Entegris

CHOOSING INSTRUMENTATION FOR ULTRAPURE CORROSIVE FLUID ENVIRONMENTS

Maintaining High Purity

Choosing flow, pressure and level measurement instrumentation for the semiconductor industry can be particularly challenging. The primary issue is maintaining high purity in liquid environments that are often highly corrosive.

To meet this challenge, the following should be considered when choosing measurement instrumentation for this environment:

- No moving parts
- No fluid filled cavities
- Metal free construction
- Chemically resistant instrument exterior
- Compact design
- Reliable instrument technology from an experienced manufacturer

No Moving Parts

Instrumentation with moving parts that are used for prolonged periods inevitably risk becoming worn or degraded over time. When wear or degradation occurs, devices with moving parts in the fluid stream can generate particles. Worn or partially degraded devices that generate particles will often function normally, making it difficult to identify the particle generation source. Avoiding the use of instruments with moving parts will minimize particle contamination.

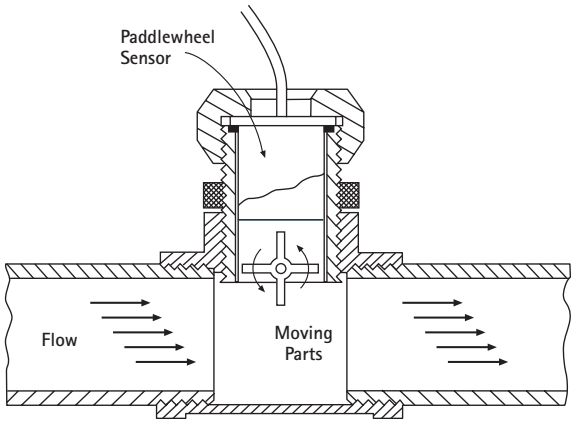

Figure 1: Example diagram of paddlewheel flowmeter with moving parts that can generate particles.

No Fluid Filled Cavities

Fluid filled pressure transducers and gauge protectors typically have a metallic pressure sensor in contact with a stationary fill fluid. The fill fluid is in contact with a flexible seal (or isolation membrane) that separates it from the process fluid. The fill fluids from these instruments may leak, causing initial contamination from the fill fluid and continuous contamination after the process fluid fills the exposed cavity. While appropriate applications do exist for instruments utilizing fluid filled cavities, their use in ultrapure corrosive environments should be avoided.

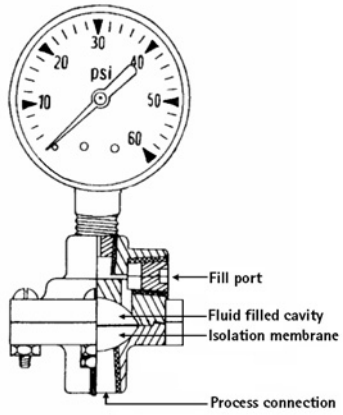

Figure 2. An example diagram of a fluid filled gauge protector that can leak fluid and cause process contamination.

Metal-free Construction

Chemicals commonly used in the semiconductor industry, such as hydrochloric acid, may attack various metal parts of an instrument. The resultant attack upon the metallic surfaces can lead to instrument failure or contamination of the ultrapure process. The severity of this phenomenon is dependent on a number of factors, such as the specific fluoropolymer or other materials used for wetted parts, the instrument design, chemical concentration, fluid temperature and line pressure. In general, instruments in ultrapure or corrosive fluid environments should be constructed of metal-free, high purity inert substances that are resistant to the chemicals being used.

Compact Design

Flow, pressure and level measurement devices come in all shapes and sizes, each with different installation requirements. Valve boxes, semiconductor processing tools, chemical distribution systems and other equipment often have limited space considerations. Some instruments are not appropriate for installation into applications where footprint is critical. These instruments may be too large, require specific installation or mounting considerations (i.e., vertical only), need straight lengths of tubing before or after the unit, are susceptible to electronic noise or vibration, or exhibit poor performance with fluids containing entrained solids or gas bubbles.

Chemically Resistant Exterior

Measurement instrumentation used in the semiconductor industry may be exposed to a variety of corrosive chemicals. These chemicals can attack the instrument exterior, typically from plumbing leaks or fumes. Electronics and wiring may corrode and will often lead to instrument failure. The product exterior and any electronics within the instrument must be protected from chemical exposure with appropriate design and materials of construction.

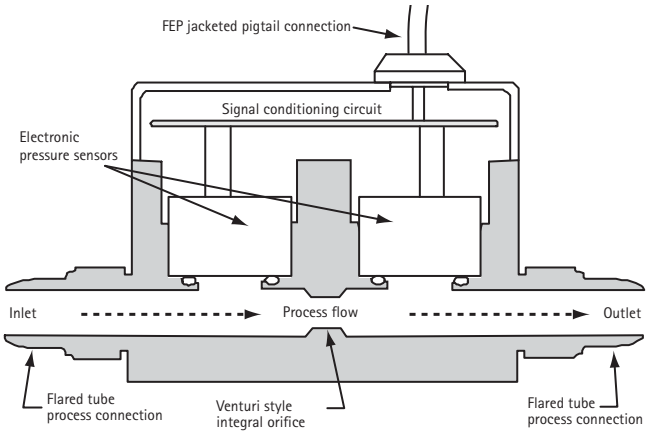

Figure 3: The NT® 4400 Electronic Flowmeter provides simultaneous flow and pressure measurements with no moving parts or fill fluids.

Entegris Product Reliability and Experience

Critical applications require instruments with proven designs in order to provide years of problem free continuous duty in ultrapure and corrosive environments.

The NT® Electronic Flowmeter is an ideal choice for replacing measurement devices that contain moving parts or fill fluids.

NT® flowmeters:

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

For More Information

For more information on choosing instrumentation for ultrapure corrosive fluid environments 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.

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