

pressure



Specification Sheet  
SS-CP-2110-US

**TRANSCAT**

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Model HL<sup>®</sup>

## Hydraulic and Gauge Deadweight Tester

### Pressure Range

100 to 22,500 kPa (10 to 3,000 psi)

### Accuracy

to  $\pm 0.05\%$  of Indicated Reading

### Available units

psi, kg/cm<sup>2</sup>, bar, kPa

### Interchangeable Weights

Models are available with dual piston/cylinder assemblies that utilize one weight set.

### Compact Design and Portability

The HydraLite is designed for use in the field and is completely self-contained within the cover of the unit.

### Includes Compact Screw Pump with Ratchet Handle

The tester models are supplied with a convenient screw pump as a pressure source. This pump has a ratchet feature that prevents the unit from depressurizing unexpectedly.

The gauge model can be retrofitted with the pump as an accessory.

### Overhung Weight Carrier

Reduces side thrust and friction on the measuring piston and cylinder assembly, thus improving measurement accuracy

### Positive Over-pressure Protection

Prevents Piston Damage

### NIST Traceable

All units are supplied with certifications that are traceable to NIST.

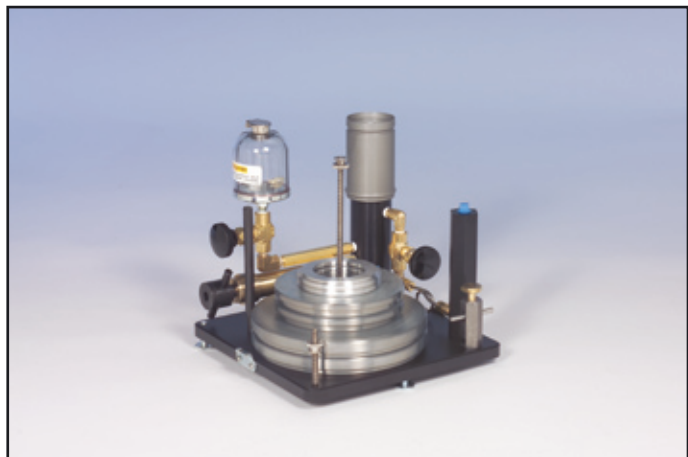
### PRODUCT DESCRIPTION

The HydraLite Hydraulic Deadweight Tester is a primary standard that features a re-entrant type measuring piston and cylinder assembly that helps maintain accuracy as the test pressure increases.

The HL Series tester is designed for rapid interchanging between high and low pistons and is NIST traceable and accurate to  $\pm 0.05\%$  using non-magnetic die-cast alloy or aluminum weights calibrated to international standard gravity at  $9.80665 \text{ m/s}^2$ . A compact screw pump with ratchet handle is easy-to-use. The unit is also available as a deadweight gauge for accurate measurements and use as a comparison standard.

### Low center of gravity

The HL tester is an easy-to-use and portable primary standard capable of offering laboratory accuracy in the field. The unit is designed to be self-contained with all necessary components stored under the cover. A screw pump pressure source on the tester model offers a convenient method to raise and lower pressure for rapid testing.



ISO 9001 Manufacturer

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## FEATURES

### Two accuracies available

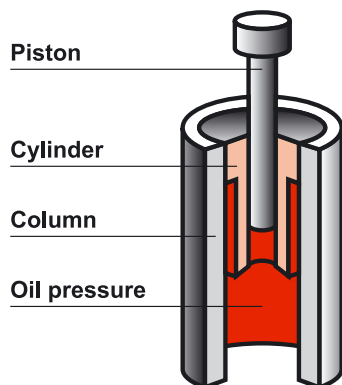
These instruments are available in  $\pm 0.100\%$  and  $\pm 0.050\%$  of reading. The accuracy stated is the overall accuracy of the tester. The accuracy takes into account linearity, hysteresis, and repeatability. It would also account for intrinsic corrections. Site corrections are the user's responsibility and the unit will not perform as specified without them. The testers are manufactured to International Standard Gravity and a local gravity site correction is easily performed with a ratio correction to the output.

### Easy Leveling

AMETEK floating ball testers incorporate a bulls-eye level for reference when preparing the unit for use. The tester also employs a 3-leg leveling system which is more convenient and is superior to a 4-leg system.

