Installation and Maintenance Instructions for Acid Leak Detection (ALD) Assemblies

ASHCROFT®

1.0 INTRODUCTION

The Acid Leak Detection (ALD) assembly provides multiple layers of safety when dealing with acid media. In addition to a diaphragm seal to isolate the pressure sensing elements of pressure gauge, it also provides a visual indication to leaking process media, alerting operators to failed instrumentation. The ALD paint turns bright red when exposed to media with a pH ≤ 3.0.

2.0 SAFETY INFORMATION

To assure safe operation and maintenance procedures, read and follow these instructions.

WARNING: Serious injury or equipment damage can result from failure to properly install, maintain, or operate these components

- Follow all instructions in this document to avoid exposure to pressurized fluid
- Use proper tools and safety equipment in installing or maintaining components
- Assure that process pressure and temperatures are properly monitored and maintained, and the process fluid is appropriate and compatible with the wetted materials of the diaphragm system
- Follow all of your company's safety procedures in the event an acid leak is detected

3.0 PRODUCT OVERVIEW

A diaphragm seal (isolator) is a device which is attached to the inlet connection of a pressure instrument to isolate its measuring element from the process media. The space between the diaphragm and the instrument's pressure sensing element is solidly filled with a suitable liquid. Displacement of the liquid fill in the pressure element, through movement of the diaphragm, transmits process pressure changes directly to a gauge, switch or any other pressure instrument. When diaphragm seals are used with pressure gauges, an additional 0.5% tolerance must be added to the gauge accuracy because of the diaphragm spring rate. Used in a variety of process applications where corrosives, slurries or viscous fluids may be encountered, the diaphragm seal affords protection to the instrument where dual containment is needed or the process media is not compatible with the pressure instrument wetted materials.

The ALD product combines a pressure gauge and a diaphragm seal into a single assembly, welded together at the socket. The diaphragm seal, gauge socket, and portions of the gauge case are coated with an acid-detecting material that turns red when exposed to acid material.

4.0 ALD SPECIFICATIONS

Accuracy: ±1.0% of span (1259, 1279) or ±1.5% of span (T6500)
Process Connection Size: ½ NPT male or ASME Flanged
Case Style: Solid front with pressure relief back
Pointer: Micrometer, adjustable, aluminum
Weather Protection: Hermetically sealed: IP66
Diaphragm Seal Type: 510 Threaded or DF Flush Flanged
Wetted materials: 316L stainless steel, Monel, Hastelloy-C276
Window Material: Shatterproof glass, acrylic (OPT.)
Tamper Proof Design: Diaphragm seal welded to gauge socket
Pressure Rating (MAWP): Standard: Vac. to 1,500 psi @ 100°F
Optional: 1,500 to 10,000 psi @ 100°F

5.0 SAFETY INFORMATION

Users should become familiar with ASME B40.100 (Gauges – Pressure Indicating Dial Type – Elastic Element) before specifying pressure measuring gauges. To prevent misapplication, pressure gauges should be selected considering media and ambient operating conditions. Improper application can be detrimental to the gauge, causing failure and possible personal injury, property damage or death. The information contained in this I&M is offered as a guide in making the proper selection of a pressure gauge. For detailed product selection information for the ALD assembly, see the ALD-2 data sheet.

5.1 SAFETY INFORMATION

The range of the instrument should be approximately twice the maximum operating pressure. Too low a range may result in (a) low fatigue life of the elastic element due to high operating stress and (b) susceptibility to overpressure set due to pressure transients that exceed the normal operating pressure. Too high a range may yield insufficient resolution for the application.

5.2 LOCATION

Whenever possible, gauges should be located to minimize the effects of vibration, extreme ambient temperatures and moisture. Dry locations away from very high thermal sources (ovens, boilers etc.) are preferred. If the mechanical vibration level is extreme, consider a pressure gauge with the ***PLUS!***™ performance option.

5.3 GAUGE REUSE

ASME B40.100 recommends that gauges not be moved indiscriminately from one application to another. The cumulative number of pressure cycles on an in-service or previously used gauge is generally unknown, so it is generally safer to install a new gauge whenever and wherever possible. This will also minimize the possibility of a reaction with previous media.

6.0 ALD INSTALLATION

The ALD Acid Leak Detection Assembly should be installed

according to the following instructions depending on whether the threaded (510-type) or flanged (DF-type) seal was selected. It is recommended that the assembly be installed with an isolation valve that will allow the instrument to be isolated from the process in the event that the Acid Alert coating has indicated a pressure boundary failure.

6.1 THREADED SEALS

Torque should never be applied to the gauge case. Instead, an open end or adjustable wrench should always be used on the wrench flats of the diaphragm seal to tighten the assembly into the fitting or pipe. NPT threads require the use of a suitable thread sealant, such as pipe dope or PTFE tape, and must be tightened securely to ensure a leak tight seal.

6.2 FLANGED SEALS

The following steps must be followed to ensure a leak-tight connection between the mating flange and the flanged diaphragm seal supplied as part of the ALD assembly.

