

Introduction

Special considerations are necessary when choosing pressure measurement instrumentation for ultrapure corrosive fluid environments. For most applications, high purity fluoropolymer wetted parts are needed for compatibility or purity reasons. These materials are used in a number of pressure measurement technologies, some of which utilize fluid filled transducers or gauge protectors. Choosing a fluid filled technology for an application may lead to process contamination and equipment down time.

Fluid Filled Pressure Instruments

Fluid filled pressure transducers and gauge protectors typically have a metallic pressure sensor in contact with a stationary fill fluid. The fill fluid can be oil, silicone or other material, and is most often DI water for high purity applications. The fill fluid is in contact with a flexible seal (or isolation membrane) that separates it from the process fluid. As the process pressure changes, the fill fluid pressure correspondingly changes. The pressure sensor actually measures the fill fluid pressure, which will typically correspond with the process pressure. (Figure 1)

Fill Fluid Leaks

The primary disadvantage of fluid filled instruments is the risk of fluid leaks through a breach in the flexible seal. If a seal breach occurs, the fill fluid (DI water, oil, etc.) will leak into the process stream and expose the pressure sensor to the high purity or corrosive process fluid.

Fill fluid leaks inevitably occur and reducing their frequency is most often accomplished through preventative maintenance programs. Harsh operating conditions, corrosive fluids and frequent changes in line pressure typically increases the likelihood of a breach from the flexible isolation membrane.

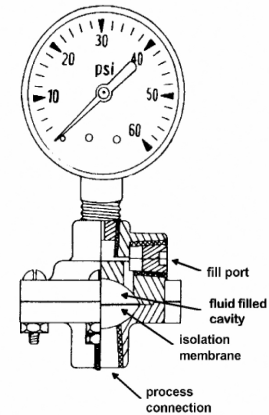


Figure 1. Example diagram of a fluid filled gauge protector that can leak fluid and cause process contamination.

Consequences of Fill Fluid Leakage

Once the flexible seal is compromised, there are several consequences of fill fluid leaks:

- Instantaneous contamination
- Continuous contamination
- Pressure measurement inaccuracy
- No failure detection
- Safety hazard
- Downtime

Instantaneous Contamination

When the flexible seal breaches, there is a one-time introduction of the fill fluid into the process stream.

Continuous Contamination

After the fill fluid leaks, the cavity fills with process fluid. If the process fluid is corrosive, it may chemically attack the metallic pressure sensor and continuously leach contaminants into the process stream until the unit is removed.

Pressure Measurement Inaccuracy

Instrument failure typically occurs when the seal leaks and the pressure sensor is chemically attacked by the process fluid. Prior to complete failure, the unit may continue to output a signal,

but most likely an inaccurate measurement. Inaccurate pressure measurement can lead to poor system performance, such as higher or lower pump speed, too little or too much chemical use and unnecessary system faults or alarms.

No Failure Detection

Pressure transducers and gauge protectors with fill fluids typically do not indicate when they have failed. As noted above, failed units may still function after the fill fluid has leaked out and the cavity has filled with process fluid. Therefore, there can be a period of time when the unit is contaminating the process, but the failure cannot be detected from the instrument output.

Safety Hazard

As noted above, fluid filled pressure measurement instruments can experience undetected isolator seal leaks. An undetected leak on any part of a pressurized system with hazardous or corrosive chemicals is a safety hazard.

Down Time

Instrument failure and subsequent process contamination can lead to significant and costly down time.

Finding the Solution

Entegris pressure measurement products utilize a nonmetallic sensing technology, containing no

moving parts or fill fluids. The wetted parts of the transducer consists of PTFE and other high purity fluoropolymers, making the instruments ideal for high purity applications and harsh chemical environments.

Replace Fluid Filled Instruments with NT® Pressure Transducers

NT® Single-Port Pressure Transducers are an ideal choice for replacing fluid filled pressure measurement devices. The NT® Pressure Transducers:

- Have no moving parts
- Contain no fill fluids
- Use nonmetallic sensing technology
- Are single integrated units in a compact design
- Can be installed in almost any orientation
- Have a chemically resistant exterior
- Have years of problem free experience in the harshest chemical environments

Entegris designs and manufactures measurement instruments for the high purity and corrosive chemical environments of the semiconductor industry. Our products measure flow, pressure and level for the various acids, caustics, solvents and slurries used in the industry.

For More Information

For more information on replacing fluid filled gauge protectors with pressure transducer systems or our complete line of fluoropolymer fluid handling solutions, contact your local Entegris distributor or Entegris, Inc.

To review our complete line of sensing and control product solutions visit Entegris' Web site at www.entegrisfluidhandling.com or contact Entegris Customer Service.

NT® Single-Port Pressure Transducer
Cutaway Drawing

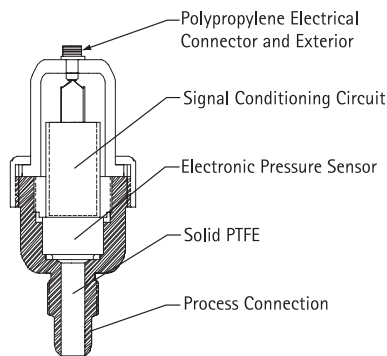


Figure 2. NT® Single-Port Pressure Transducer

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