

Metris Extreme HPHT permanent PT gauge

Noise-immune gauges with advanced bidirectional telemetry



Pressure:

Rated up to 30,000 psi [207 MPa]



Temperature:

Rated up to 400 degF [204 degC]

Enhanced metrology

Metris Extreme* HPHT permanent PT gauges have advanced quartz sensors for high-quality measurements in the tubing or annulus. Robust electronic technology and stringent qualification procedures ensure an extended lifetime and flawless performance.

How it improves wells

The gauges enable real-time evaluation and prompt corrective actions by delivering continuous pressure and temperature (PT) measurements. Acquired data is used for

- long-term production, injection, and reservoir monitoring in real time
- production allocation and management
- production and injection optimization
- well productivity, pressure transient, and decline analysis
- workover and intervention planning
- improved field development via interwell connectivity identification and offset well placement and completion design optimization
- reservoir model improvement and validation
- artificial lift optimization
- hydraulic fracture monitoring.

The ability to multidrop these compact gauges on one monoconductor cable simplifies intelligent completion deployment.

How it works

Robust electronic technology and stringent qualification procedures ensure an extended lifetime and flawless performance. The telemetry used by the gauge and surface acquisition unit is immune to external electrical noise and electromagnetic field interference (e.g., from ESP power cables or motor drives).

Among other advantages, it enables multidropping up to eight dual-sensor gauges (i.e., 16 sensors) on a single monoconductor cable and eliminates limitations on the distance between gauges.

For extra reliability, the gauges are equipped with Intellitite* downhole dual-seal dry-mate connectors. Incorporating a retainer system and two fully redundant metal-to-metal seals, this premium connector is fully pressure testable using a microleak detection system.

Bidirectional telemetry

Unlike conventional permanent downhole systems, Metris Extreme gauges use advanced bidirectional telemetry. This not only transmits PT data but also enables users to update gauge firmware if needed.

What else I should know

These permanent gauges are engineered to deliver stable PT measurements at downhole conditions, a capability that is essential for long-term reservoir and production monitoring. Performance is validated in a controlled test cell, where drift stability is measured at simulated reservoir PT conditions. Every gauge is calibrated in-house at a Schlumberger manufacturing center to maximize performance.

The gauges are also subjected to power on-off cycles and temperature cycling to simulate the most demanding operating conditions. They are qualified for a lifetime in excess of 20 years at maximum pressure and up to 400 degF. Repeated shock and vibration testing at rigorous levels ensures that they meet the environmental qualifications for production and injection wells. Qualifications meet or exceed the Advanced Well Equipment Standards (AWES) recommended practice for the qualification of downhole instrumentation and sensors.

Metris Extreme gauges transmit 32 system health tags to surface for diagnostic and prognostic system health monitoring.

The lower connection is V0-qualified per ISO 14998 and the gauge metallurgy is H₂S resistant per NACE MR0175/ISO 15156.

