

Pressure Measurement Filtration Systems

Measuring the pressure difference across a filtration system can indicate the need for filter replacement as the pressure difference increases and flow rate decreases due to filter loading.

Chemical Mechanical Planarization (CMP) Is a common semi-conductor application. CMP slurry dispense systems may utilize gross filtration for filtering large agglomerations of particles, typically larger than 1 micron, that can, if unfiltered, scratch the wafer during polishing. A plugged, or loaded, filter decreases the downstream pressure and flow rate of slurry to the polishing system, which may lead to damaged wafers due to an inadequate supply of slurry.

Pressure measurement allows CMP operators to optimize filter life, schedule the installation of replacement filters with minimal downtime, and monitor inlet or outlet dispense pressures.

Figure 1 illustrates a typical filtration installation using pressure transducers and a local digital display to monitor pre-, post-, and differential filter pressures.

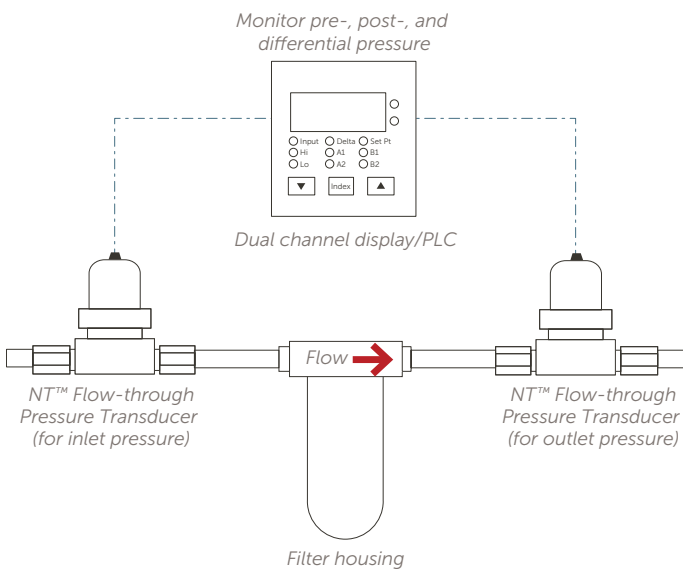


Figure 1. Using pressure transducers for pre-, post-, and differential pressure measurement.

Figure 2 provides an example of monitoring filter loading and installing filter replacements by using differential pressure measurement.

Monitoring Differential Pressure to Schedule Filter Replacement

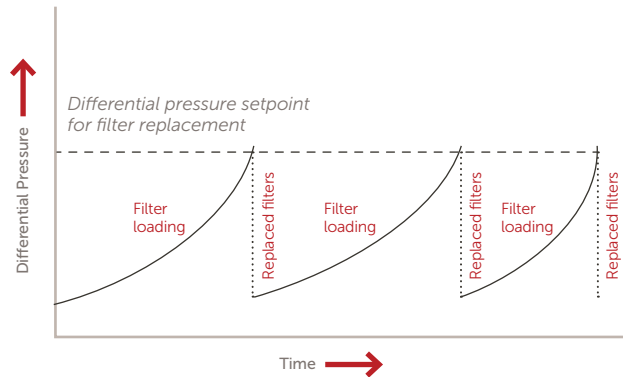


Figure 2. A generalized example of monitoring filter loading and scheduling filter replacement with differential pressure.

For CMP slurry applications, the pressure transducers must utilize a flow-through design to minimize any dead volume and reduce the possibility of slurry settling or forming agglomerations. To minimize the risk of contamination, the pressure transducers must not contain any fill fluids and must be constructed of chemically compatible and high-purity materials, such as PTFE. The NT™ Flow-through Pressure Transducer meets the requirements for CMP slurry applications with measurement capability up to 690 kPa (100 psig). The transducer provides a continuous electronic signal (i.e., 4 – 20 mA, 0 – 5 VDC, or 0 – 10 VDC) allowing easy integration with PLCs, control systems or local digital displays.

Measuring the flow rate of slurry ensures that an adequate supply of slurry is reaching the polishing operation. Process improvements may also be achieved by optimizing the flow of slurry, other process chemicals, and deionized water.

Figure 3 demonstrates the use of the InVue® Electronic Flowmeter to simultaneously measure the flow rate and inlet pressure of the filtration system.

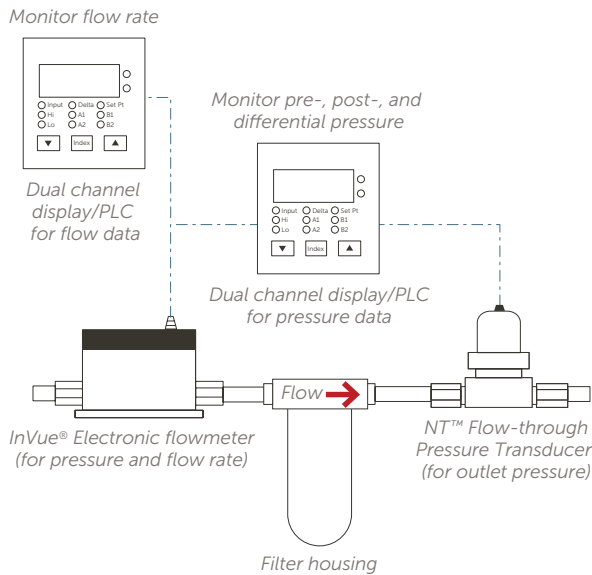


Figure 3. InVue Electronic Flowmeter with simultaneous flow and pressure output signals.

FEATURED PRODUCTS

NT Flow-Through Pressure Transducer to measure pressure.

InVue Electronic Flowmeter to simultaneously measure flow and pressure.

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 on CMP filtration products 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.entegris.com or contact Entegris Customer Service.

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