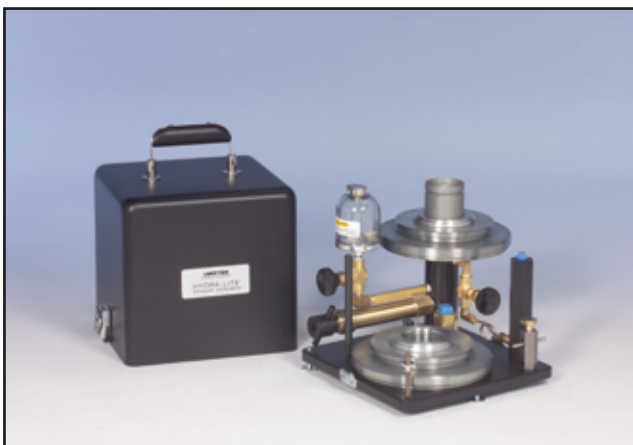
### Re-entrant piston / cylinders

The HL deadweight tester employs a re-entrant type piston/cylinder assembly. This design applies test fluid to the outside and inside of the cylinder. Unlike a simple piston/cylinder, this configuration reduces clearance between the piston and cylinder as pressure increases. This reduces the rate of fluid leakage and increases float time, offers the technician more time for testing, and reduces the amount of pumping necessary to sustain the fluid loss.



### Pressure media

Because the HL is manufactured using brass and aluminum components, AAA Tester Oil is the recommended and supplied pressure media. Other fluids compatible with stainless steel, brass, aluminum, and Buna may be used; however, consideration should be given to the cleanliness of the fluid. AAA Tester Oil is triple-filtered to remove suspended solids that can harm the piston/cylinder assembly.



### Overhung weight carriers

Another feature of HL deadweight tester is the way that the weights are positioned on the carrier - an overhung weight carrier design. This design employs a tube carrier that is positioned over the column and onto the piston driver, which lowers the center of gravity of the weights reducing side thrust and friction. This design lengthens the life of the piston and cylinder assembly thus improving measurement accuracy.

### Over-pressure protection

The measuring piston assembly features positive over-pressure protection restricting vertical movement of the measuring piston by a piston cap. This positive stop will prevent the piston from damage due to accidental removal of the weights when pressurized.

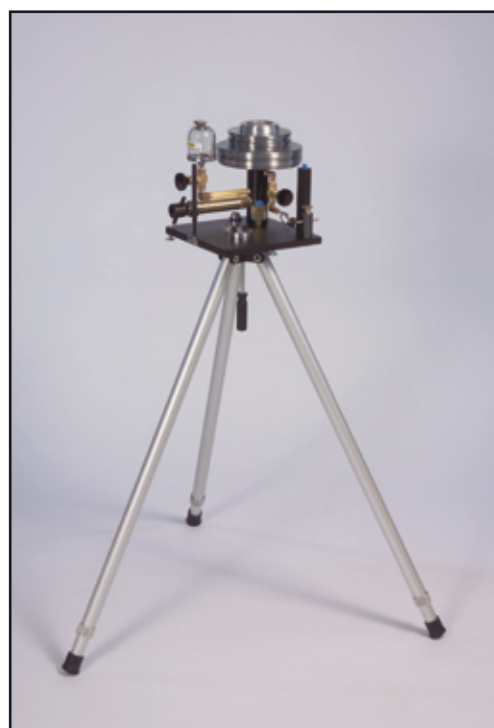
### Worldwide engineering units

The HL deadweight tester and HLG gauge can be manufactured in four different engineering units: psi, bar, kg/cm<sup>2</sup>, and kPa. All of the different engineering units are available in any of the configurations.

### HydraLite HLG Gauge

The AMETEK HydraLite HLG Gauge is a precision, portable instrument used to accurately measure pressure in field conditions. The HydraLite HLG gauge may be used as a primary standard instrument where a high accuracy reference measurement is needed. Simply connect the gauge to the process and add weights until there is a proper float. Standard accuracy is  $\pm 0.1\%$  of indicated pressure traceable to the U.S. National Institute of Standards and Technology (NIST). The instrument may also be specified with  $+0.05\%$  accuracy.

If you initially need a gauge and later find that you need a full tester, an accessory kit is available to incorporate the screw pump into the gauge.





## ORDERING INFORMATION

### Base model

HL-	Single piston/cylinder assembly, imperial engineering units, 0.100% accuracy, standard accessories, NIST traceable certificate
HLG-	Single piston/cylinder assembly, imperial engineering units, 0.100% accuracy, standard accessories, NIST traceable certificate

### Range options

Model	Operating range	Increment	Piston area	Weight set
2	10 to 200 psi	0.1 psi	0.05 in <sup>2</sup>	1
4	10 to 400 psi	0.1 psi	0.05 in <sup>2</sup>	2
6	10 to 600 psi	0.1 psi	0.05 in <sup>2</sup>	3
10	50 to 1,000 psi	0.5 psi	0.01 in <sup>2</sup>	1
20	50 to 2,000 psi	0.5 psi	0.01 in <sup>2</sup>	2
30	50 to 3,000 psi	0.5 psi	0.01 in <sup>2</sup>	3

