



## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

### SAFETY:

“The history of safety with respect to the use of pressure gauges has been excellent. Injury to personnel and damage to property has been minimal. In most instances, the cause of failure has been misuse or misapplication.” The preceding excerpt and other text from ASME’s American National Standard on pressure gauges (ANSI B40. 1-1980) emphasizes the need to minimize hazards through careful selection, installation and use of pressure gauges.

In especially hazardous systems careful evaluation and/or consultation with the manufacturer is recommended. However, the ultimate responsibility for proper selection, installation and safety rests with the user. The following systems are representative of some, but not all, of potentially hazardous installations:

1. Compressed gas systems.
2. Oxygen systems.
3. Systems containing hydrogen or free hydrogen atoms.
4. Corrosive fluid systems.
5. Pressure systems containing any explosive or flammable fluids.
6. Steam systems.
7. Non-steady pressure systems.
8. Systems where overpressure in excess of 150% of the gauge scale could be applied.
9. Systems where interchangeability of gauges could result in hazardous internal contamination or where lower pressure gauges could be installed in higher pressure systems.
10. Systems containing radioactive or toxic fluids.
11. Systems installed in a hazardous environment.

Note: ‘fluid(s)’ means a liquid or gas.

### INSTALLATION:

Upon receipt of Perma-Cal gauges, the gauge connection will have a thread protector installed. The thread protector also acts to keep debris and/or contamination out of the gauge fitting and elastic element. Therefore, the protector should be left on until immediately prior to installation. This is especially true for gauges cleaned for oxygen service.

Perma-Cal recommends installation with Teflon thread sealant tape if it is compatible with the pressure fluid. Every Perma-Cal gauge stem (fitting) has an integral wrench flat hex to help facilitate tightening the gauge on to the system connection. **DO NOT USE THE GAUGE CASE AS A HAND HOLD TO TIGHTEN THE GAUGE INTO THE SYSTEM CONNECTION** as this may cause serious damage to the gauge.

Perma-Cal gauges are normally calibrated while mounted in a vertical plane and should be mounted vertically in the system to assure best accuracy. Gauges calibrated for mounting in other positions are available if specified when ordered.

For special system conditions, the following options and accessories should be considered:

1. Installation in a non-vertical position (where the stem is not vertical) or the dial is up-side-down.
2. For excessive system pulsations and vibrations; A filter snubber (standard equipment on most

Perma-Cal gauges) and special dampening of the elastic element should be considered.

3) With corrosive fluids; Isolation of the gauge from system chemicals or particulates with an isolating diaphragm seal.

4) For oxygen service; Special cleaning to remove hydrocarbons (oil and grease) should be mandatory for safety.

5) High/Low Temperatures; Ambient temperatures above 200°F (95°C) or lower than 30°F (0°C) can be problematic. Consult the factory for options.

6) High system fluid temperatures; Fluid temperatures greater than 250°F can be problematic. Consider a gauge utilizing a high temperature plastic or metallic case. Alternately; a syphon or stand-off can be used as a heat sink.

7) If pressure surges greater than 150% of span are possible; Employ a pressure relief (“gauge saver”) device set at a pressure approximately equivalent to 135% of full scale.

#### OPERATION:

Perma-Cal gauges are quite easy to operate, as operation consists of merely reading the data indicated on the dial. The ideal position for an accurate reading, is at eye level and at a 90° angle to the dial face.

Test gauges ( $\pm 0.25\%$  of Full Scale Accuracy) employ a mirror band and “knife-edged” pointer to assure the most accurate reading (eliminating any parallax errors). To use these features, align the pointer with its mirror image in the mirror band.

#### MAINTENANCE:

The only user control or adjustment on Perma-Cal gauges is a zero adjust screw located at the six o'clock position, just below the dial face. Normally no adjustment is necessary, but occasionally pointer shift from zero occurs during shipment. The zero adjust feature is standard equipment on some models only and should be done with the gauge in the position for which it was calibrated. If zero adjustment is needed on a gauge without this feature, return the gauge to the factory for adjustment. Do not remove the back cover from the gauge, as there are no user adjustments located within. Even the slightest direct contact with the elastic element may damage the elastic element. Tampering with the mechanism inside the back cover will void the warranty.

If adjustment or repair is needed, return the gauge along with a completed *Return Material Authorization* (found on [perma-cal.com](http://perma-cal.com)) explaining the malfunction directly to Perma-Cal.

#### ADDITIONAL INFORMATION:

For a more complete discussion of safety and application considerations, consult *ASME B40.100-2005* (or subsequent).