Системы рециркуляции выхлопных газов Atlas, решения для сокращения выбросов углекислого газа при производстве полупроводников Proteus, интеллектуальные решения по управлению температурным режимом SMART TMS

Технические характеристики

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Atlas offers unrivalled abatement performance

Atlas™ from Edwards, provides outstanding reliability, excellent powder handling and corrosion resistance, delivering abatement performance for the semiconductor, flat panel display, solar and MOCVD industries.

Atlas abatement technology: a range of combustion gas abatement solutions - specific to your process:

- Atlas TCS for common CVD gases (NF3/F2)
- Atlas TPU for PFC gases (ClF3, C2F6, C3F8) in CVD processes
- Atlas Kronis for the low-k CVD gases in next-generation processes
- Atlas Etch for semicon etch and flat panel display processes (CF4, SF6 and high flow PFCs)
- Atlas Helios for safe treatment of hydrogen processes in epitaxy and MOCVD

Atlas™ systems have low fuel consumption compared with previous-generation gas abatement devices. We use proven Alzeta™ inward-fired combustor technology to achieve a significantly reduced cost of ownership. With one to six inlets with a number of options, including a temperature management system (TMS), Atlas systems can treat a flow capacity of up to 1,200 slm. They are designed to be easy to use and enable more efficient maintenance.

Edwards' inward-fired combustion technology

Used by most major semiconductor manufacturers, the inward-fired combustor has become a world standard in gas abatement since 1994.

Our unique combustion technology operates with a uniform combustion temperature. This ensures very low background emissions, and the inward flow of gas prevents process material contact with the chamber walls, which minimises the blockage by solids. The exclusive composition of the combustor material ensures superior resistance to corrosion and helps to provide the Atlas with unrivalled reliability and safety.

At our state of the art environmental innovation centre, we have process tuned solutions for outstanding performance, field proven and third party verified. Abatement DRE's typically extend beyond global and local legislation:

SiH4 and other Halides below TLV

NF3 : >99% / <TLV

F2 : : >99% / <TLV

CF4 : >90%

Other PFCs : >99%

With an expansive install base, unparalleled global applications team and service support, we can offer the best solution designed for your process needs. Get in touch with our team and we can work together for the ultimate resolution.

Edwards Proteus

Edwards Proteus enables the effective treatment of PFC and other global warming gases without the use of natural gas or other hydrocarbons.

Proteus is a low power consumption, user-friendly and cost effective solution to reducing the carbon footprint of semiconductor manufacturing.

- Low power, high efficiency Plasma technology
- Plasma Power Modulation
- Low NOx emissions
- Long MTBS
- Uptime protection with Proteus Dual

1. A unique, low power Plasma Technology that achieves high destruction rate efficiency (DRE) of PFC gases such as CF4 and other global warming gases such as SF6, NF3 and N2O. This makes Proteus one of the most cost-effective solutions for the abatement of global warming gases from semiconductor manufacturing processes.
2. Proteus Plasma's operating power is fully adjustable in function of the incoming gas load, allowing users to minimize power consumption yet maintaining optimum treatment efficiency. Interfacing with the process tool and automatic Plasma Power Modulation offers further opportunities for reducing operation cost whilst maintaining the highest environmental performance.
3. PFC gas abatement requires high temperatures that promote the formation of NOx gases. Proteus Plasma technology was developed to minimize “thermal NOx” emissions and is now standing as one of the leading “low NOx” PFC abatement system.
4. The destruction of PFC molecules tends to increase the acid loading through the creation of toxic and corrosive water soluble compounds. Proteus Plasma torch and wet

scrubbing stages have been specifically designed to minimise component corrosion. Combined with an excellent powder handling capability, Proteus is able to achieve long MTBS whilst maintaining a safe working environment in the Fab.

5. Proteus Dual offers a fully integrated “backup” solution to help secure abatement availability without the need for complicated piping and interfacing. Proteus Dual is a cost effective, easy to install solution. It helps maintain process uptime, reduce footprint and installation costs, whilst enhancing the safety of the sub-fab.

Thermal Management Solutions

Edwards Smart Thermal Management Solutions

Designed to provide custom process solutions to increase system yields, Smart TMS benefits from Edwards global presence and industry experience.

Edwards Smart Thermal Management Solutions provides reliable and accurately controlled heating of forelines and process exhaust pipes to prevent blockage by condensed by-products or residual process materials.
The complete Smart TMS package comprises electrical pipeline heaters, high-efficiency insulation jackets, a Smart TMS control unit with optional HMI (touch screen interface), and access to Edwards highly-trained and experienced Applications Specialists. Designed for simplicity of installation, Smart TMS provides repeatable, controlled temperature management to ensure consistent process performance and safe pipeline maintenance.

