rod connection (sold separately, see page 38).

Shelby Tube Head, 3" Tubes

H-4202.7A

Ship wt. 5.9lb (2.7 kg)

Shelby Tubes Heads

Various heads for different sized Shelby tubes.

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

AW= 3 threads per inch AWJ= 5 threads per inch

Shelby Tubes Heads

See Table

Ship wt. See Table



ACCESSORIES

For Knives, Go to page 382.

For Pans, Go to pages 378-379.

Water Level Indicator

The Water Level Indicator determines water levels in drainage operations, dams, reservoirs, embankments, wells, bore holes, underground cavities, or any hydrological/geological work. Works well with small openings, holes & shafts that are not always straight. Compact, self-contained units feature a jointed design for easy access to difficult openings. Weighted probe is lowered into the opening via high-strength, flexible cable. Buzzer & light indicate when water

level has been reached. Readings taken from marked cable to very tip of probe so less than 1 ml of water is displaced. Probe resists false readings caused by cascading water. Standard models have cables marked in feet.

Water Level Indicator, 150ft.

H-4040.150

Water Level Indicator, 300ft.

H-4040.300

Water Level Indicator, 500ft.

H-4040.500

Ship wt. 6 to 12lbs (3 to 5kg)

Water Level Meter

The Water Level Meter is designed to measure groundwater levels, especially in small diameter tubes and piezometers, or where a flexible assembly is needed to get past downhole instrumentation. Units include a 3/8" dia. x 2.75" (10 x 70mm) stainless steel probe with 10 stainless steel weights, weighing 6.14oz. (174g). This probe is ideal for the majority of water level measurement applications. The flexible weight assembly allows easy well access and keeps the cable hanging straight in monitoring wells. The coaxial cable used has a durable polyethylene jacket with permanent markings precisely etched on the cable every 1/100ft.

Water Level Meter, 100ft.

H-4041.100

Water Level Meter 200ft.

H-4041.200

Water Level Meter, 300ft.

H-4041.300

Water Level Meter, 500ft.

H-4041.500

Water Level Meter, 30m

H-4041.30M

Water Level Meter, 60m

H-4041.60M

Water Level Meter, 100m

H-4041.100M

Water Level Meter, 150m

H-4041.150M

Ship wt. 6 to 12lbs (3 to 5kg)



ACCESSORIES

For Melting Pots, Go to page 198.

**Resistivity Meter, Digital**

ASTM G187, G57; AASHTO T288

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

Accuracy:

0.01Ω to 1MΩ range: ±1.6% ±1LS Display Digit
1MΩ to 10MΩ range: ±5% ±1LS Display Digit

Resistivity Meter, Digital **H-4385D**
Ship wt. 10.5lbs (5kg)

Resistivity Meter, Analog

ASTM G187, G57; AASHTO T288

The resistivity meter can be easily used to measure resistivity of soil in-situ using the 2, 3, or 4 electrode method or with a soil box to measure resistivity of soil or water in the range of distilled to sea water. Resistance measurement range is from 0.01Ω to 1.1MΩ and resistance measurements are unaffected by any stray interference signals that may be present in the earth during measurement, due to use of narrow band-pass filters. It has a rugged, lightweight weatherproof case with an IP67 rating for dust and water intrusion. The lid can be removed to facilitate use and

movement of the meter to new locations without removing test leads. Runs on a set of C-cell alkaline batteries eliminating recharging and plugged-in power sources.

Resistivity Meter **H-4385**
Ship wt. 10lbs (5kg)

Soil Box

The Soil Box can be used with both resistivity meters 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 Resistivity Meter, when the box is filled level, can be expressed in ohm-centimeter, making calculations unnecessary. The box can also be used with other meters. H-4386: 8.75" x 1.5" x 1.25" (222 x 38 x 32mm) and H-4386SM: 4.375" x 1.125" x 1.5" (111 x 29 x 38mm).

Soil Box, 270ml Capacity **H-4386**

Soil Box, 80ml Capacity **H-4386SM**
Ship wt. 1.3lb (0.5kg)

Soil Cylinder

ASTM G187; AASHTO T288

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

Soil Cylinder **H-4385.5**

Ship wt. 4.6lbs (2.3kg)

Resistivity Test Reel with Soil Pins

ASTM G187, ASTM G57, AASHTO T288

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.

Resistivity Test Reel with Soil Pins **H-4388**
Ship wt. 6.7lbs (3.2kg)

Soil Pins (Electrodes)

Set of 4 soil pins for use with resistivity meters. Pins measure 1/4" x 20" (1.9 x 51cm).

Soil Pins (Electrodes) **H-4388.1**
Ship wt. 3.9lbs (1.8kg)

Soil Box Leads, set of 4

Set of 4 wire leads for use with resistivity meters to connect to soil boxes. Leads are 4 ft. (122 cm) long.