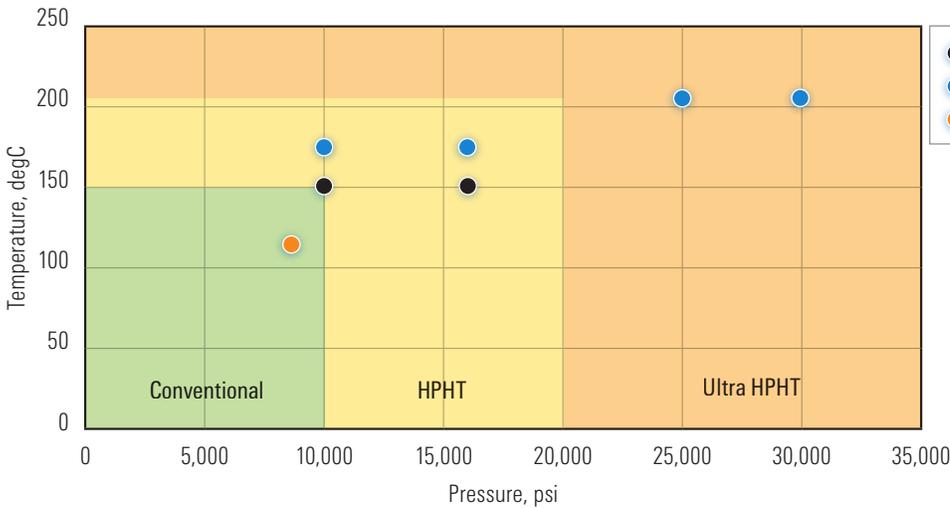
Part of an integrated system

Metris Extreme gauges belong to the family of [Metris* permanent monitoring systems](#). When used together with [WellWatcher Advisor* real-time intelligent completion software](#), the gauges become part of a monitoring solution that includes downhole surveillance, data analysis, and reservoir interpretation. These technologies are supported and deployed by a specialized group of scientists, engineers, and technicians who are highly trained and experienced in permanent monitoring systems and intelligent completion technology. This specific central support for project preparation and operations contributes to the delivery of best-in-class service quality worldwide.



Metris Extreme gauges are available in different configurations to suit any completion design.

Metris Extreme



- Metris Evolve* permanent PT gauge
- Metris Extreme HPHT permanent PT gauge
- Metris Express* single-sensor permanent PT gauge

Metris Evolve and Metris Extreme gauges are available with various pressure and temperature ratings to suit the application.

Metris Extreme HPHT Permanent PT Gauge Specifications

Maximum pressure, psi [MPa]	10,000 [69]	16,000 [110]	25,000 [172]	30,000 [207]
Maximum temperature, degF [degC]	350 [177]	350 [177]	400 [204]	400 [204]
Shock and vibration	AWES standard or beyond			
H ₂ S resistance	NACE MR0175	NACE MR0175	NACE MR0175	NACE MR0175
Scanning rate	One dataset (pressure and temperature) per sensor per second	One dataset (pressure and temperature) per sensor per second	One dataset (pressure and temperature) per sensor per second	One dataset (pressure and temperature) per sensor per second
Tool current	20 mA for gauge and 15 mA for telemetry	20 mA for gauge and 15 mA for telemetry	20 mA for gauge and 15 mA for telemetry	20 mA for gauge and 15 mA for telemetry

Metrology

Standard pressure calibration range, [†] psi [MPa]	1,000 to 10,000 [6.9 to 69]	1,000 to 16,000 [6.9 to 110]	1,000 to 25,000 [6.9 to 172]	1,000 to 30,000 [6.9 to 207]
Standard temperature calibration range, [†] degF [degC]	77 to 350 [25 to 177]	77 to 350 [25 to 177]	77 to 400 [25 to 204]	77 to 400 [25 to 204]
Pressure accuracy, % full scale	±0.015	±0.02	±0.02	±0.02
Pressure resolution, 1-s gate time, psi [kPa]	0.006 [0.041]	0.008 [0.055]	0.010 [0.069]	0.010 [0.069]
Pressure repeatability, % full scale	<0.01	<0.01	<0.01	<0.01
Pressure drift over full range, % full scale per year	±0.02	±0.02	±0.02	±0.02
Temperature accuracy, degF [degC]	±0.9 [±0.5]	±0.9 [±0.5]	±0.9 [±0.5]	±0.9 [±0.5]
Temperature resolution, 1-s gate time, degF [degC]	0.009 [0.005]	0.009 [0.005]	0.009 [0.005]	0.009 [0.005]
Temperature repeatability, degF [degC]	<0.02 [<0.01]	<0.02 [<0.01]	<0.02 [<0.01]	<0.02 [<0.01]
Temperature drift at 350 degF, degF/year [177 degC, degC/year]	±0.18 [±0.1]	±0.18 [±0.1]	±0.18 [±0.1]	±0.18 [±0.1]

Dimensions

Outer diameter, in [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.84 [21]
Single-sensor length, in [mm]	22.8 [579]	22.8 [579]	22.8 [579]	22.8 [579]
Single-sensor length with feedthrough, in [mm]	25.8 [655]	25.8 [655]	25.8 [655]	25.8 [655]
Dual-sensor length, in [mm]	20.9 [531]	20.9 [531]	20.9 [531]	20.9 [531]
Dual-sensor length with feedthrough, in [mm]	31.5 [800]	31.5 [800]	31.5 [800]	31.5 [800]

[†] Custom calibration ranges are available if required.

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