

Virtual Wall™

NITROGEN BARRIER DEVICE FOR SCRUBBER INLETS

Many semiconductor processes utilize water scrubbers to remove water-soluble toxic and corrosive gases from the exhaust stream. These types of scrubbers are used throughout the fab in demanding CVD and dry etch applications. In the exhaust line, upstream of the scrubber, solid byproducts can form from the chemical reaction of the highly reactive process gases. These effluent byproducts may hydrolyze upon contact with water vapor, forming solids that clog the scrubber entrance.

Two such processes are WCVD and Metal Etch. In both cases, solid byproducts are created that adhere to the walls of the scrubber inlet, clogging it. Cleaning this area is not only time consuming but is also dangerous as tungsten hexafluoride (WF₆) from WCVD is highly toxic and boron trichloride and aluminum chloride from metal etch are extremely reactive.

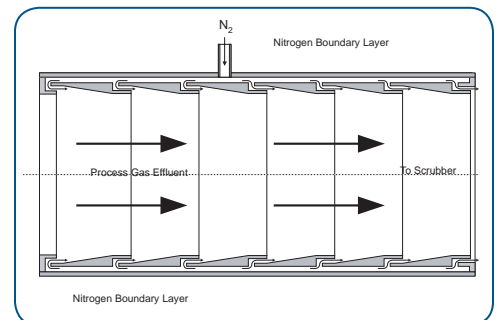
The Virtual Wall, when used as one element of an Effluent Management Subsystem™, has proven very effective in reducing clogging at the scrubber inlet. The Virtual Wall at the scrubber inlet combats byproducts by:

- Preventing the chemical reaction of the byproducts in the tubing by significantly reducing water adsorption on the tube surface
- Sweeping the solid byproducts downstream into the scrubber

It should be noted that the design of the Virtual Wall for the scrubber inlets is different than that for the furnace exit.

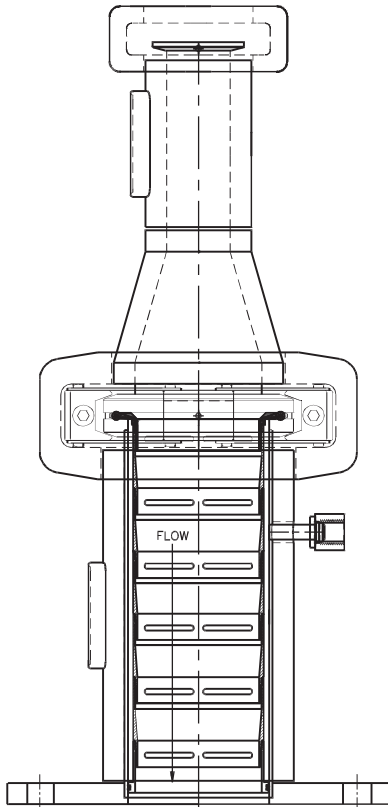
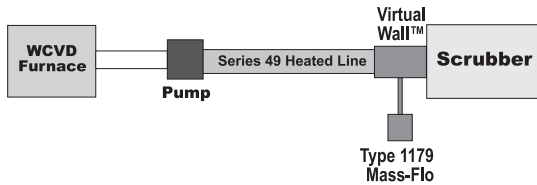
Features & Benefits

- Reduces surface chemical reaction, lowering the solid deposition at the scrubber inlet, for longer time between maintenance cycles
- Prevents exposure to potentially hazardous chemicals
- Moves solid byproducts downstream into the scrubber
- Available in several sizes for use with the most common scrubber



Specifications

Installation Examples



Designing the Virtual Wall™

Since the Virtual Wall is tailored specifically to the scrubber, specific dimensions are required. The Virtual Wall will be located in the entrance to the scrubber to lower deposition and clogging.

To ensure proper fit, accurate measurements must be provided. If system drawings are available, these are helpful to the design engineers. If they are not, you will need to take system measurements. For the best result, contact MKS to have an applications engineer measure the lines.

Measure each component dimension separately, starting from the scrubber. The first is the tubing internal and external diameter. Both diameters can be measured directly with a pair of calipers. Measure each subsequent component length and any ports.

Heat is often used in conjunction with the Virtual Wall to prevent initial sublimation or to minimize water adsorption on the tube.

The Virtual Wall™ Kit

The Virtual Wall kit includes:

- MKS Virtual Wall Nitrogen Barrier Device
- MKS Manifold
- MKS Type 1179 Mass-Flo® Controller
- MKS Type 246 Power Readout
- MKS Flow Controller Cable
- MKS Series 49 Heaters

For some processes, like WCVD, we recommend that you heat from the pump to the scrubber. In other applications, like Metal Etch, we have additional devices to help manage the process byproducts.

MKS is continually working on Effluent Management Subsystems for other semiconductor process and byproduct management programs for other industries. For more information, call MKS, Integrated Process Solutions at 1-800-345-1967 or 303-449-9861.

Specifications

Materials Exposed to Vacuum	Stainless Steel type 304
O-Ring	Users choice: Viton®, Kalrez®, Chemraz®
Weight (NW 80 10" section)	1.6 lb (0.73 kg)
Maximum Length	10" (254 mm)
Incremental Lengths	1.5" (38 mm)



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