Soil Box Leads, set of 4 **H-4387**
Ship wt. 0.7lbs (0.3kg)

Resistivity Meter Test Kit

ASTM G187, G57; AASHTO T288

The Soil resistivity test kit is designed to conveniently store and carry all that is necessary to perform the Wenner Four-Pin Method, as outlined in the ASTM G57-06 Standard, as well as the Soil-Box Method. The kit includes: (1) large Soil Box; Soil container test leads set, (1) set of 4-Pin Test Reel leads; 4-Pin soil resistivity test reel, (4) Heavy-duty, stainless steel, 18" long, T-handle, Soil pins and carrying case. **Order Resistivity Meter separately.**

Resistivity Meter Test Case **H-4385.1**
Ship wt. 10lbs (6kg)



HM-4502



HSM-2100



H-4377



H-4368A

Double Ring Infiltrometer

ASTM D3385

Ideal for field testing, as well as lab use. The Double-Ring Infiltrometer provides actual field measurements of the rate of infiltration of water or other liquid through soils, especially fine-grained soils. The test provides reliable data for use in environmental and other geotechnical studies, such as liquid waste disposal; leaching; drainage; irrigation requirements, and canal or reservoir leakage.

The Infiltrometer consists of (2) stainless steel rings measuring 12" and 24" dia x 20"H (304.8 and 609.6 dia x 508mm). These rings are driven into the soil in a concentric arrangement using the included driving plate.

The rings are filled with water and the water level is maintained by the use of constant-head Mariotte reservoir cylinders, which provide a constant head of water for the duration of the test. The velocity of liquid passing into the soil from the inner ring is equivalent to the infiltration rate. Water between the two rings promotes one-dimensional vertical flow beneath the inner ring.

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. There is a main flow valve in the base platform and a bleed valve next to the adjusting tube seal. Includes: 0.5" 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 with support stands, flexible tubing and rubber splash guards.

Double Ring Infiltrometer

HM-4502

Ship wt. 148lbs (72.5kg)

Guelph Permeameter Kit

ASTM D5126

The Guelph Permeameter is an easy-to-use instrument to quickly and accurately measure in-situ hydraulic conductivity. Accurate evaluation of soil hydraulic conductivity, soil absorptivity, 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 10.5 to 2 hours, depending on soil type, and requires only about 2.5 liters of water. Measurements can be made in the range of 15 to 75cm below the soil surface.

The Guelph Permeameter is a complete kit consisting of the permeameter, field tripod, well auger, well preparation and cleanup tools, collapsible water container, and vacuum test hand pump, all packaged in a durable carrying case. Accessory attachments are available for extending the measurement capability of the permeameter. Depth attachments increase the depth of operation by 80cm. The maximum practical operating depth is 315cm. Ring attachments allow ring infiltrometer measurements from 10 and 20cm diameter rings. A tension adapter allows measurements to be made under tensional and very low head conditions. The Guelph Permeameter Kit, consists of: permeameter field tripod, well auger, well preparation and cleanup tools, collapsible water container, and vacuum test hand pump, in a durable carrying case.

Guelph Permeameter Kit

HSM-2100

Ship wt. 33lbs (14.9kg)

Acidity and Moisture Tester

Provides the ability to make on-the-spot in field or lab tests for soil acidity in moist soil. Measures pH and moisture content (% relative saturation). The Kelway tester operates on the principle of electrical potential between two dissimilar metal plates - without batteries or any external power source. When inserted into moist soil it registers

the degree of acidity on the upper scale. The lower scale shows degree of moisture (% saturation) when the switch button is held in. Tester is supplied with belt-loop case, two 3" x 4" (76 x 102mm) conditioning film sheets and instructions. Not for use with liquids.

Acidity and Moisture Tester

H-4377

Ship wt. 2lbs (1kg)

Acidity and Moisture Tester Conditioner Film

Conditioning film sheets for Acidity and Moisture Tester. Package of 12.

Conditioner Film (12 pk)

H-4377.1

Ship wt. 1lbs (0.5kg)

Soil Color Charts

Munsell soil color charts were developed with the U.S. soil conservation service for classifying soil color, but may also be used for rocks, archaeological specimens, and other natural products. Munsell charts are a standard tool for geologists, civil engineers, and soil scientists. The tabbed charts include 10R, 7.5R, 5R, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y and 10Y-5GY color ranges. Charts for tropical and semitropical soils, and for Australia, SE Asia are now included. A two page Gley chart for submerged soils covers weak chromas and neutrals of blue and green hues. A white page is used to describe carbonate, silica, gypsum, soluble salt participates and more. Openings between chips allow easy visual comparison with soil samples. Illustrations of soil grain structures, charts for estimating proportions of mottles and coarse fragments, color name diagrams, and instructions are furnished. Color chips are mounted on neutral gray, 7.25" x 4.25" (184 x 108mm) water resistant pages in an 8" x 6" (203 x 152mm) loose-leaf binder.

Soil Color Charts

H-4368A

Ship wt. 1.5lbs (0.5kg)