

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

The performance of a system or the output of a process frequently requires the control or indication of pressure. It is important that the proper pressure gauge be used. For instance, either a commercial gauge or a test gauge will perform the same function—to indicate pressure. In a specific application, neither may be suitable. For example, a liquid filled Ashcroft Duragauge® may be needed to prevent accuracy deterioration caused by vibration.

It is important to select the proper gauge for the specific application, since the correct selection will result in long-term reliability, minimum cost and a satisfied customer.

Many factors are involved in proper selection of a pressure gauge. Economy does not always mean the lowest priced product. The life-time cost of an inexpensive gauge could be many times that of a properly selected, higher priced gauge.

Quite often, a customer requires that a gauge indicate only a specific pressure in a certain type of environment. The customer's process may be such where the exact size, case, accuracy and connection size are not of primary importance. In this instance, a readily available stock gauge should be suggested.

There are some applications that require a custom gauge especially designed for a unique combination of service requirements. Different combinations of gauge components can result in producing millions of types of different gauges. Ashcroft® gauges can be provided with many special features to satisfy specific customers' design requirements. Contact Customer Service for expert application assistance in specifying gauges to meet your customers' requirements.

Important factors to consider in the selection of a pressure gauge appear on the following pages.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 1

PROCESS—since the pressure sensing element will be exposed directly to the process media, pressure sensing materials to prevent corrosion must be selected. In addition, the pressurized fluid may solidify at ambient temperatures, or it may contain sediment which may eventually clog the sensing inlet. To prevent these conditions, the addition of a diaphragm seal may be necessary. If process conditions result in extreme overpressure or corrosion, a solid-front case is recommended for safety. Many applications have standardized on solid-front construction to minimize potential injuries caused by gauge misuse which could lead to failure of the pressure sensing element.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 2

PRESSURE RANGE—normal system operating pressure generally determines the selection of the correct pressure gauge range. Pressure gauge standard ASME B40.1 recommends that the normal operating pressure be within 25% to 75% of the scale. If fluctuating pressures are present, the maximum operating pressure should not exceed 50% of the range. To minimize fluctuating pressure pulsations from reaching the Bourdon tube, the use of pulsation-dampening accessories such as a throttle screw, snubber, gauge saver, or diaphragm seal is recommended. This will increase gauge life as well as improve readability.

Standard ranges are listed in each product bulletin. Many non-standard ranges are also available. They include both single and dual scale, false reading dials, metric ranges and custom dials. To determine availability of these dials, contact Customer Service for your special dial or range needs.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 3

ENVIRONMENT—the environment where the gauge is installed should be considered. The correct case material and possibly a liquid filled or hermetically sealed gauge may be necessary.

Where vibration and shock is severe, a more rugged instrument such as a liquid filled gauge may be required.

If process conditions cause gauge temperature to exceed 150°F (65°C), a protective device such as a diaphragm seal or syphon should be considered.

The gauge case, the Bourdon tube and/or the environment, can be affected by airborne corrosives.

To prevent freeze-up of the movement at very low ambient temperatures, a liquid filled gauge (silicone filled below 0°F) or a gauge accessory heater may be required.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 4

ACCURACY—accuracy is the conformity of the pressure reading to an accepted standard, e.g., deadweight tester. Accuracy is the difference (error) between the true value and the indications expressed as a percent of the span. It includes the combined errors of method, observer, apparatus and environment. Accuracy error includes hysteresis and repeatability errors but not friction error. It is determined under specific environmental conditions. (Normal position 73.4°F (23°C), and 29.2" Hg barometric pressure.) See ASME B40.1, pages 16 and 17 as it relates to the conformity of indication for pressure gauges. See ASME B40.1, pages 9 and 10 for definitions of hysteresis and repeatability.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 5

SIZE—the size of the gauge is generally determined by the readability required. If the gauge is remote from the observer, a larger, more legible dial would be required than if the gauge were mounted on a panel directly in front of the operator. More accurate gauges generally should have larger dials, in order to be read to the closer tolerance.

Equipment downsizing and space limitations will often dictate the use of smaller gauges with dial sizes under 4½". Don't let a small gauge requirement eliminate the need to properly select the appropriate gauge.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 6

CONNECTIONS—generally $\frac{1}{4}$ and $\frac{1}{2}$ NPT male connections are most commonly used on pressure gauges used in North America. Gauges with dial sizes under $4\frac{1}{2}$ " are usually provided with $\frac{1}{4}$ NPT connections, $4\frac{1}{2}$ " and larger with $\frac{1}{2}$ NPT connections. Connections of $\frac{1}{8}$ NPT are often used on $1\frac{1}{2}$ " and smaller pressure gauges and sometimes on 2" and $2\frac{1}{2}$ " gauges.

With the growing international influence on equipment, more demands exist for BSP, DIN and JIS connections. Many of these international connections and other special connections such as SAE J514 straight threads and flare connections are available on Ashcroft® gauges. Some are offered as standard available products and others as special connections. Contact Customer Service with your requirements.

PRESSURE GAUGE SELECTION IN SEVEN EASY STEPS

Step 7

MOUNTING—although most gauges are stem mounted, many are flush, panel or surface mounted. The proper casing and/or casing accessory for the desired mounting method must be specified. See ASME B40.1, page 11 for more details.