- Reliable and Stable Performance
- Comprehensive Integrated and Standalone Solutions
- Global Application and Product Support

PRODUCT DATA SHEET

SMART TMS

Designed to provide custom process solutions, utilizing Edwards global presence and industry experience to increase system yields.

Edwards SMART Thermal Management Solutions provides reliable and accurately controlled heating of forelines and process exhaust pipes to prevent blockage by condensed by-products or residual process materials.

The complete SMART TMS package comprises electrical pipeline heaters, high-efficiency insulation jackets, a SMART TMS control unit with optional HMI (touch screen interface), and access to Edwards highly-trained and experienced Applications Specialists. Designed for simplicity of installation, SMART TMS provides repeatable, controlled temperature management to ensure consistent process performance and safe pipeline maintenance.

Reliable and Stable Performance

Comprehensive Integrated and Standalone Solutions

Global Application and Product Support

Features and benefits

1. Maximizes tool uptime and production yields
2. Rapid tool startups through standardized and easy to install parts
3. Best solution for every application based on access to Edwards global Application Specialists
4. Ultra-safe operation through double thermal protection every 225mm on average
5. Up to 9 configurable zones of pipe heating solutions
6. Temperature set-points from ambient to ~180°C with adjustable alert bands
7. Maximum output of 1.2kW per zone (up to 8m of 40mm pipe coverage in each zone)
8. Zone control through Solid State Relays for maximum reliability
9. "Fail on" configuration capability to safely maintaining high pipe temperature on critical chemistries
10. Separate heaters and insulation jackets for maximum configurability, flexibility, and efficiency
11. Custom shaped parts for pipe components and parts
12. "One-handed" design simplifies installation and ensures proper fit
13. Low particulate, highly efficient, flame retardant insulation
14. Fabworks 3.2 and EdCentra™
15. Expert install inspection and commissioning

