

# UPAS Full Wet: Abatement System

**Universal Plasma Abatement System** is a **fuel free** solution for point-of-use treatment of effluents containing **high GWP gases**

**Patented microwave plasma technology** with a PFC destruction rate up to **99.5%**

**Patented turbine based wet scrubber** with very low water consumption

The UPAS operates at **atmospheric pressure** in high nitrogen flows since it is installed downstream the primary pumps



## → Applications

**Typical applications:** PFC destruction to achieve environmental friendly levels. Varied examples of possible manufacturing processes realizing high amount of PFC's:

- Silicon Oxide and deep oxide etch :  $C_4F_8$ ,  $CF_4$ ,  $CHF_3$ ,  $CH_3F$ ,  $CH_2F_2$ ,  $C_5F_8$
- Silicon and polysilicon etch:  $SF_6$ ,  $CF_4$ ,  $CH_2F_2$ ,  $CHF_3$ ,  $C_2F_6$ ,  $HBr$
- Tungsten etch:  $WF_6$ ,  $SF_6$

## → Operation

The effluent stream to be treated is directed to the plasma discharge tube where the PFC are converted in radicals. The addition of controlled amount of air and DIW supplies oxygen and hydrogen atoms allowing the PFC conversion to simple molecules like  $HF$ ,  $COF_2$ ,  $F_2$ ,  $CO_2$ . After cooling these highly reactive molecules are removed from the waste stream by wet scrubbing down below their respective TLV.



- Very low Total Cost of Ownership compared to other abatement solutions
- Patented microwave surface wave atmospheric plasma source with low reflection, negligible Joule heating losses and undetectable residual microwave radiation to the outside
- A dielectric discharge tube with excellent thermal conductivity for calories extraction and excellent chemical compatibility to  $F_2$ ,  $HF$  and  $F$  radicals
- Very low water consumption thanks to gas stream cooling after plasma treatment and before scrubbing by a patented small and efficient wet scrubber

## → Recognition



Winner of the «Eurosemi IC Industry Awards» in 2005



## Product description

### Features

- Energy saving:
  - Standby mode
  - Plasma power self adaptation to the flow
- Up to 4 etch process chambers connection
- 5 Gal DI Water tank
- DI Water injection
- PLC based technology with colour touch screen
- Ethernet communication port for SCADA monitoring
- Customized signal interface with tool manufacturers
- Gas cooling before releasing for treatment by scrubber
- On board wet scrubber

### Options

- Extension module with by pass valves to adapt power consumption
- HF & CO gas detectors
- Communication card: Profibus, Ethernet or RS485

### Reliability

- Uptime > 99.5%
- MTTR < 2 h
- MTBF > 4000 h
- MTBPM > 4200 h

### Safety features

- Easy to reach "Emergency Machine Off" button
- Standard exhaust flow a
- Leak detection
- Precise alarm messages
- Operator intervention reduced to a minimum
- Multi-level password protection to restrict access to critical functions
- Optional gas detection and
- Waste water lift pump



## Technical specifications

### Utilities requirements

Cooling water	4-6 bars; 13-18 °C; Flow rate minimum 6 slm reusable
DI Water	3-4 barg - 2 l/day for wet injection
Soft water THO	max 2 l/min for on board wet scrubber
Argon	5-7 bars; peak flow <40 slm; average flow 0,2 slm
CDA	5-7 bars; peak flow <15 slm; average flow 5 slm
Nitrogen	5-7 bars; peak flow <50 slm; average flow 16 slm
Cabinet exhaust	200 Nm <sup>3</sup> /h; Inlet total depression -25 Pa
Drain	Elevation 5 m max; 4 to 5 slm max
Power	<ul style="list-style-type: none"> <li>• Three-phase: 14 A, 11100W (maxi), 50/60 Hz; 380 V-415 V (208 V optional)</li> <li>• Single phase : 7 A; 1600 W (maxi); 50/60 Hz; 230V (110 V optional)</li> </ul>

### Dimensions

	Height	Width	Depth
Overall dimensions	1 902mm	625mm	840mm
Total dimensions	2 243mm	625mm	840mm

### Process data

- Max Total flow rate: 120slm
- Min Total flow rate: 40slm (option 20slm)
- Abatement SF6: > 95% up to 100 slm
- Abatement CF4: > 95% up to 50 slm / > 70% up to 80 slm
- Abatement (other PFC) > 99%

### Certifications

CE mark  
SEMI standards compliant  
Third party certification upon request



### Contacts

#### Air Liquide

#### Electronics Systems

8, rue Méridiens – Sud Galaxie

38130 Echirolles – France

Phone: +33 (0)4 38 49 88 00

E-mail: frales-contact@airliquide.com

ales.airliquide.com