



Signature

QUARTZ GAUGES

High-quality pressure measurements
in all reservoir testing environments



Primary Insight

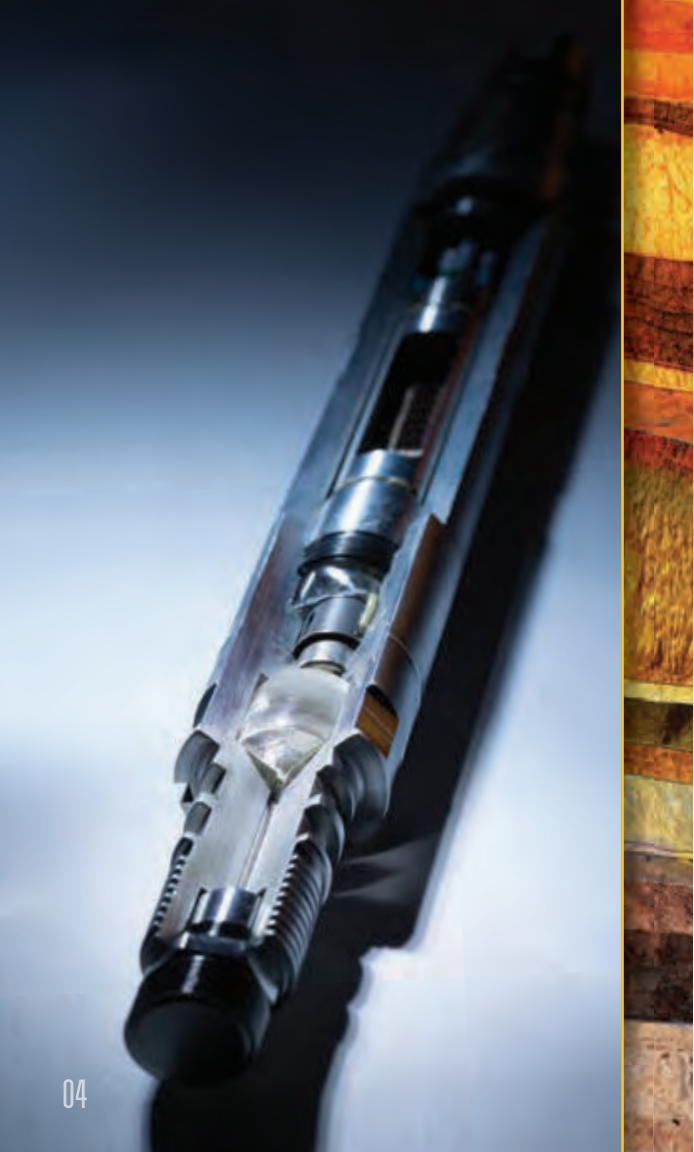
Pressure measurements give you a deep look into your reservoir. By answering questions on permeability thickness, skin, boundaries, and volumes, pressure measurements help prove reservoir potential, confirm well performance, and improve field productivity. Increasing measurement accuracy and resolution affects everything that follows, including reserve estimates and well design.

Rated to **437 degF**
and **30,000 psi**

Measurably Better

Combining market-leading metrology and reliability, Signature* quartz gauges deliver the highest quality downhole pressure measurements to help you meet your reservoir test objectives. Consistent performance throughout your test allows you to identify finer reservoir features and more accurately characterize your reservoir.





Signature Gauges: Raising the Bar

Signature gauges provide accurate, high-resolution pressure measurements in all operating scenarios. Rated to 437 degF and 30,000 psi, Signature gauges ensure that the quality of your test data is never compromised, even in HPHT environments. Large memory capacity accommodates high data sampling rates for a more comprehensive dataset, and long battery life means you acquire high-quality measurements continuously for the duration of your test.

Up to 6.4 million datasets

Complete Dataset from Every Test

Signature gauges can withstand HPHT conditions for extended periods of time and continue to deliver high-quality measurements. In addition to this industry-leading durability, Signature gauges' high data sampling rates, large memory capacity, and long battery life ensure the most complete dataset of accurate, high-resolution pressure measurements.

Accurate measurements in rugged downhole conditions

- All-ceramic multichip module design
- Welded electronics housing
- Ratings to 437 degF, 30,000 psi

Low power consumption and longer battery life

- 12 days of autonomy at 428 degF
- 21 days of autonomy at 410 degF
- 37 days of autonomy at 400 degF
- 1 year of autonomy at 350 degF

Greater memory for more data storage

- 12 days at 1-second recording at 437 degF
- 50 days at 1-second recording at 350 degF
- Up to 6.4 million datasets



