FLUKE®
Calibration

Technical data

P3100 HP Series

Very High Pressure Hydraulic Deadweight Testers Models P3117, P3118 and P3119

Key Features

- **Instrumental Measurement Uncertainty Specifications**
  - **Standard Accuracy** Delivers high pressure measurement at 0.02 % of reading without the need for pressure correction factors[1]
  - **Optional Improved Accuracy of 0.015% of Reading**: PressCal software supports users to easily apply all necessary corrections to allow for improved accuracy of 0.015 % of reading
- **Three models available in ranges from 30,000 psi to 60,000 psi (2,000 bar to 4,000 bar)**: Select nominal increments in psi, bar or MPa pressure units
- **Gravity Correction –** includes user specified local gravity correction at no additional cost
- **ISO/IEC 17025 accredited calibration**: all models are delivered with an ISO/IEC 17025 calibration certificate
- **Single-Valve Simplicity**: Streamlined operation with a single valve for ease of use
- **No Intensifier Needed**: Variable volume system achieves full working pressure without an intensifier for simpler use, fewer components, and greater reliability
- **Ergonomic Spindle Pump**: 4-arm spindle design provides smooth, comfortable operation and reduces operator fatigue

- **Easy Priming**: Lever-style priming pump offers quick, ergonomic priming with minimal effort
- **Clean and Efficient Oil Management**: Enhanced oil drainage system with integrated catch minimizes mess and simplifies maintenance
- **Quick and Easy Oil Inspection**: Front-facing oil reservoir allows fast, at-a-glance checks of oil level and cleanliness

Instrument base

The P3100 HP Series very high-pressure hydraulic deadweight tester incorporates the “Piston Gauge” principle, in which an applied pressure within the system, balances a known mass applied to a piston of known effective area. The unit comprises a base plate onto which is mounted a high-pressure manifold, a piston/cylinder unit (PCU), a fluid reservoir, a variable volume 4-arm spindle pressure generating system with a lever-style priming pump and a safety relief valve (which protects both the low- and high-pressure systems from accidental overpressure). A built-in test station allows quick and secure connection of the device under test. Adjustable leveling feet and an external level vial ensure proper leveling for optimal performance. Additionally, a piston float reference indicator helps the user easily identify the optimal “mid-float” position, enhancing measurement precision. The whole assembly is contained within a strong GRP housing.

Product group:

- Electrical
- RF
- Temperature
- Humidity
- Pressure
- Flow
- Software

Piston/Cylinder

At the heart of every deadweight tester is the piston-cylinder assembly—and in the P3100 HP Series, this critical component is engineered for superior performance. Each piston is crafted from high-grade tungsten carbide, offering exceptional long-term stability, outstanding durability, and ultra-low coefficients of thermal expansion and pressure distortion. The result: consistently accurate performance you can rely on, year after year.

Weight Sets

The P3100 HP Series includes standard weights made from Series 3 non-magnetic stainless steel for superior stability and corrosion resistance.

Each mass is individually marked with the instrument's serial number and its corresponding nominal pressure value. Choose from pressure units in psi, bar, or MPa. For added flexibility, optional PressCal software allows support for additional pressure units to suit your calibration needs.

Gravity Correction

Because gravity varies by location—and even small differences can affect high-accuracy pressure calibrations—the P3100 HP Series can be calibrated to your specific local gravity at no additional cost. If local gravity is not specified, instruments are calibrated to the standard reference of 980.665 cm/s^2, ensuring consistent and reliable performance out of the box.

Specifications

Pressure ranges	
P3117	500 psi to 30 000 psi, or 40 bar to 2 000 bar, or 4 MPa to 200 MPa
P3118	500 psi to 40 000 psi, or 40 bar to 2 600 bar, or 4 MPa to 260 MPa
P3119	500 psi to 60 000 psi, or 40 bar to 4 000 bar, or 4 MPa to 400 MPa
Instrumental measurement uncertainty specification	Standard Accuracy[1]: ±(0.02 % of reading or 0.001 % of range, whichever is greater) Optional (Improved Accuracy)[2]: ±(0.015 % of reading or 0.00075 % of range, whichever is greater) [1] Correction factors are not necessary for the standard accuracy of 0.02 % of reading when used within the stated environmental limits of: Ambient temperature: 18 °C to 28 °C Ambient pressure: 80 kPa to 105 kPa Location: local gravity adjusted weights [2] Windows-based PressCal software program is available that allows users to easily apply all necessary corrections needed for the specific piston range and accuracy **Note:** For more information on the uncertainty, including the % reading threshold, please see technical note, "Guide for the Uncertainty Analysis in Pressure When Using P3000 Series Deadweight Testers".
Materials of construction	
Standard weight materials	Series 3 non-magnetic, austenitic, stainless steel Density: 7.8 g/cm^3
Piston materials	Tungsten carbide with nickel binder
Cylinder material	Tungsten carbide with cobalt binder
Thermal coefficient of expansion	11 ppm/°C

