

## About Pressure and Vacuum Gauges

**Pressure gauges** measure pressure above atmospheric pressure (positive pressure).

**Vacuum gauges** measure pressure below atmospheric pressure (negative pressure).

**Compound gauges** measure both pressure and vacuum.

**Differential gauges** measure the difference between two pressures.

Most gauges sense pressure changes with the use of an internal Bourdon pressure tube—a curved or coiled tube behind the dial that uncoils when pressure increases and coils more tightly when pressure decreases. Gauges for very low pressures have a diaphragm instead of a Bourdon pressure tube.

**General service pressure gauges** can be used with noncorrosive gases and liquids, such as air and water. The connection and Bourdon pressure tube or diaphragm are made of a copper alloy, such as brass or bronze.

**Corrosive service pressure gauges** can be used with more corrosive media that could attack brass or bronze components. The connection and Bourdon pressure tube or diaphragm are usually Type 316 stainless steel. If you're dealing with highly corrosive media, we recommend using a gauge guard (diaphragm seal) between the medium and your gauge (see page 560).

Use a **coiled pipe (siphon)** to protect gauges in steam and other high-temperature applications (see page 560). The pipes prevent high-temperature fluids from reaching the internal parts of the gauge where they can cause damage.

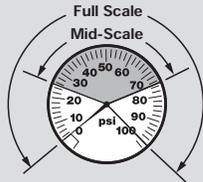
### Temperature Range

**Ambient temperature** refers to the temperature of the environment to which the exterior of the gauge is exposed.

**Process temperature** refers to the temperature of the process media to which the internal components of the gauge are exposed (i.e. the Bourdon pressure tube or diaphragm).

### Gauge Accuracy

Gauge accuracy and grade are categorized by ASME (ANSI) standard B40.1. Gauges that are "Not Graded" do not meet one of the ASME (ANSI) B40.1 guidelines. For example, a gauge with  $\pm 1.5\%$  full-scale accuracy falls between grades A and 1A, so it is listed as "Not Graded." We offer gauges in the following ASME (ANSI) grades:



Accuracy	Grade
$\pm 5\%$ Full Scale	D
$\pm 2\%$ Mid Scale; $\pm 3\%$ Rest of Scale	B
$\pm 1\%$ Mid Scale; $\pm 2\%$ Rest of Scale	A
$\pm 1\%$ Full Scale	1A
$\pm 0.5\%$ Full Scale	2A
$\pm 0.25\%$ Full Scale	3A

### NIST Certificates

Many gauges are available with a certificate of calibration traceable to the National Institute of Standards and Technology (NIST). This certificate shows you that your gauge has been tested against a gauge certified by NIST and proven to fall within a required tolerance.

Certificates have a calibration date and a put-to-service date. Gauges must be calibrated again after a set period of time from the put-to-service date, not the calibration date; they do not begin to fall out of calibration until they are actually put in service.

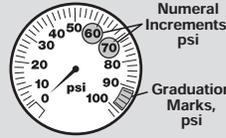
### Range Selection

Choose a gauge with a full-scale pressure range that is approximately double your normal operating pressure. Your maximum operating pressure should not exceed 75% of the full-scale range.

### Dial Face

**Numerical increments** refer to the pressure increments between numbers on the dial face. For example, the dial face shown has a numeral every 10 psi.

**Graduation marks** are the hash marks between the numerals. For example, the dial face shown has a graduation mark every 2 psi.



### Case Materials

In a clean, dry, noncorrosive environment, a painted-steel-case gauge is sufficient. Brass is a good choice for damp areas, and stainless steel and thermoplastic cases are better in corrosive environments.

### Dry or Glycerin-Filled

Most of the gauges we offer are dry, containing only the gauge mechanism inside the case. These work well for most applications. In some environments, however, vibrations and pulsation (pressure fluctuations) can cause the gauge needle to flutter, making the gauge difficult to read. Glycerin-filled gauges reduce this flutter. In addition, most glycerin-filled gauges have an air bubble inside that allows for expansion due to temperature changes.

### Common Units of Pressure

**psi**—Pounds per square inch

**kPa**—Kilopascals

**kg/cm<sup>2</sup>**—Kilograms per square centimeter

**bar**—100 Kilopascals

**oz./in.<sup>2</sup>**—Ounces per square inch

**in. of H<sub>2</sub>O**—Inches of water

**in. of Hg**—Inches of mercury

**ft. of H<sub>2</sub>O**—Feet of water

## General Service Pressure Gauges

### Miniature Gauges— $\pm 5\%$ Full-Scale Accuracy (Grade D)



- Use with compressed air, water, ethyl alcohol, and nitrogen
- Bourdon Pressure Tube Material: Beryllium copper
- Connection: Brass NPT male or brass BSPT male
- Case Material: ABS thermoplastic
- Lens Material: Polycarbonate
- Temperature Ranges:  
Ambient:  $-40^\circ$  to  $+150^\circ$  F  
Process:  $-40^\circ$  to  $+150^\circ$  F

When you're in a tight spot choose these miniature gauges. Their pressure tube transmits motion directly to the pointer so there are no gears or bearings to wear out. Choose from gauges with NPT and BSPT (British Standard Pipe Taper) threads.

Available Pressure Ranges (psi)					
Pressure Range	Numeral Increments	Grad. Marks	Pressure Range	Numeral Increments	Grad. Marks
0-60	10	5	0-200	40	10
0-100	20	5	0-300	50	25
0-160	40	10			

**To Order:** Please specify pressure range from the listing above.



**CENTER BACK CONNECTION**  
NPT Male      BSPT Male

Dial Size	Pipe Size	Each	Each
$2\frac{9}{32}$ "	$\frac{1}{8}$ "	38105K51	\$9.92
		38105K61	\$11.02

### High-Pressure Miniature Gauges— $\pm 5\%$ Full-Scale Accuracy (Grade D)



- Use with compressed air, water, and hydraulic oil
- Bourdon Pressure Tube Material: Bronze
- Connection: Nickel-plated brass NPT male
- Case Material: Nickel-plated brass
- Lens Material: Acrylic
- Temperature Ranges:  
Ambient:  $-50^\circ$  to  $+160^\circ$  F  
Process:  $-50^\circ$  to  $+160^\circ$  F

For high-pressure applications, these gauges come in pressure ranges up to 6000 psi. They have a 1" hex size dial with no bushing so the gauge mounts flush in an NPT female opening. They have a gearless design for long life and porous brass in the connection that reduces pulsation.

Available Pressure Ranges (psi)					
Pressure Range	Numeral Increments	Grad. Marks	Pressure Range	Numeral Increments	Grad. Marks
0-160	40	8	0-1200	400	80
0-300	100	20	0-4000	1000	200
0-500	200	20	0-5000	1000	200
0-750	200	50	0-6000	1000	250

**To Order:** Please specify pressure range from the listing above.



**Center Back Connection**  
Each

Dial Size	Pipe Size	Each
1"	$\frac{1}{8}$ "	9767T21
		\$9.80