Signature Gauges

Specifications

| Model | TCQR Signature CQG* Crystal Quartz Gauge | TQPR Signature* Quartz Gauge | TUPR Signature HP* High-Pressure Quartz Gauge | THQR Signature HPHT* High-Pressure, High- Temperature Quartz Gauge | THXR Signature Xtreme* High-Temperature Quartz Gauge |
|--|--|---|--|---|---|
| Sensor type | CQG crystal quartz | Quartz | HP quartz | HPHT quartz | Extreme-temperature quartz |
| Pressure rating, psi [MPa] | 15,000 [103] | 16,000 [110] | 30,000 [207] | 30,000 [207] | 25,000 [172] |
| Temperature rating, degF [degC] | 347 [175] | 347 [175] | 347 [175] | 410 [210] | 437 [225] |
| Autonomy [†] | 6 months | 1 year | 1 year | 37 d at 400 degF 21 d at 410 degF | 12 d at 428 degF |
| Max. datasets | 5,000,000 | 5,000,000 | 5,000,000 | 1,250,000 | 1,250,000 |
| Memory size, MB | 16 | 16 | 16 | 4 | 4 |
| Memory capacity [‡] at 1-s recording, days | 40 | 50 | 50 | 12 | 12 |
| Max. OD, in [mm] | 1.2 [30.5] | 1.0 [25.4] | 1.0 [25.4] | 1.0 [25.4] | 1.0 [25.4] |
| Length, in [mm] | 40.2 [1,021] | 18.9 [480] | 18.9 [480] | 18.9 [480] | 19.9 [506] |
| Weight (excluding battery), lbm [kg] | 9.9 [4.5] | 3.75 [1.70] | 3.75 [1.70] | 3.75 [1.70] | 3.90 [1.77] |
| Material | Inconel® 718 and C276 | Inconel 718 and MP35N [§] | Inconel 718 and MP35N | Inconel 718 and MP35N | Inconel 718 and MP35N |
| Function enabled by Muzic* wireless telemetry | na ^{††} | Real-time or historical wireless data transmission | Real-time or historical wireless data transmission | Real-time or historical wireless data transmission | na |
| Interface with Muzic wireless telemetry | na | MZGM | MZGM | MZGM | na |
| Autonomy of wireless transmission of real-time data, ^{††} days | na | 20 | 20 | 20 | na |
| Downhole to surface wireless transmission time, s | na | 90 | 90 | 90 | na |

[†] Function of temperature and recording rate that may vary based on individual job parameters.

^{††} Not applicable.

[‡] Exact capacity depends on data compression ratio.

^{§§} Transmission of historical-mode data remains uninterrupted and lasts the test duration.

[§] Sensor housing and bulkhead are Inconel 718. Battery housing and sensor are MP35N.

Metrology

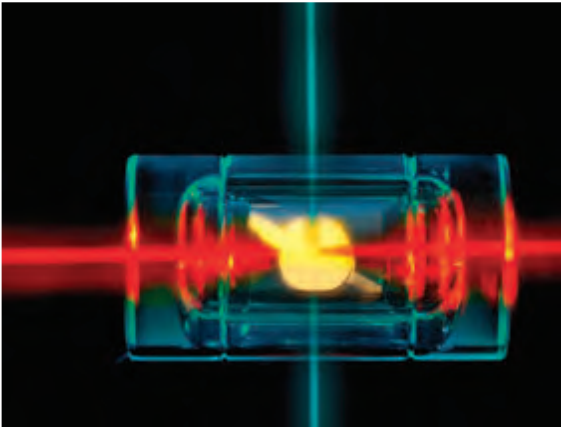
| Model | TCQR Signature CQG Crystal Quartz Gauge | TQPR Signature Quartz Gauge | TUPR Signature HP* High-Pressure Quartz Gauge | THQR Signature HPHT* High-Pressure, High- Temperature Quartz Gauge | THXR Signature Xtreme High-Temperature Quartz Gauge |
|---|---|-----------------------------------|--|---|--|
| Pressure | | | | | |
| Accuracy | ±1.2 psi [±8.3 kPa] | ±3.2 psi [±22 kPa] | ±0.015% full scale [†] | ±0.015% full scale [†] | ±0.015% full scale [†] |
| Resolution, psi [kPa] | 0.003 [0.021] | 0.005 [0.03] | 0.01 [0.07] | 0.01 [0.07] | 0.01 [0.07] |
| Calibration range, psi [MPa] | Atmospheric to 15,000 [103] | Atmospheric to 16,000 [110] | Atmospheric to 30,000 [207] | Atmospheric to 30,000 [207] | Atmospheric to 25,000 [172] |
| Drift at pressure and temperature rating, % full scale/year | <0.01 | <0.020 | <0.025 | <0.025 | <0.025 |
| Temperature | | | | | |
| Accuracy, degF [degC] | ±0.4 [±0.2] | ±0.4 [±0.2] | ±0.4 [±0.2] | ±0.4 [±0.2] | ±0.4 [±0.2] |
| Resolution, degF [degC] | 0.002 [0.001] | 0.002 [0.001] | 0.002 [0.001] | 0.002 [0.001] | 0.002 [0.001] |
| Calibration range, [‡] degF [degC] | 77–347 [25–175] | 77–347 [25–175] | 77–347 [25–175] | 95–410 [35–210] | 77–437 [25–225] |
| Drift, degF/year [degC/year] | <0.2 [<0.1] | <0.2 [<0.1] | <0.2 [<0.1] | <0.2 [<0.1] | <0.2 [<0.1] |
| Scanning rate | 0.1 s to 10 min | 0.1 s to 10 min | 0.1 s to 10 min | 0.1 s to 5 s | 0.1 s to 5 s |

[†] Accuracy of high-pressure quartz sensor is dependent on calibrated range of gauge.

[‡] Calibration range can be extended to 32 degF [0 degC] on request for seabed operations.

for any **environment**

Designed with proprietary ceramic electronics technology, Signature gauges obtain accurate, high-resolution measurements in all operating scenarios. With unparalleled reliability and durability, Signature gauges deliver measurably better results in today's challenging operations, helping you reach a better basis for your decisions and **be certain**.



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