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General Specifications

Test port adaptors	DH500, equivalent to HiP 60-xxxx high pressure fittings (60,000 psi) for ¼" and 3/8" tube sizes
Weight	23 lbs (10.5 kg)
Dimensions (W x D x H)	18" X 20" X 20" (457 mm x 508 mm x 508 mm)
Mass set weight	100 lbs (45.5 kg)
Reservoir volume	150 cc
Priming pump	Included with Standard 3117, 3118 and 3119 models
Minimum weight increments	2 bar, 0.2 MPa, 20 psi
Optional fine increment weights	Minimum increments of 0.2 bar, 0.02 MPa, 2 psi
Seal materials	Viton and Buna
Operating fluid	Sebacate, our reference 3069551 (1 gallon standard)
Shipping	Ships as a pallet and a crate

Ordering Information

Models	Description
P3117-BAR	HIGH-PRESSURE DEADWEIGHT TESTER, 2000 BAR
P3117-MPA	HIGH-PRESSURE DEADWEIGHT TESTER, 200 MPA
P3117-PSI	HIGH-PRESSURE DEADWEIGHT TESTER, 30,000 PSI
P3118-BAR	HIGH-PRESSURE DEADWEIGHT TESTER, 2600 BAR
P3118-MPA	HIGH-PRESSURE DEADWEIGHT TESTER, 260 MPA
P3118-PSI	HIGH-PRESSURE DEADWEIGHT TESTER, 40,000 PSI
P3119-BAR	HIGH-PRESSURE DEADWEIGHT TESTER, 4000 BAR
P3119-MPA	HIGH-PRESSURE DEADWEIGHT TESTER, 400 MPA
P3119-PSI	HIGH-PRESSURE DEADWEIGHT TESTER, 60,000 PSI
Conversion Weight Sets	
CWS P3117-BAR	CONVERSION WEIGHT SET, P3117 2000 BAR
CWS P3117-MPA	CONVERSION WEIGHT SET, P3117 200 MPA
CWS P3117-PSI	CONVERSION WEIGHT SET, P3117 30,000 PSI
CWS P3118-BAR	CONVERSION WEIGHT SET, P3118 2600 BAR
CWS P3118-MPA	CONVERSION WEIGHT SET, P3118 260 MPA
CWS P3118-PSI	CONVERSION WEIGHT SET, P3118 40,000 PSI
CWS P3119-BAR	CONVERSION WEIGHT SET, P3119 4000 BAR
CWS P3119-MPA	CONVERSION WEIGHT SET, P3119 400 MPA
CWS P3119-PSI	CONVERSION WEIGHT SET, P3119 60,000 PSI
Comparison Test Pump	
P5516-400M[4]	HIGH-PRESSURE COMPARISON TEST PUMP, 400 MPA (60K PSI)

[4] The P5516-400M Comparison Test Pump generates up to 60,000 psi (4200 bar) for checking pressure measuring instruments against master test gauges, indicators or transducers. These hydraulic test pumps provide a quick and easy solution for checking pressure measuring instruments to 60,000 psi (4200 bar). Designed for operation with a wide range of fluids, the P5516 is an extension of the P5515 Comparison Test pump, including several features from our popular line of deadweight testers.

Options and accessories

A. **Improved Accuracy Option with Software –** PressCal Software is a Windows based software program that allows users to easily apply all necessary corrections, allowing for improved accuracy of 0.015% of Reading

B. **Fine Incremental Weights –** Additional small weights that allow for finer pressure increments

PPA9159-CAL for use with kPa, MPa, Bar, or kgf/cm2 weight sets

PPA9608-CAL for use with psi weight sets

C. **Conversion Weights –** Allows for an instrument to be used in a pressure unit other than the pressure unit the instrument was ordered for.

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