

Stainless Steel Case Gauges
PIP #: SS-PI-01A

Applicable to:

TEMPERATURE ERROR OF 1008 AND 1009 DRY AND LIQUID FILLED GAUGES

The accuracy of all pressure gauges is affected by changes in ambient temperature from the temperature at which the gauge was calibrated and filled. There are two components to this error, as follows:

1. Bourdon tube/Movement Error: because of temperature affects on the Bourdon tube and movement, an error equal to approximately +0.2% of range per 10°F temperature rise will occur on all gauges, dry, **PLUS™** and liquid filled. This error is the same percentage for all ranges, and will be -0.2% per 10°F for a temperature drop.
2. Liquid Fill Error: as ambient temperature increases, the expansion of the fill will increase the pressure within the case, resulting in a decrease in the indicated pressure. This error is equal to approximately -0.2 psi/10°F temperature rise for glycerin fill, and -0.3 psi/10°F temperature rise for silicone fill. This error is the same psi value for all ranges, and therefore is a lower percentage for higher ranges. For a temperature drop of 10°F, the corresponding errors will be +0.2 psi for glycerin and +0.3 psi for silicone.

The appropriate total temperature-induced error for a glycerin filled gauge will be the sum of these two affects, as follows:

Error for +10°F Ambient Temperature Rise Change

Range psi	Bourdon Tube/ Movement Error		Liquid Fill Error (Glycerin)		Liquid Filled Gauge Total Error	
	%	psi	%	psi	%	psi
15	+0.2	+0.03	-1.33	-0.2	-1.1	-0.17
30	+0.2	+0.06	-0.7	-0.2	-0.5	-0.14
600	+0.2	+1.20	-0.03	-0.2	+0.17	+1.0
1000	+0.2	+2.00	-0.02	-0.2	+0.18	+1.8

A vented liquid filled gauge will have temperature-induced errors in accordance with the “Bourdon tube/Movement Error” column only.

Errors for a 20°F change will be 2 x the above; for 30°F, 3 x, etc.

Note that all the above errors are in addition to the actual room temperature calibration error. For example, a 30 psi liquid filled gauge that may have a measured error of +0.3% at 70°F will have an error at 80°F equal to (+0.3-0.5=0.2%).

The dry gauge with no venting or compensation will exhibit errors per the following table:

Error for +10°F Ambient Temperature Change

Range psi	Error psi	Error %
15	-0.32	-2.1
30	-0.32	-1.1
60	-0.32	-0.5
100	-0.32	-0.3

Generally speaking, all pressure gauges should be used within the ambient temperature limits listed below.

Ambient Temperature Limits

Dry Gauge	-40/+200°F
Glycerin Filled Gauge	+20/+150°F
Silicone Filled Gauge	-40/+150°F