

# Pressure Gauge Installation & Usage Guidelines



Users should become familiar with ASME B40.100 (Gauges – Pressure Indicating Dial Type – Elastic Element) before specifying pressure measuring gauges. This document – containing valuable information regarding gauge construction, accuracy, safety, selection and testing – may be ordered from: [www.asme.org](http://www.asme.org)

## PRESSURE RANGE SELECTION

To ensure proper operation and long service life, the proper pressure range should be selected. For applications with constant, steady pressure, the measured pressure should be no more than 75% of the full scale range of the gauge. For applications with fluctuating pressure, the measured pressure should be no more than two-thirds of the full scale range of the gauge. In general, it is best to choose a range that is roughly 2X the average measured pressure. This gives over pressure protection and the highest accuracy.

## TEMPERATURE

**Ambient Temperature:** To ensure long life and accuracy, pressure gauges should preferably be used at an ambient temperature between –20 and +150°F (–30 to +65°C). At very low temperatures, standard gauges may exhibit slow pointer response. Above 150°F (65°C), the accuracy will be affected by approximately 1.5% per 100°F (38°C). The pressure gauge should not be used outside of its rated temperature limits as noted on the Data Sheet specific to that gauge. At temperatures above or below these limits, the gauge accuracy will be significantly reduced and the possibility of gauge failure may exist.

**High Temperatures or Corrosive Process Media:** In order to prevent hot media such as steam from entering the bourdon tube, a gauge siphon or pigtail filled with water should be installed between the gauge and the process line. A cooling tower may also be used to reduce the temperature effect on gauges. A chemical or a diaphragm seal should be used to protect gauges from corrosive media, or media that will plug the instrument.

## INSTALLATION

The pressure gauge should be installed where exposure to heat, vibration and moisture are minimal and where the dial can be easily read.

**Isolating Devices:** A shut-off valve such as a needle valve or gauge cock should be installed between the gauge and the process in order to be able to isolate the gauge for inspection or replacement without shutting down the process. The use of such devices are critical in times where start up pressures may temporarily exceed normal operating pressure. All isolating devices shall be opened slowly to prevent “slamming” of the bourdon tube. Care not taken during this time may damage the instrument.

**Overload Protection:** An overload protector should be used in situations where the process media may spike or be susceptible to overpressure of the design range for the gauge. This will prevent damage to the instrument.

**Threaded Connections:** The tightening or loosening of gauge connections can be done using the wrench flats on the gauge fitting. Using the gauge case to tighten or loosen pressure gauges will damage the gauge and may cause unreparable damage to the instrument. Proper sealant tape or paste should be used for sealing tapered threads like National Pipe Thread (NPT)

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**Vibration/Pulsation protection:** If the pressure gauge is exposed to vibration or pulsating pressure or both, a liquid filled pressure gauge is recommended. The liquid dampens the effects of vibration making the pointer easier to read. Pressure dampeners, snubbers and or restrictor screws may be used to reduce pulsation. In extreme cases, a remotely mounted liquid filled gauge connected with a length of capillary line may be used.

**Pressure Gauge Safety:** Pressure media such as oxygen, acetylene, welding equipment, life support or diving equipment, boilers etc., may require pressure gauges of a construction complying with national standards or local codes. Selection of a pressure gauge for such media or applications must be carefully considered and specified when ordering.

**Storage:** Storage temperature should not exceed -4°F (-20°C) or 140°F (60°C) unless specified otherwise. Pressure gauges should be stored in their original packaging until ready for use. Threads and gauge orifices should be kept clean and free of debris until they are ready for installation.

**Maintenance:** Any gauge which is not working correctly should be removed from service.

Examples include gauges displaying erratic pointer motion or readings that are suspect (indications of pressure when the user believes the true pressure is 0 psi), bent or unattached pointers, cracked windows, leakage of gauge fill, case damage or cracks, signs of process media leakage through

the gauge or its connection, and/or discoloration of gauge fill that impedes readability.

**Case Venting of Sealed Case Gauges:** Case venting must be done after installation to maintain the accuracy for sealed case pressure gauges with full scale ranges of 300 psi or below. This includes vacuum and compound ranges of 30" Hg-0-200 psi or below.

You can vent gauges easily by clipping the top plug on the gauge or by lifting the top plug and resetting it. **Please note:** If the gauge is installed in an upright position, you may clip the top plug (no periodic venting required). If you need to mount the gauge in a non-upright position or where the gauge may be exposed to wash down conditions and other contaminants (periodic venting required), you can lift the top plug and reset it in its sealed position.

Manufacturers have determined that elevation and temperature variations during shipment and in the process applications often cause the case to expand and contract. These expansions and contractions change the pressure inside the sealed gauge case which can reduce the accuracy of the device. In some cases, the pointer may not return exactly to zero until the gauge is vented to match local atmospheric pressure.