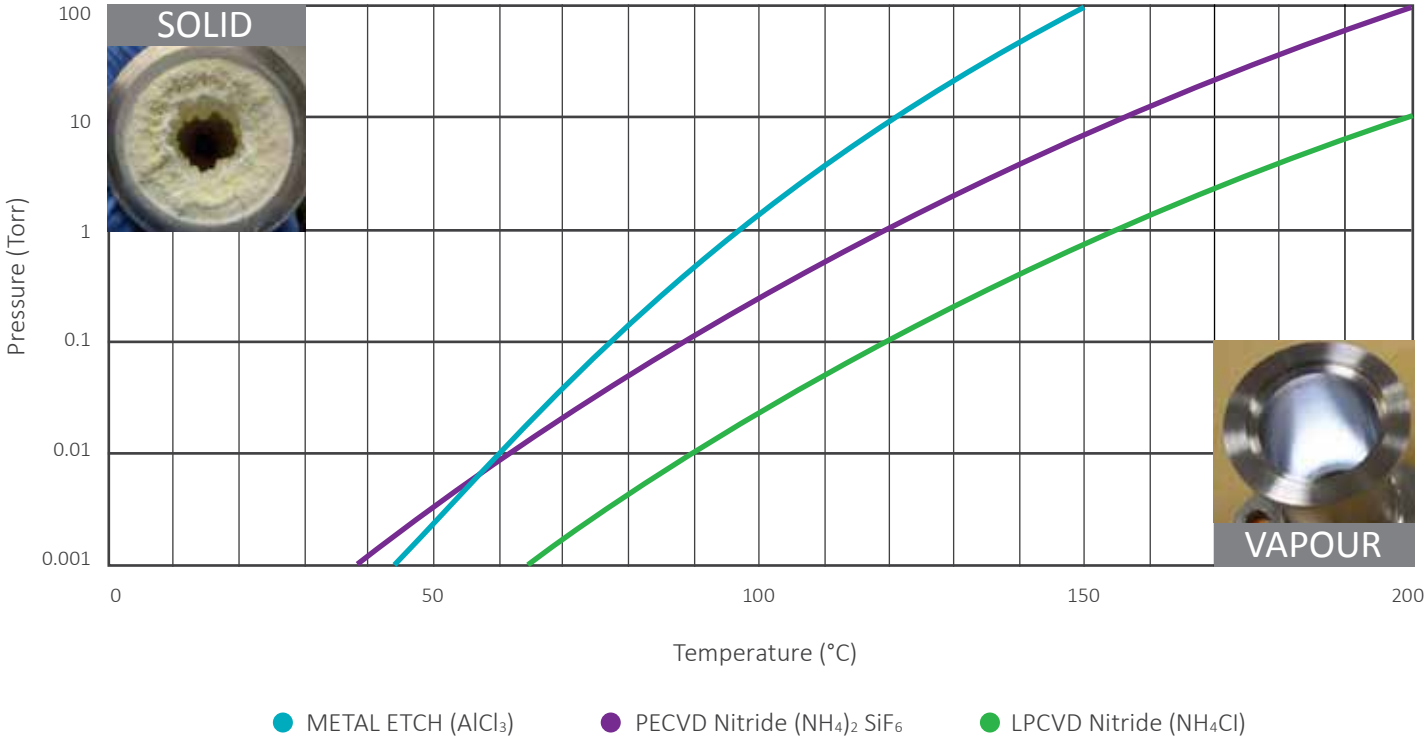
WHY THERMAL MANAGEMENT SOLUTIONS ARE IMPORTANT

- Vapour pressure and temperature relationships can have an effect on condensation.
- Temperature control helps minimize condensation that can lead to:
  - Blocked pipes
  - Fire risk from highly reactive condensates
  - Personnel risk from acidic condensates
  - Violent reactions when certain condensed materials are exposed to air or other process gases

WHY CORRECT TEMPERATURE SELECTION IS IMPORTANT

- Temperature set-point matches specific process materials and reaction by-products
- Temperature-sensitive precursors may react if pipe temperature is too high
- Reduces pipe blockage rate
- Reduces pipe cleaning frequency and extends MTBS
- Improves process reliability
- Eliminates exhaust pipe service hazards

VAPOUR PRESSURE CHARACTERISTICS OF COMMON REACTION BY-PRODUCTS



Edwards Global Applications Group can advise correct SMART TMS set-up for each chemistry need

SMART TMS PRODUCT DATA

SMART TMS Operating and Storage Conditions	
Operating environment	Suitable for indoor use only
Operating / storage ambient temperature range	5 to 40°C
Maximum operating / storage ambient humidity	80% relative humidity for ambient temperatures lower than 31°C, decreasing linearly to 50% relative humidity for an ambient temperature of 40°C
Maximum operating altitude	2,000 m
Installation category	Class 2
Pollution category	2

SMART TMS Control Unit Electrical Data	
Electrical supply data	
Phases	3-phase + neutral + earth (ground)
Voltage	208 V ac
Voltage tolerance	+/- 8%
Frequency	50 / 60 Hz
Full load current	30 A
Heater power output	
Voltage	120 V ac
Number of heating zones	9 (max.)
Maximum current per zone	10 A
Circuit breaker protection	
Maximum current per 3 zones	32 A (per 3 zones)
Maximum earth leakage current	30 mA
Thermal overload protection circuit breakers	10 A (per zone)

SMART TMS Pipe Heater Data	
Materials of construction:	
Heater mat	Silicone-coated nylon
Heater cable insulation	PTFE (polytetrafluoroethylene), Vidaflex
Thermal switch and fuse patch cover	Silicone-coated nylon,
Connectors	Polyamide
Heater retaining straps	Silicone-coated nylon
Heater cable label	Polyolefin
Electrical supply	120 V
Nominal heater power density	0.1 W/cm^2 and 0.2 W/cm^2
Thermal switch set-point	190°C
Thermal fuse fail temperature	235°C

SMART TMS STRAIGHT PIPE HEATER POWER

Heater Power Density - 0.1 W/cm^2

Pipe Diameter	Heater Length					
	50mm	80mm	100mm	200mm	300mm	500mm
40 mm	6 W	10 W	12 W	24 W	36 W	60 W
50 mm	8 W	13 W	16 W	31 W	47 W	78 W
63 mm	10 W	16 W	18 W	40 W	60 W	99 W
80 mm	12 W	19 W	24 W	48 W	72 W	120 W
100 mm	16 W	26 W	32 W	64 W	96 W	160 W
160 mm	25 W	40 W	51 W	101 W	151 W	252 W

Heater Power Density - 0.2 W/cm^2

Pipe Diameter	Heater Length					
	50mm	80mm	100mm	200mm	300mm	500mm
40 mm	13 W	21 W	26 W	51 W	76 W	126 W
50 mm	16 W	25 W	31 W	63 W	94 W	157 W
63 mm	Contact Edwards					
80 mm						
100 mm						
160 mm						