### Base model

HL-	Single piston/cylinder assembly, metric engineering units, ±0.100% accuracy, standard accessories, NIST traceable certificate
HLG-	Single piston/cylinder assembly, metric engineering units, ±0.100% accuracy, standard accessories, NIST traceable certificate

### Range options

Model	Operating range	Increment	Piston area	Weight set
15M	1 to 15 kg/cm <sup>2</sup>	0.005 kg/cm <sup>2</sup>	0.05 in <sup>2</sup>	1M
30M	1 to 30 kg/cm <sup>2</sup>	0.005 kg/cm <sup>2</sup>	0.05 in <sup>2</sup>	2M
45M	1 to 45 kg/cm <sup>2</sup>	0.005 kg/cm <sup>2</sup>	0.05 in <sup>2</sup>	3M
75M	5 to 75 kg/cm <sup>2</sup>	0.025 kg/cm <sup>2</sup>	0.01 in <sup>2</sup>	1M
150M	5 to 150 kg/cm <sup>2</sup>	0.025 kg/cm <sup>2</sup>	0.01 in <sup>2</sup>	2M
225M	5 to 225 kg/cm <sup>2</sup>	0.025 kg/cm <sup>2</sup>	0.01 in <sup>2</sup>	3M
15B	1 to 15 bar	5 mbar	0.05 in <sup>2</sup>	1N
30B	1 to 30 bar	5 mbar	0.05 in <sup>2</sup>	2N
45B	1 to 45 bar	5 mbar	0.05 in <sup>2</sup>	3N
75B	5 to 75 bar	25 mbar	0.01 in <sup>2</sup>	1N
150B	5 to 150 bar	25 mbar	0.01 in <sup>2</sup>	2N
225B	5 to 225 bar	25 mbar	0.01 in <sup>2</sup>	3N
1500N	100 to 1,500 kPa	0.5 kPa	0.05 in <sup>2</sup>	1N
3000N	100 to 3,000 kPa	0.5 kPa	0.05 in <sup>2</sup>	2N
4500N	100 to 4,500 kPa	0.5 kPa	0.05 in <sup>2</sup>	3N
7500N	500 to 7,500 kPa	2.5 kPa	0.01 in <sup>2</sup>	1N
15000N	500 to 15,000 kPa	2.5 kPa	0.01 in <sup>2</sup>	2N
22500N	500 to 22,500 kPa	2.5 kPa	0.01 in <sup>2</sup>	3N

### Calibration Options (all models and ranges)

Model	Accuracy	Gravity	Data
NONE	±0.100% rdg (standard)	9.80665 m/s <sup>2</sup> (standard)	None
/C	±0.100% rdg (standard)	9.80665 m/s <sup>2</sup> (standard)	Yes
-1/C	±0.050% rdg (optional)	9.80665 m/s <sup>2</sup> (standard)	Yes

## ORDERING INFORMATION

### Base model

HL-	Dual piston/cylinder assembly, imperial engineering units, ±0.100% accuracy, standard accessories, NIST traceable certificate
HLG-	Dual piston/cylinder assembly, imperial engineering units, ±0.100% accuracy, standard accessories, NIST traceable certificate

### Range options

Model	Operating range	Increment	Piston area	Weight set
12	10 to 200 psi	0.1 psi	0.05 in <sup>2</sup>	1
	50 to 1,000 psi	0.5 psi	0.01 in <sup>2</sup>	
24	10 to 400 psi	0.1 psi	0.05 in <sup>2</sup>	2
	50 to 2,000 psi	0.5 psi	0.01 in <sup>2</sup>	
36	10 to 600 psi	0.1 psi	0.05 in <sup>2</sup>	3
	50 to 3,000 psi	0.5 psi	0.01 in <sup>2</sup>	

### Base model

HL-	Dual piston/cylinder assembly, metric engineering units, ±0.100% accuracy, standard accessories, NIST traceable certificate
HLG-	Dual piston/cylinder assembly, metric engineering units, ±0.100% accuracy, standard accessories, NIST traceable certificate

