

Performing precise pressure calibrations may cost less than you think

Application Note



If you have ever considered calibrating your own pressure workload but thought it was too complicated or expensive, then there is something you ought to know. While there are complex pressure calibration methods requiring multiple

instruments, expensive auxiliary devices, and lots of training there is another option: the deadweight tester. One more thing you should know is that everything you need to get started is at Fluke Calibration in our deadweight tester product line.

An affordable solution

Today's automated calibrators and state-of-the-art piston gauges require a fairly high cost of entry, but a simple and cost-effective solution to cover a wide range of pressure calibrations is the deadweight tester. For many years, deadweight testers have been trusted as accurate and reliable standards for calibrating pressure gauges, transducers, transmitters and portable calibrators. Due to their fundamental method of pressure measurement using calibrated piston-cylinders and masses, they offer unmatched measurement stability and reliability. Due to excellent deadweight tester stability, owners of often extend recalibration intervals beyond one year, reducing cost of ownership.

Why deadweight testers

A key advantage of deadweight testers is that all of the hardware required to generate pressure and precisely control and measure it can be contained within the instrument. On-board hand pumps are offered on Fluke Calibration deadweight testers to generate vacuum or air pressure, or to prime higher pressure hydraulic systems. Precise control of higher pressures is accomplished using a built-in fine control screw press. No external readouts or power supply are needed for deadweight tester operation. Deadweight testers also inherently regulate a stable test pressure once the piston is floated, solving a problem that operators of some manual pressure calibrators encounter.

Deadweight testers also measure accurately over a wide range of pressure. The uncertainty of deadweight tester measurements is a percent of the measured value (% of reading). By including multiple piston-cylinders, a single deadweight tester can calibrate units under test with full scale ranges that vary by a 100:1 ratio or more. For example a P3025 pneumatic deadweight tester can measure from vacuum to 3,500 kPa (500 psig). A P3125 hydraulic model measures from 100 kPa to 110 MPa (10 to 16,000 psig).

The business case for calibrating in house

A Fluke Calibration deadweight tester can be purchased at a very reasonable upfront cost, often less than a third of a sensor-based calibrator with comparable specifications. Purchase of a deadweight tester may offer a favorable payback by calibrating as few as 25 pressure devices per year. Some additional economic factors to consider are:

- Calibrating in house reduces the downtime of sending devices out.
- Shipping charges can be avoided by calibrating in-house.
- Owning a pressure standard makes calibrating devices multiple times per year practical when the application calls for it.
- Commercial labs can offer more comprehensive services to their customers with fast turnaround by acquiring pressure capability.

Fluke Calibration quality

While seeking an affordable solution, calibration professionals still must ensure they are using a reliable instrument that will be convenient to use and offer years of reliable service. Fluke Calibration deadweight testers come with accredited calibration and offer features and refinements that offer practical benefits over lower performance industrial solutions:

- Dual piston models allow coverage of a very wide pressure range without changing pistons
- A high-quality fine control screw press makes it easy to precisely control pressure in both increasing and decreasing direction.
- Hand-tightened o-ring based connection allows connection of units under test without tools or thread tape.

- Visible fluid reservoir on hydraulic models so users can monitor the level and condition of test media.

Fluke Calibration deadweight testers include pressure generation and test connection hardware to allow operators to get started quickly. With little or no training, operators are able to efficiently perform calibrations. But as always, Fluke Calibration application experts are there to support you with installation and operation assistance to make the most of your investment.

Fluke Calibration. *Precision, performance, confidence.™*

Electrical	RF	Temperature	Pressure	Flow	Software
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