

Cecomp gauge accuracy

API TECH SUPPORT - TS1014

How is accuracy calculated for Cecomp gauges?

The accuracy of a measurement is determined by how close a result comes to the true value. Determining the accuracy of a pressure gauge requires calibration with a known standard.

Accuracy calculations are based on the characteristics (linearity, hysteresis, repeatability) of the transducer and supporting electronics, range of the transducer, and display resolution. These calculations are expressed as a percent of full scale of the transducer plus the round-off error of the rightmost least significant digit (LSD). This round-off error has to do with the fact that the analog output of the pressure transducer needs to be rounded up or down when it is converted to a digital readout. This produces a 1 digit uncertainty in the right-most digit in the display which cannot be ignored. Sometimes the “±1 LSD” is left off from the specifications, but it is safe to assume it is there.

The Cecomp accuracy specifications typically state ±0.25% FS ±1LSD.

For example, an F16B100PSIG gauge will have an overall accuracy of ±0.4 PSI. To calculate the accuracy of this gauge :

- ◆ First calculate the 0.25% accuracy of the gauge: $\pm 0.0025 \times 100\text{psi} = \pm 0.25 \text{ psi}$
- ◆ Since this gauge has a digital display resolution of 0.1, we round the 0.25 error up to ±0.3. This is the round off error for the transducer analog output signal being converted to a digital readout.
- ◆ Then we add a display last digit uncertainty of ±0.1 to get a calculated accuracy of ±0.4 psi. This is the digit uncertainty for the right-most digit in the display.

Our gauges are conservatively rated and operate well within the stated accuracy limits. Cecomp uses the “terminal point” specifications method during gauge calibration instead of “best-fit straight line” specifications. This type of calibration procedure is more stringent and means that the zero pressure point and the 100 percent pressure point are “terminals” (sometimes referred to as end points) to which the actual performance of the transducer is fixed. Since the “terminal-based” specification is based on stated accuracy at zero and full scale, the worst possible case, usually at midrange, will never have the unit exceed specified nonlinearity.



It is possible to scale and calibrate a Cecomp gauge over part of the transducer range, but accuracy will always be determined by the full range of the transducer. Our digital gauges can generally withstand 2 times their rated pressure without incurring damage.