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ON-BOARD® WATERPUMPS

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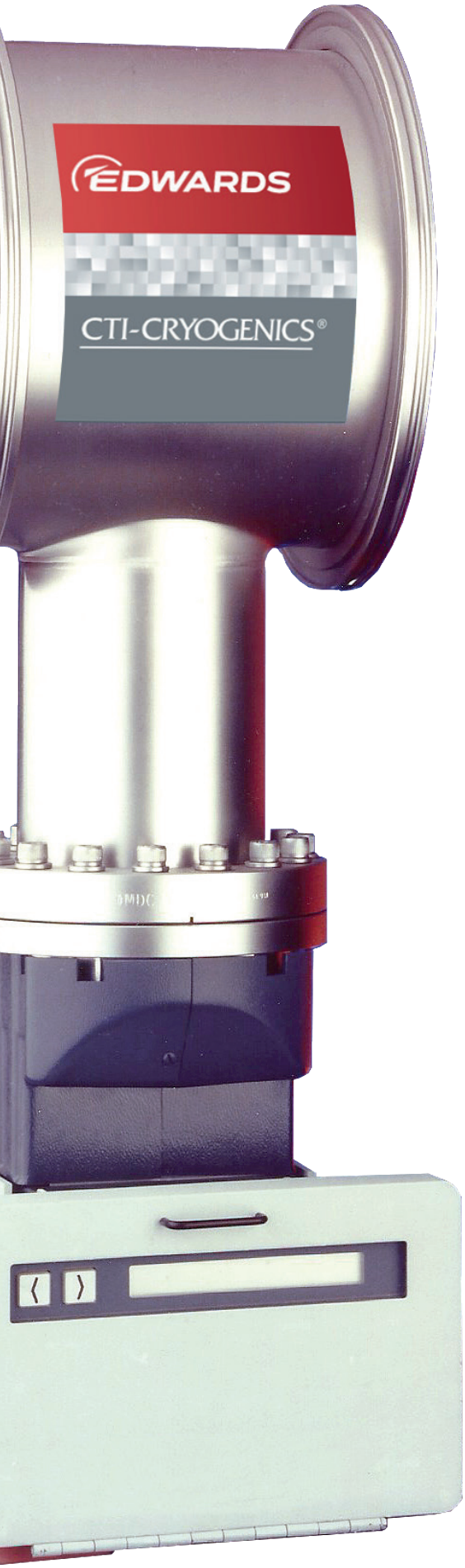
On-Board® Waterpumps are high performance vacuum pumps which increase water vapor pumping speed, providing substantially improved system throughput and better process results. They are available in several distinct configurations to fit any application. And they provide the field-proven reliability, the process flexibility, and the advanced productivity and performance of CTI-Cryogenics®' On-Board® family of high vacuum pumps.

FEATURES & BENEFITS

- **50% to 75% reduction in time to base pressure**
- **Higher yields through reduced water vapor and lower contamination.**
- **Full pumping speed down to 10^{-11} Torr, water vapor partial pressure of 10^{-13} Torr**
- **Temperature control for selective water vapor pumping. No gate valve required.**
- **The flexibility of three standard configurations, in a complete range of sizes, to fit any application or system**
- **Low cost installation and operation. The compressor can be located remotely, with no cold refrigerant lines.**
- **CTI-Cryogenics®' cryocooling technology, proven clean and reliable in over 20 years of demanding applications.**
- **Advanced On-Board® control system for process optimization and monitoring, predictive maintenance, networked pump management, and ease of use.**
- **Compatibility with other On-Board® pumps including common user interface, compressor, and communications protocol.**



HIGH SPEED WATER VAPOR PUMPS TO FIT ANY APPLICATION....

Clean Operation

On-Board® Waterpumps use closed-cycle helium refrigeration to cool the pumping surface. There are no cold, dripping refrigerant lines – lines that can be potential sources of refrigerant or vacuum leaks.

Small Footprint

Refrigeration takes place at the pump, so the compressor can be located remotely instead of consuming valuable space near the processing system. And, since water vapor is selectively pumped, an expensive gate valve is not required.

Consistent Vacuum

Integrated microprocessor control optimizes On-Board® Waterpump performance. The On-Board® microprocessor monitors the temperature of the refrigerator and maintains it at a user-adjustable set point, optimizing pumping performance.

Easy Integration

The pump can be operated either directly from the keypad mounted on the pump, or over a data bus using standard communications protocols. This enables automatic control of the pump by the vacuum processing systems' main controller, or by a PC running CTI-Cryogenics®' On-Board® Central Control software.