1. Select nuts, bolts, washers, gasket and thread lubricant in accordance with process requirements and ASME PCC-1-2010
2. Center the gasket between the mating flange and diaphragm seal face, lining up the bolt pattern on each flange. Ensure that the gasket does not cover the active surface of the diaphragm
3. Thread nuts and washers onto one end of each bolt, and insert through the bolt holes on the mating flange, passing up through the bolt holes on the diaphragm. Attach nuts and washers to the opposite end of the bolt and finger-tighten
4. Refer to ASME PCC-1-2010 to determine the necessary torque based on gasket material and bolt frictions. Using a torque and a conventional wrench, tighten each bolt to 30% of the target torque for the flange in a crisscross tightening sequence. Next tighten to 70% using the same tightening sequence, then finally 100% of the required torque. After at least four hours, the bolts should be tightened one final time to their required final torque value.

7.0 OPERATION AND REPLACEMENT

7.1 FREQUENCY OF INSPECTION

Inspection frequency is application-specific and depends upon the severity of the service and how critical the accuracy of the indicated pressure is. For example, a monthly inspection frequency may be in order for severe service applications. Annual inspections, or even less frequent schedules, are often employed in non-critical applications.

7.2 IN-SERVICE INSPECTION

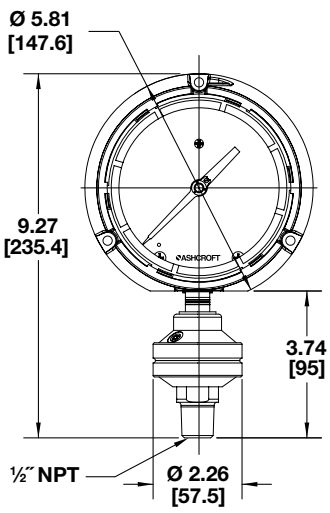
If the accuracy of the gauge cannot be checked in place, the user can at least look for (a) erratic or random pointer motion; (b) readings that are suspect – especially indications of pressure when the user believes the true pressure is 0 psig. Any gauge which is obviously not working or indicating erroneously, should be immediately isolated from the process and removed from service to avoid a possible pressure boundary failure.

7.3 FREQUENCY OF INSPECTION

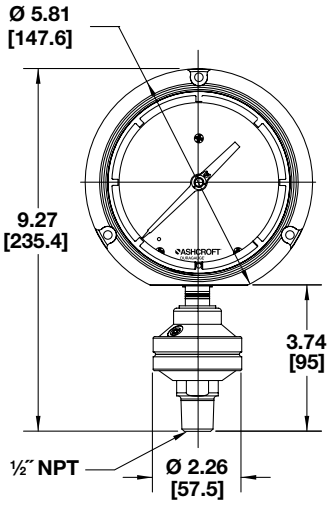
In the event that exposure to acidic material triggers the Acid Alert coating on the ALD assembly, the assembly should be immediately isolated from the process and the source of the exposure determined. Red ALD coating on the diaphragm seal could point to a leak nearby, perhaps a loose threaded or flanged joint or acidic mists or vapors in the atmosphere. In the unlikely event of reddened Acid Alert coating inside the gauge case, a serious failure of both the diaphragm and bourdon tube could be at fault. In this scenario it is critical that the wetted materials of the assembly be evaluated for compatibility before it is replaced.

8.0 DIMENSIONAL INFORMATION

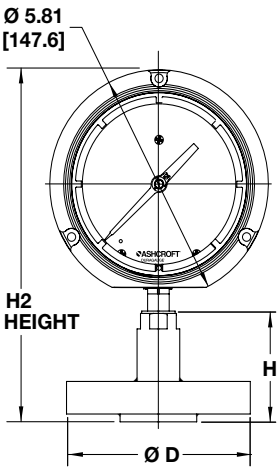
1259/510 Assembly



1279/510 Assembly



1279 or 1259/DF Seal Assembly



1279 or 1259/DF Seal Dimensions

SIZE DN	PRESSURE CLASSES	Ø D	H	H2 HEIGHT	MIN SPAN	WEIGHT lbs [kg]
1˝	150	4.33 [110]	2.71 [68.8]	8.835 [224.4]	1bar 14.5 psi	3.3 [1.5]
	300	4.92 [125]	2.75 [69.8]	8.875 [225.4]		4.4 [2.0]
1½˝	150	4.92 [125]	2.75 [69.8]	8.875 [225.4]		4.6 [2.1]
	300	6.10 [155]	2.87 [72.9]	8.995 [228.5]		7.7 [3.5]
2˝	150	5.91 [150	2.81 [71.3]	8.935 [223.95]		66 [3.0]
	300	6.50 [165]	2.93 [74.5]	9.055 [230]		88 [4.0]

9.0 STORAGE

Assemblies should be stored in a cool, dry area. Storage temperature should not exceed 250°F (150°F for ***PLUS!***™ Performance) or drop below -40°F.