

Introduction

For the precise requirements of the semiconductor industry, it is extremely important that chemicals are blended properly. In Fabs, chemical blending occurs in the bulk distribution area, chemical dock, at off-site chemical manufacturing facilities and other locations. Additionally, more and more chemicals are blended at the point of use to minimize materials and handling costs.

Existing technologies used in the semiconductor industry blend chemicals in bulk containment vessels. Large containment vessels are sometimes not desirable, and some chemical blends become destabilized after mixing, requiring point-of-use dispense immediately after blending.

If the chemical blends are mixed in the wrong ratios, the results can be disastrous. For example, many Fabs will dilute 49 percent hydrofluoric acid (HF) with deionized water to obtain 4.9 percent HF, a 10:1 dilution. If the water and concentrated HF are not blended in the proper ratios, this will affect etch rate and create wafer defects.

Finding the Solution

Chemical blending can be accomplished in-line using two or more NT® Integrated Flow Controllers installed in parallel. For blending applications, each flow controller is fed pressurized liquid from a different source and each receives a user generated control signal. Two, three or more chemicals can be blended simultaneously using this method.

Advantages

The advantages of chemical blending using NT® flow controllers include:

- Less retention time for blended chemicals that have short shelf-life
- Greater accuracy than conventional methods
- Ideal for point-of-use blend applications
- Eliminates the need for large bulk containment vessels
- Ideal for chemical blends that destabilize after mixing

Example Blending System from Two Pressurized Feed Sources

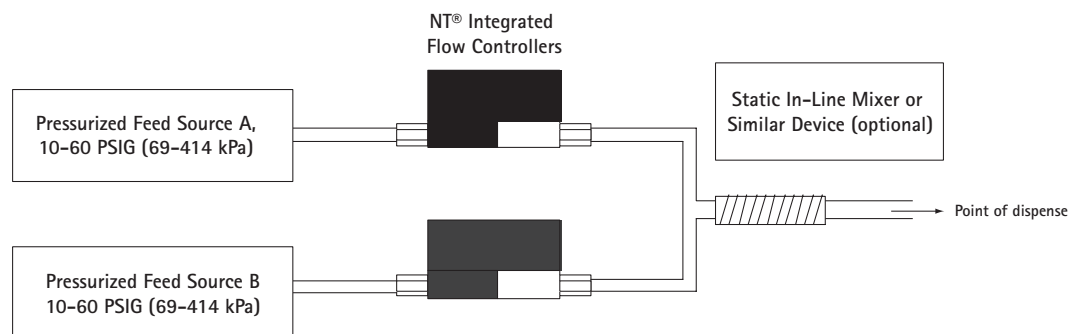


Figure 1. Chemical blending example using independent pressurized feed sources.



Figure 2. NT® Integrated Flow Controllers control flow from 5 ml/min. up to 40 l/min.

NT® Integrated Flow Controllers each have three subcomponents: a differential pressure flowmeter with no moving parts, a stepper motor actuated diaphragm control valve that minimizes movement to minimize particle generation, and control software that regulates valve position based on the desired flow and actual flow condition. The units may be ordered in a “batch” configuration that shuts off flow between batches, or a “continuous” configuration which keeps the valve open between batches.

Features

The NT® Integrated Flow Controller offers:

- High accuracy, 1% full scale flow measurement accuracy
- Fast response, typically <3 second response time from 10-95% of full scale
- ±1% repeatability
- Minimal particle generation
- Flow measurement with no moving parts
- Pressure measurement for alarming and diagnostics

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 chemical blending solutions 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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