Flexible Configurations

On-Board® Waterpump systems are available in three flexible configurations, to suit your specific vacuum system and application requirements.

Inline Configuration

For installation 'In Series' with a turbopump or a diffusion pump to increase water vapor pumping speed, or as a high-conductance alternative to a cooled baffle. The hollow tube cryopanel maximizes the conductance from the chamber to the throughput pump.

In Situ Designs

For installation in process chambers, transfer chambers, or load locks. Provides maximum water vapor pumping speed through a large surface area. A line of standard cryopanels is available, and custom designs can be provided for specific applications.

Appendage Configuration

For installation in process chambers or load locks or as a booster pump in large chambers with high water loads. Includes fully integrated purge valve, roughing valve, and TC gauge for automatic operation through the On-Board® microprocessor.

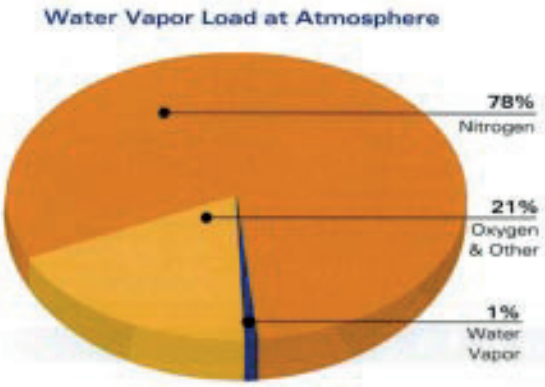
VACUUM UPTIME IS PROCESS UPTIME...

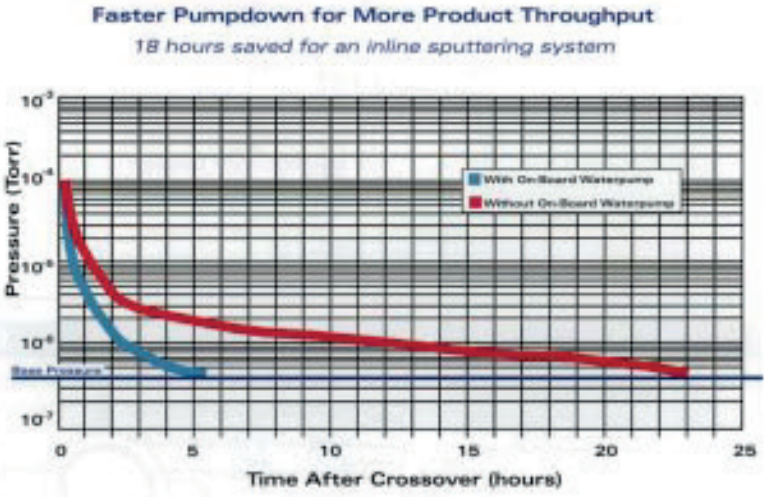
Because water outgasses slowly from vacuum chamber walls, water vapor comprises over 97% of the residual gas load at 10^{-3} Torr and below. It creates the primary impediment to reaching desired base pressure, and it is detrimental to the chemistry and yield of many processes. To maximize process throughput and yield, it is important to maximize water vapor pumping speed.

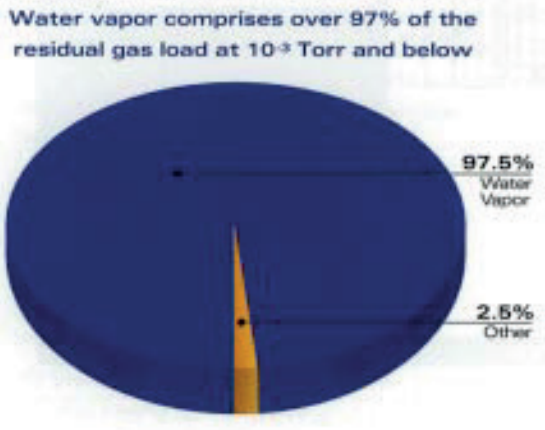
On-Board® Waterpumps are an effective and economical way to add high water vapor pumping speed to turbopumped, diffusion pumped, and cryopumped processes. They significantly reduce pumpdown time to base pressure for more throughput, while reducing the amount of residual water vapor in the process chamber, for improved process performance.

