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Ashcroft® Gauges, General Information

PIP #: ASH/PI-21D

Applicable to:

LOW TEMPERATURE AND CRYOGENIC INSTRUMENT APPLICATIONS

Low Ambient Temperature Service (–65°F/–54°C)
Using a gauge at low temperatures may result in gauge movement freeze up which will render the gauge inoperable.

High humidity and rapidly changing temperature or barometric pressure may "force" moist air into a gauge case and interfere with movement operation. The probability of this occurring is a function of humidity and becomes progressively worse as the temperature drops below the freezing point.

For expected long-term, low temperature service of a Duragauge® pressure gauge (below –20°F or 29°C) a hermetically sealed gauge with Krytox lubricated movement is recommended. Add an "H" to the product code to get a hermetically sealed gauge. The Krytox lubricant (formerly Vydex) is variation code XVY. An example of a complete product code is 45-1279-SSH-04L-XVY. Ranges below 60 psi are normally Krytox lubricated and no variation is needed.

Provided the media is compatible, stainless steel is the preferred material for cryogenic and low temperature service. Bronze and Monel are acceptable. Steel tube gauges should be avoided for low or cryogenic service because the ductility of the metal is reduced at low temperatures.

Krytox lubricated movements, in hermetically sealed Duragauge gauges, will operate satisfactorily to –65°F (–54°C) even if assembled in ambient conditions of 90°F and 95% relative humidity.

A standard dry Duragauge, or any size 1009, gauge will operate at –50°F (–46°C) even if assembled under these same high humidity and conditions. The standard gauge with a normally lubricated movement composed of a mixture of silicone and molydisulfide on ranges of 60 psi and above, will not stop functioning at this low temperature but will operate very slowly. Gauges in ranges below 60 psi are normally lubricated with Krytox and will have minimal response time reduction. No "X" code variation or change is needed.

Diaphragm seals for expected low temperature service below –50F should use stainless steel rings and bolts, variation code XSE. Glycerin fill cannot be used.

The standard hardened 4130 steel diaphragm seal rings and standard bolts can be used for temperatures above –50°F as they are not subject to movement or impact.

Low Process Temperature (below –65°F/–54°C) and Cryogenic Service
The common liquefied cryogenic gases are not corrosive to stainless steel. This includes such gases as anhydrous ammonia, argon, nitrogen, liquefied natural gas (LNG), and other fuel gases. Liquefied oxygen (LOX) is a special case as is discussed below. The only potential problem that can occur with a pressure gauge is movement ice-up which would render the gauge inoperable in extremely low temperatures.

For these applications, it is recommended the gauge be remote mounted using a minimum length of 5 feet of stainless steel capillary tubing or a 5 foot length of standpipe. This will allow the liquid to vaporize to a gas and warm up over the ambient dew-point. Any standard dry pressure gauge with 316 stainless steel wetted parts may be used unless there is vibration present. In this case use of a liquid filled gauge or a ***PLUS!*** performance gauge is recommended.

Cryogenic Oxygen Service
Both the gauge and capillary, intended for use on cryogenic oxygen, must be cleaned for oxygen service; variation code X6B must be specified. Liquid oxygen variation code X6D is available for the aerospace industry. Monel wetted parts are required.

All specifications are subject to change without notice.
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