TRINITY

A Triple Threat To PFCs

System Description

Trinity is a complete, self-contained system designed to abate PFC, SiF_4 and acid gas emissions resulting from etch and CVD manufacturing operations. Trinity employs two water scrubbers integrated with a catalytic reactor system. The first water scrubber, located upstream of the catalytic reactor, removes acid gases and SiF_4 from the pump exhaust. PFCs pass through the first water scrubber and are decomposed within the catalytic reactor. Product HF (generated during PFC destruction) is removed downstream of the catalytic reactor using a second water scrubber. The net result is a *process for complete control* of etch and CVD emissions.

Trinity employs a patented poison resistant catalyst that reduces PFCs to CO_2 and HF. The catalyst is capable of operating in excess of one year without replacement. Use of a catalyst greatly reduces the operating temperature necessary to destroy target PFCs, leading to a *significant reduction* in system size and cost-of-ownership compared to other PFC abatement technologies.

Trinity is designed for point-of-use abatement, but is readily scaled to multi-tool applications resulting in *reduced capital and operating cost* on a per tool basis. Trinity is located downstream of the process pump and operates independently of the chamber process. Therefore, no chamber process requalification is necessary. Trinity contains an internal bypass that allows the chamber process to continue to operate during periods of routine maintenance. The operator interface can provide remote communication with the process tool.

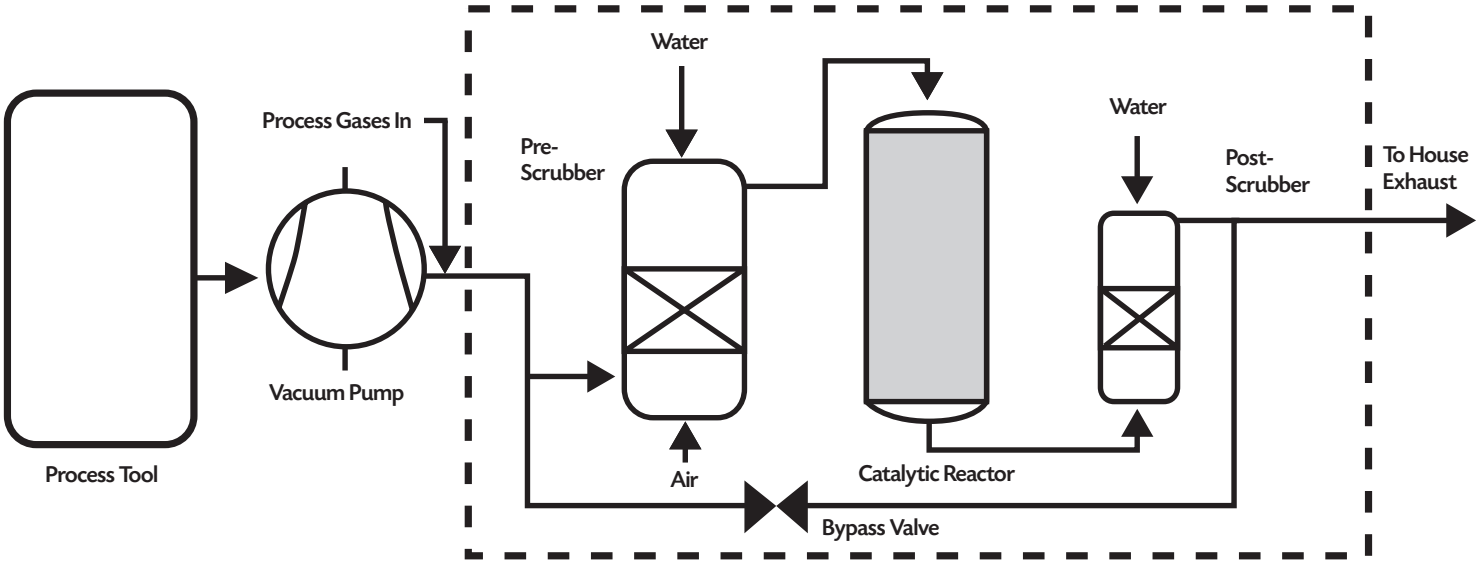
Advantages

- > 99.5% removal of SiF4 and acid gases in pre-scrubber
- > 95% destruction of PFCs in catalytic reactor
- 99% removal of product HF in post scrubber
- Built-in bypass capabilities to allow process tool to operate during PM
- SEMI S2, S8 & CE compliant
- Removable access doors for maintenance
- Creates no hazardous waste
- Extended catalyst life
- Low operating temperatures
- Low cost of ownership
- Scalable technology

ENVIRO-MATRIX Trinity Catalytic Abatement Process

Simultaneous Control of PFC, SiF4 and Acid Gas Emissions

Trinity Process Schematic



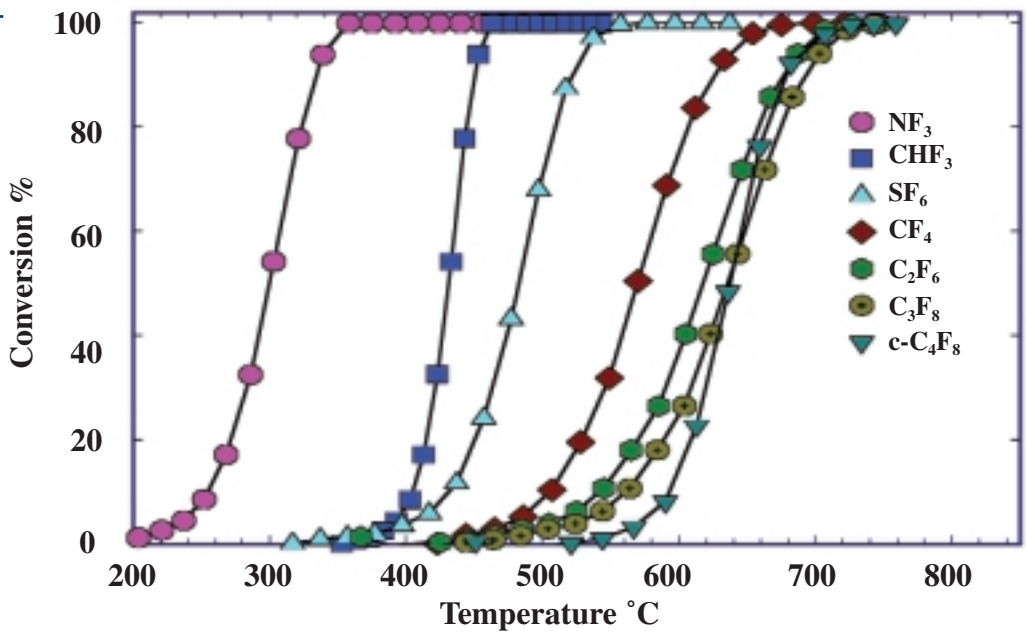
Features:

Capabilities	4 Chambers of 200 mm Etch Tool or 3 Chambers of 300 mm Etch Tool	Dimensions	27" D x 36" W x 79" H
		Pressure Drop	Zero
Total Gas		Power	Less than 4KW Electric
Flow Rate	200 slpm	H_2O Usage	<1 gpm
Gas Requirements	200 slm house air		

Catalyst Specifications

DRE's	> 95% for NF_3, CHF_3, SF_6, CF_4, C_2F_6, C_3F_8 and c-C_4F_8
Products	CO_2, HF
Lifetime	Greater than 1 Year

Used Catalyst
Classified as Non-Hazardous



Light-off Curves for Selected PFCs

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