

# WellWatcher TruOptic

High-temperature fiber-optic pressure gauge



Rated to 20,000 psi [137,895 kPa]



Rated to 250 degC [482 degF]

**APPLICATIONS**

- Extremely harsh downhole conditions
  - HPHT applications
  - Heavy oil thermal recovery
- Wells where electromagnetic fields may compromise accuracy of electric gauges

**BENEFITS**

- Enhances recovery through improved reservoir surveillance
- Improves production management in harsh wellbore environments
- Enables faster identification of production problems through best-in-class pressure measurement

**FEATURES**

- Permanent, reliable in-well monitoring
- No downhole electronics
- Optimized for HT environments
- Pressure measurement independent of temperature
- Immune to electromagnetic interference
- Hydrogen-resistant
- Simple-to-use surface software with automatic setup and optimization
- Unique side-hole fiber-sensing technology with gauge performance equal to an electrical quartz pressure gauge
- Exceptionally dependable at high temperatures
- Optional hybrid deployment with electrical gauges or distributed temperature measurements
- No mechanical amplifier required to boost measurement signal
- Proprietary glass-to-metal seal and single-end attachment of sensors that make gauge less sensitive to hysteresis effects, improving both accuracy and drift sensitivity

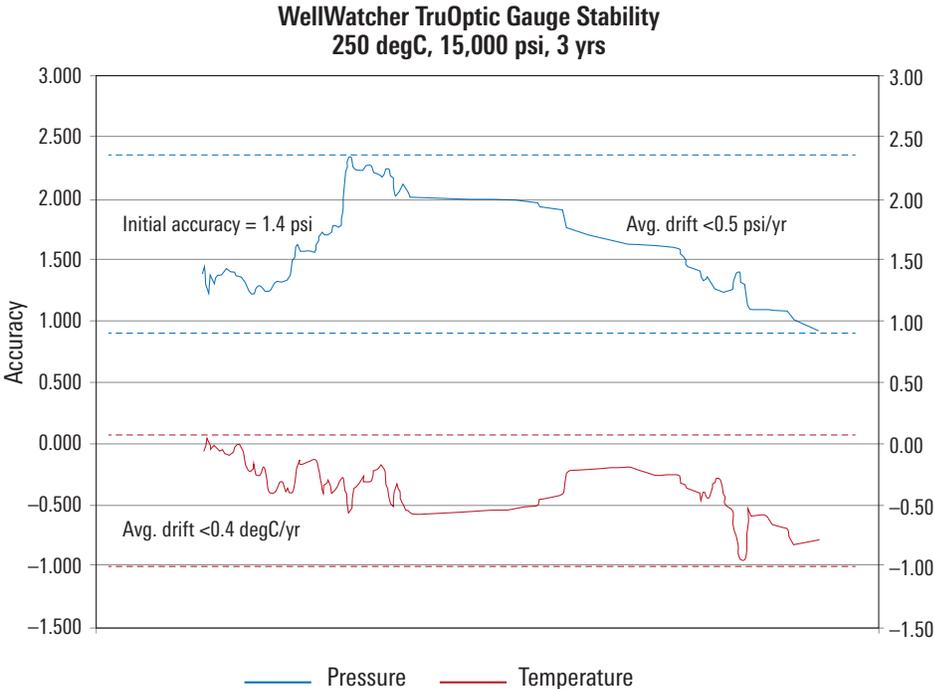
**Designed for accuracy in extreme conditions**

Rigorously tested, the WellWatcher TruOptic\* high-temperature fiber-optic pressure gauge provides quartz-gauge accuracy for ultrahigh-temperature applications. The rugged design ensures reliable, accurate well data is transmitted in even the harshest conditions. Pressure is measured through changes in the optical path length of the sensor’s two orthogonal axes. Data is available in real time and can be imported into Schlumberger software solutions or customized for other applications.

Unlike optical strain gauges based on Bragg gratings, the WellWatcher TruOptic gauge takes direct measurements of pressure. Because the sensing element is kept strain-free, the risk of hysteresis and drift is minimized.

**Metrology**

All pressure gauges are prone to drift after factory calibration, and those not designed for stable operation can drift up to tens of psi per year. Testing has found the drift of the WellWatcher TruOptic gauge to be less than 1.5 psi [10.34 kPa] per year, or less than 3 ft [1 m] per year when measuring a brine fluid column.



Over a period of three years, pressure drift of the WellWatcher TruOptic gauge has been verified to be no more than 1.5 psi with a temperature drift of only 1 degC.