### Range options

Model	Operating range	Increment	Piston area	Weight set
90M	1 to 15 kg/cm <sup>2</sup>	0.005 kg/cm <sup>2</sup>	0.05 in <sup>2</sup>	1M
	5 to 75 kg/cm <sup>2</sup>	0.025 kg/cm <sup>2</sup>	0.01 in <sup>2</sup>	
180M	1 to 30 kg/cm <sup>2</sup>	0.005 kg/cm <sup>2</sup>	0.05 in <sup>2</sup>	2M
	5 to 150 kg/cm <sup>2</sup>	0.025 kg/cm <sup>2</sup>	0.01 in <sup>2</sup>	
270M	1 to 45 kg/cm <sup>2</sup>	0.005 kg/cm <sup>2</sup>	0.05 in <sup>2</sup>	3M
	5 to 225 kg/cm <sup>2</sup>	0.025 kg/cm <sup>2</sup>	0.01 in <sup>2</sup>	
90B	1 to 15 bar	5 mbar	0.05 in <sup>2</sup>	1N
	5 to 75 bar	25 mbar	0.01 in <sup>2</sup>	
180B	1 to 30 bar	5 mbar	0.05 in <sup>2</sup>	2N
	5 to 150 bar	25 mbar	0.01 in <sup>2</sup>	
270B	1 to 45 bar	5 mbar	0.05 in <sup>2</sup>	3N
	5 to 225 bar	25 mbar	0.01 in <sup>2</sup>	
9000N	100 to 1,500 kPa	0.5 kPa	0.05 in <sup>2</sup>	1N
	500 to 7,500 kPa	2.5 kPa	0.01 in <sup>2</sup>	
18000N	100 to 3,000 kPa	0.5 kPa	0.05 in <sup>2</sup>	2N
	500 to 15,000 kPa	2.5 kPa	0.01 in <sup>2</sup>	
27000N	100 to 4,500 kPa	0.5 kPa	0.05 in <sup>2</sup>	3N
	500 to 22,500 kPa	2.5 kPa	0.01 in <sup>2</sup>	

### Accessories

Order no.	Description
T-536	Overall rebuild kit - HL/HLG Buna N (standard material)
MGAAA/QT	Tester oil - 0.95 l (1 qt)
MGAAA/GL	Tester oil - 3.79 l (1 gal)
99-90019	Oil dispenser
11-90009	Adapter (1/4" NPT male x 1/2" NPT female)
T-786	Adapter (1/4" NPT male x 1/4" BSP female)
T-787	Adapter (1/4" NPT male x 1/2" BSP female)
60I104	Roll of Teflon tape
101549	Bonded seal (1/2")
60R120	Bonded seal (1/4")
60R122	Bonded seal (1/8")
K-1562	Tripod for convenient field use

## FUNCTIONAL SPECIFICATIONS

Model: ..... HydraLite HL and HLG  
Type:.....Hydraulic, piston gauge  
Pressure range: ..... to 22,500 kPa / 3,000 psi (model dependent)  
Accuracy (12 months): ..... to  $\pm 0.050\%$  rdg  
Increments (low - min):.....0.1 psi, 0.005 kg/cm<sup>2</sup>, 5 mbar, 0.5 kPa  
Increments (high - min): .....0.5 psi, 0.025 kg/cm<sup>2</sup>, 25 mbar, 2.5 kPa  
Gravity: .....9.80665 m/s<sup>2</sup> (international standard)  
Piston/cylinders:..... Single or dual (as ordered)  
Columns: ..... Single  
Weight sets:.....Single (as ordered)  
Pressure source: ..... Screw pump, hand-actuated,  
..... hydraulic pump (tester models only)  
Medium: ..... AAA oil  
Reservoir capacity:.....0.24 l / 14.4 in<sup>3</sup> (tester models only)  
Wetted surfaces: ..... 300 series stainless steel, brass, aluminum  
O-rings:.....Buna N  
Test connections:..... 1/4" NPT and 1/2" NPT  
Weight material: ..... Hard, non-magnetic alloy and aluminum  
Engineering units:..... psi, kg/cm<sup>2</sup>, bar, kPa  
Cases: ..... 1 (self-contained)

## PHYSICAL SPECIFICATIONS

Tester size (L x W x H): ..... 22.9 x 22.9 x 25.4 cm / 9 x 9 x 10 in  
Weight: .....20.4 kg / 45 lb  
Configuration:.....Single or dual piston/cylinder  
.....single column hydraulic deadweight or gauge  
Delivery:.....Pump (tester), piston(s), weight set, tools, gauge  
.....post, adapters, manual, and NIST traceable certification

## General Process Information for Calibrated Parts

- Include serial number, accuracy, gravity, and model number of deadweight tester when ordering weight sets or calibrated parts.
- Masses for weights ordered separately, including tolerance, must be supplied by customer; unless combined with tester on same order.
- Calibrated parts may be made to archival data if requested on the purchase order.
- Calibrated parts are certified for physical dimension only (mass or area) and not for accuracy unless ordered with a new tester or the tester is returned for proper calibration of parts.

## Certification of Accuracy and Traceability

A Certification of Accuracy and Traceability to NIST is included with every AMETEK floating ball-type deadweight tester. An optional Certification of Accuracy with area, mass and intrinsic correction factors is available.

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Pressure generators from small Hydraulic "bicycle" style pumps to hydraulic pumps generating up to 1,000 bar (15,000 psi).

*...because calibration is  
a matter of confidence*