SMART TMS SHAPED PIPE HEATER POWER

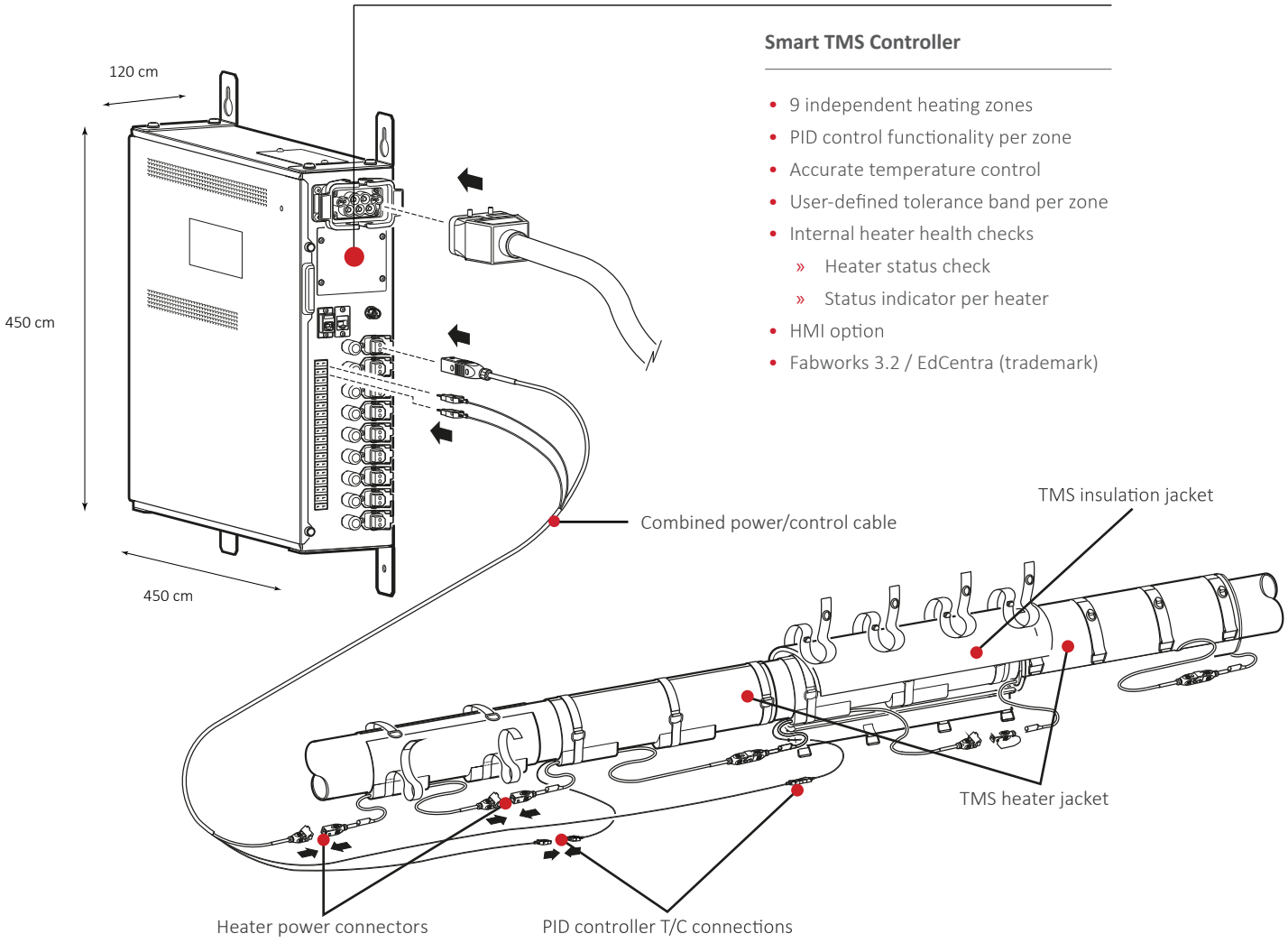
Heater Power Density - 0.1 W/cm^2

Pipe Diameter	Elbow Heater	Bellows Heater		T-piece Heater	Gate Valve Heater
		50 mm	80 mm		
40 mm	9 W	9 W	15 W	11 W	
50 mm	13 W	11 W	18 W		
63 mm	23 W	12 W	19 W		
80 mm	30 W	14 W	23 W		
100 mm	55 W	20 W	32 W		30 W
160 mm	125 W	27 W	42 W		36 W

Heater Power Density - 0.2 W/cm^2

Pipe Diameter	Elbow Heater	Bellows Heater		T-piece Heater	Gate Valve Heater
		50 mm	80 mm		
40 mm	18 W			23 W	
50 mm	26 W				
63 mm					
80 mm					Contact Edwards
100 mm					
160 mm					

THE MODULAR SMART TMS SYSTEM



Smart TMS Controller

- 9 independent heating zones
- PID control functionality per zone
- Accurate temperature control
- User-defined tolerance band per zone
- Internal heater health checks
  - » Heater status check
  - » Status indicator per heater
- HMI option
- Fabworks 3.2 / EdCentra (trademark)

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