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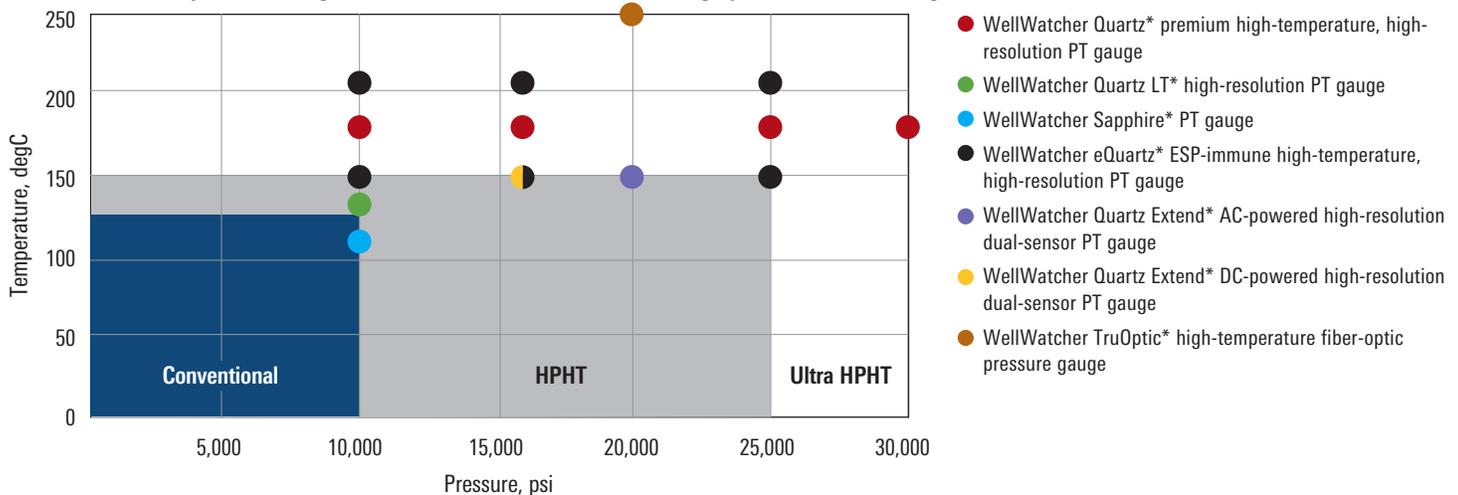
## WellWatcher TruOptic Gauge Specifications

Max. OD, in [mm]	1 [25]
Length, ft [m]	4.68 [1.426]
Pressure operating range, psi [kPa]	Atmospheric to 20,000 [137,895]
Pressure calibrated range, psi [kPa]	Atmospheric to 20,000 [137,895]
Temperature operating range, degC [degF]	-10 to 250 [14 to 482]
Temperature calibrated range, degC [degF]	30 to 250 [86 to 482]
Drift at 250 degC, psi/yr [kPa]	<1.5 [<10.34]
Pressure accuracy at 250 degC, psi [kPa]	<1 [<6.89] ± 0.01% of measured pressure
Pressure accuracy over 30–250 degC range, psi [kPa]	<2 [<13.79] ± 0.01% of measured pressure
Pressure resolution at 1 sec, psi [kPa]	<0.03 [<0.21]
Pressure resolution at 5 sec, psi [kPa]	<0.01 [<0.07]
Temperature accuracy, degC [degF]	<2 [<3.6]
Temperature resolution at 1 sec, degC [degF]	<0.4 [<0.72]
Temperature resolution at 5 sec, degC [degF]	<0.2 [<0.36]
Flow-wetted housing material	Titanium grade 7

## Surface Acquisition Unit Specifications

Max. number of gauges per single cable line	4
Fiber type compatibility	9/125 um, single-mode
Physical dimensions	4U 19-in, rack-mounted
Operating temperature, degC [degF]	0 to 45 [32 to 113]
Storage temperature, degC [degF]	-40 to 75 [-40 to 167]
Relative humidity, %	<90 (noncondensing)
Power	100/240 V AC, 50/60 Hz, or 24 V DC; Typical steady state: 50 W, max. 150 W
Optical budget	10 dB
Update frequency	1 Hz
Communications	Ethernet
Acquisition unit to PC	Ethernet 100/1,000 BASE T
Data delivery	Modbus®, ASCII file storage
Laser classification, IEC/EN 60825-1 [2001]	Class 1

## Pressure and Temperature Ratings for WellWatcher\* Permanent Monitoring Systems Downhole Gauges



The graph shows the environmental applications in which WellWatcher system downhole gauges are most appropriate. The WellWatcher TruOptic gauge is suitable for temperatures as high as 250 degC and pressures as high as 20,000 psi.

[slb.com/WellWatcher](http://slb.com/WellWatcher)

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