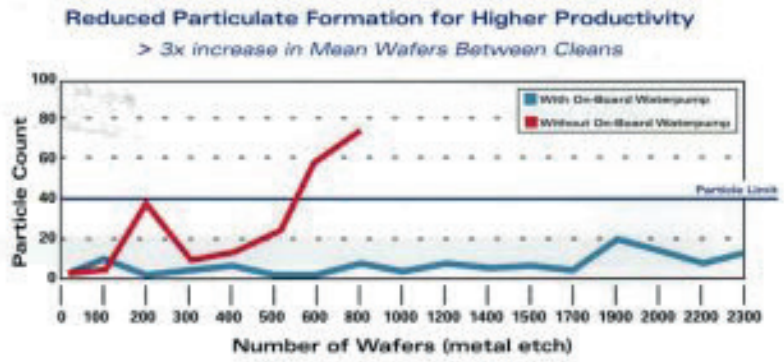
The low operating temperature of 107K results in water vapor partial pressure of 10^{-13} Torr. This allows full pumping speed down to 10^{-11} Torr, applicable even in ultra-high vacuum applications. And operating temperature is user-adjustable, allowing selective pumping of water vapor. For example, sputter gases are not pumped, and no expensive gate valve is required.

On-Board® Waterpumps feature all the unique productivity-enhancing benefits of On-Board® Cryopumps, made possible through comprehensive microprocessor-based performance monitoring and control. As with On-Board® Cryopumps, they can be fully integrated with the rest of the vacuum system. In fact, they share the same user interface, compressor hardware, and communications hardware and protocol.









...AND ON-BOARD® MAKES IT BETTER

- **Ease of Use**
  Comprehensive monitoring and control is easy, from a keyboard mounted on the pump or on an accessory rack, a remote NetLink terminal, or by On-Board® Central Control, an intuitive, PC-based graphical user interface.

- **Consistent vacuum, with process monitoring and control**
  Continuous, real-time monitoring and control of refrigerator temperature gives stable base pressure, and provides data readout for correlation with process lots.
  Temperature is adjustable above 107K, allowing selectable pumping of water vapor.
  Programmable alarms allow you to respond quickly to any unexpected process variations.

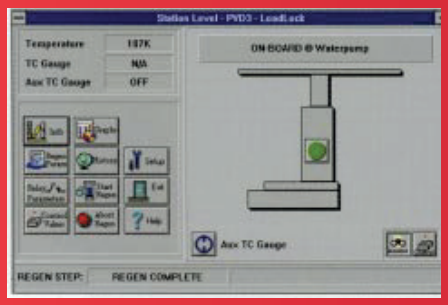
- **Predictive Maintenance**
  Comprehensive pump performance data and graphical trend analysis allow you to track system performance and to plan corrective action before the need becomes critical. This avoids costly unscheduled downtime.

- **More efficient process operations**
  On-Board® Waterpumps can be networked with other types of On-Board® pumps, allowing uniform, centralized monitoring, control, and maintenance of all pumps in the process area via On-Board® Central Control software.

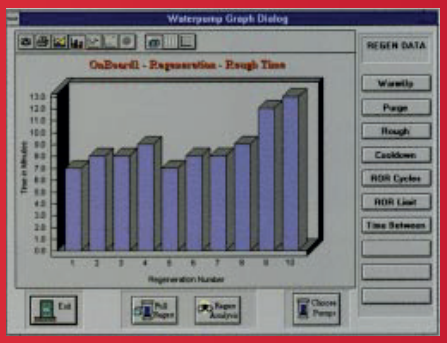
  Within the network, pumps associated with multi-pump process tools can be controlled as groups by On-Board® Central Control software, as well as by each process tool's controller. Modem access capability allows remote operation and maintenance.

- **East upgrades and process tailoring**
  Upgrading your On-Board® Waterpumps to keep current with new product developments (for example, process-specific performance optimization) is accomplished quickly and economically by simple exchange of the removable module.

- **Complete retrofit performance package**
  On-Board® Waterpumps can be retrofitted to many existing process tools to improve uptime and performance. Both standard upgrade packages and custom solutions are available.



The On-Board® Central Control graphical user interface provides easy access to complete operation, monitoring and control capabilities.



Pump history data facilitates predictive maintenance. For example, increasing rough time can indicate increasing water vapor in the system (due to rising humidity, longer exposure to ambient, or a leak developing).

PERFORMANCE SPECIFICATIONS FOR ON-BOARD® WATERPUMPS

All models are available in standard metal seal or ISO flange configurations. Other configurations are also available.

Contact your CTI-Cryogenics® representative for assistance, and for detailed dimensional drawings for any configuration.

Backed by GUTS®

Like all CTI-Cryogenics® products, On-Board® Waterpumps are backed by GUTS® (Guaranteed Uptime Support) rapid response network, our unique, comprehensive global customer support program.

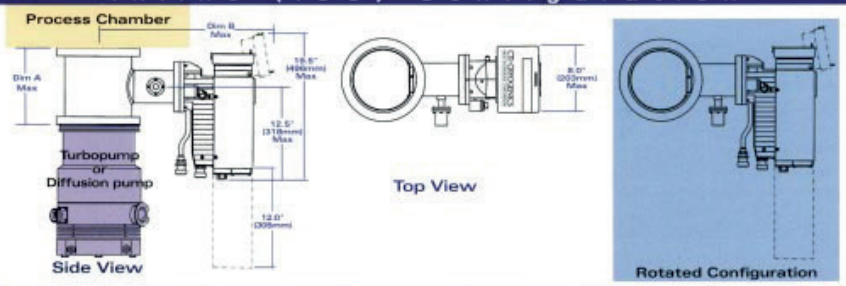
When you call a GUTS® service center, you are guaranteed immediate, competent response and action by a vacuum exert from our worldwide technical support staff. We're at work for you 24 hours a day, 365 days a year.

On-Board® Waterpumps Inline and Appendage Configurations

Pump Size	4"	6"	8"	10"	16"
(Inlet Flange) ISO Flange Metal Seal	100mm 6" OD	160mm 8" OD	200mm 10" OD	250mm 12" OD	400mm
Water Speed	1,100 l/s	2,500 l/s	4,000 l/s	7,000 l/s	16,000 l/s
Conductance (N_2 Inline configuration)	450 l/s	1,000 l/s	1,800 l/s	2,800 l/s	7,200 l/s

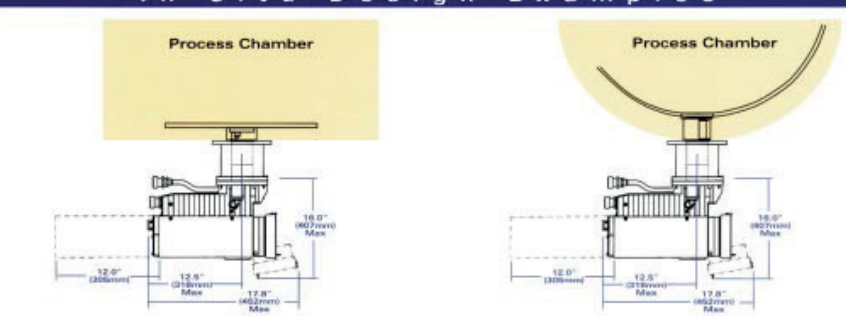
Water Speed	**In Situ Designs** For in situ designs, the water vapor pumping speed is proportional to cryopanel front surface area at 96 liters/sec/in². For example, 14,000 l/s can be achieved with a 10" by 15" panel. Standard in situ configurations are available. Custom cryopanels can be designed for any vacuum chamber.

Inline (ISO) Configuration

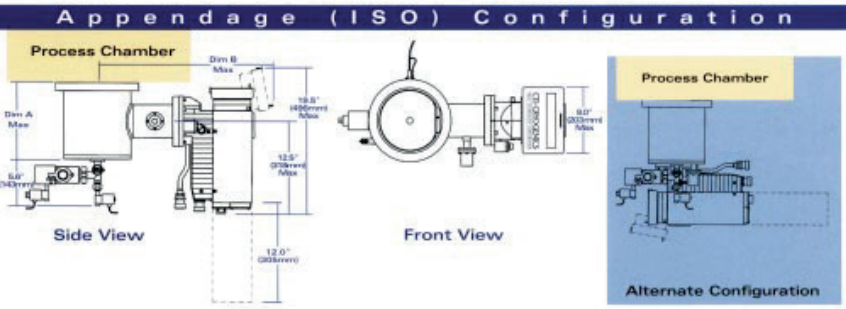


Pump Sizes	4"(100mm)	6"(160mm)	8"(200mm)	10"(250mm)	16"(400mm)
Dimension A	5.5"(140mm)	6.5"(165mm)	6.7"(169mm)	7.5"(191mm)	8.0"(203mm)
Dimension B	19.6"(499mm)	19.9"(505mm)	20.9"(531mm)	22.1"(560mm)	25.3"(641mm)

In Situ Design Examples



Appendage (ISO) Configuration



Pump Sizes	6"O.D.	8"O.D.	10"O.D.	16"O.D.
Dimension A	8.3"(211mm)	8.4"(213mm)	8.9"(225mm)	12.2"(308mm)
Dimension B	19.9"(505mm)	20.9"(515mm)	22.7"(576mm)	25.9"(657mm)

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