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ON-BOARD® *IS* SINGLE STAGE CRYOPUMPS

EDWARDS

ON-BOARD®*IS*
SINGLE STAGE CRYOPUMPS

Today, Edwards introduces the Next Generation in vacuum productivity systems, On-Board *IS*.

As always, the goal is to maximize tool throughput while maintaining the highest quality.

Each On-Board IS cryopump system delivers:

- Superior quality vacuum for higher yields.
- Fastest regenerations plus significantly longer run-time between regenerations for unparalleled productivity.
- Built-in intelligent system management /enhanced predictive maintenance features for unequalled dependability.
- Intelligent adaptive system performance for optimal results regardless of process.
- Energy efficiency with no compromise in performance for lower operating costs.

On-Board IS cryopumps, compressors, and accessories operate as a fully integrated system to deliver previously unattainable levels of process performance. The system features many advances including innovative cryogenic refrigerator technology, breakthrough "system-level" intelligence, increased pumping capacity, and much more.

Taken together, these performance advantages deliver one crystal-clear benefit: significantly improved productivity.

Selective Cryopumping Solutions for Improved Vacuum

Water vapor is 97% of the gas load at 10-3 Torr and below. Its presence degrades the ability of vacuum systems to reach base pressure rapidly, and it is detrimental to many production vacuum processes.

By increasing the ability of your vacuum systems to reduce water vapor dramatically, On-Board IS Single Stage Cryopumps greatly expand system uptime and overall productivity.

On-Board IS Single Stage Cryopumps maximize water vapor pumping speed economically. Used with turbopumped, diffusion pumped, and even cryopumped systems, they cut pumpdown time to pressure in half, substantially enhancing process throughput.

Their low operating temperature of 107K results in a water partial pressure of 10-13 Torr which allows full pumping down to 10-11 Torr, applicable even to ultra-high vacuum applications. Their user-adjustable operating temperature enables selective pumping of water vapor and other contaminating gases, without interfering with process gases. And expensive gate valves are not needed.

CTI-Cryogenics vacuum products, and tailored solutions provide the flexibility, superior reliability, and precise performance that are essential for a broad range of applications:

Semiconductor
Metrology
Physical Vapor Deposition
Chemical Vapor Deposition
Atomic Layer Deposition
Etch
Implant
Thermal Processing
Lithography

Data Storage
Magnetic/Optical Media
Read/Write Heads

Flat Panel Displays

Thin Film Coatings

Analytical
Ionization
Electron Beam

Education/Government
Accelerators and Synchrotrons
Space simulation
Fusion research
Surface science
Atomic Physics

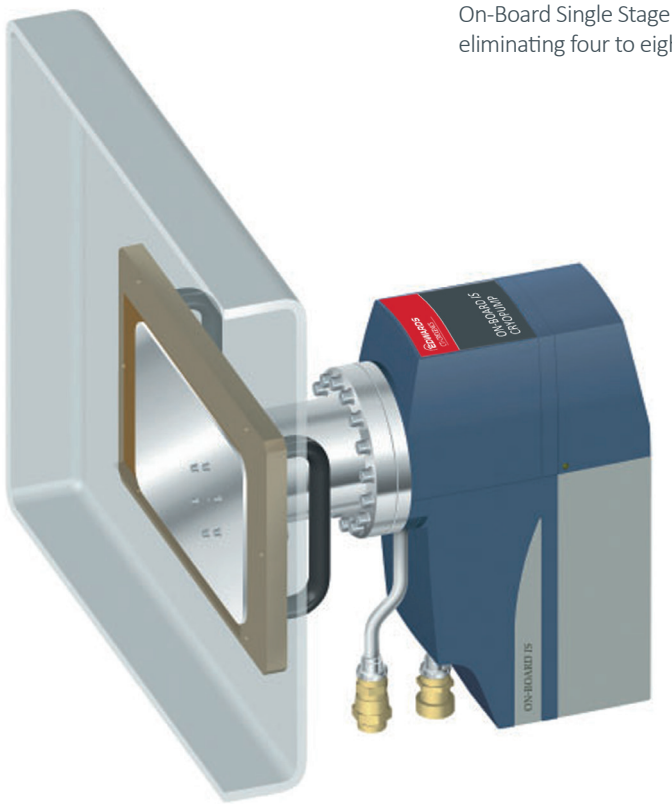
Industrial
Vacuum furnaces
Heat treat furnaces
General vacuum

Description

Achieving optimal productivity in a broad range of vacuum process applications requires high water-pumping speed. CTI-Cryogenics On-Board Single Stage Cryopumps from Edwards Technology Corporation increase the water pumping capacity of turbopumps by eight times, making possible significant advances in system throughput and process productivity whether they are used in transfer, in-line, or process chamber applications.

High water-pumping speed also enhances end-product quality in many vacuum processes, improving overall yields and sharply cutting both waste and the cost of production itself.

On-Board Single Stage Cryopumps are designed in a variety of configurations to meet most application requirements. They are available in both inline or insitu configurations in a variety of sizes.



Product Highlights

- **Pumps more than 24,000 liters per second of water vapor,** improving process quality and decreasing cycle time in a broad range of applications.
- **Pumps a wide variety of hydrocarbon gas contaminants,** delivering five to ten times higher contaminant pumping speed than turbopumps while reducing end-product defects.
- **Increases turbopump water vapor pumping speed by eight times** in load-locked transfer or process chamber use.
- **Lowest vibration** of On-Board cryopump family.
- **Operates at low-cost and with a minimal footprint,** since it does not require a large closely coupled compressor, it often can operate with existing helium system.
- **Available for *inline or insitu* configurations** in a variety of sizes to meet user requirements.
- **Installs easily.**

Key Application Benefits

The On-Board Single Stage Cryopump optimizes turbopump performance in SEM Metrology, Ion Beam Deposition, Flat Panel Displays, Roll-to-Roll Plastic Coaters, Batch Decorative Coatings, Optical Coating, and PVD Transfer Chambers.

- **Improves throughput** by decreasing cycle time.
- **Reduces pumpdown time by 50%** following system maintenance.
- **Improves deposition quality** by decreasing process contamination caused by residual hydrocarbon gas.
- **Prevents process contamination from water vapor** by lowering the system's water partial pressure.
- **SEM Metrology:** The presence of hydrocarbon contaminants can adversely impact the measurement performance of these tools. On-Board IS Single Stage Cryopumps significantly reduce the presence of a broad range of long chain hydrocarbon species.
- **Ion Beam Deposition:** Pumpdown time after maintenance is slowed by water vapor. On-Board Single Stage Cryopumps remove water vapor and cut pump downtime in half, eliminating four to eight hours of cooldown waiting time.
- **Flat Panel Displays:** Water vapor present during flat panel display manufacturing can react adversely with materials such as MgO and organic light-emitting films, reducing productivity. On-Board Single Stage Cryopumps reduce water partial pressure, cutting water vapor contamination and measurably improving yield.
- **Roll-to-Roll Plastic Coaters:** Evaporative processes such as plastic coating are subject to high water vapor loads because of the very large surface area of rolled plastics. Reducing the water vapor load maintains water partial pressure during process, significantly improving production consistency and yield.
- **Batch Decorative Coatings /Optical Coating:** Leveraging the On-Board Single Stage Cryopump for batch coatings results in approximately 50% faster pumpdown and greater throughput than with turbopumps alone.
- **PVD Transfer Chambers:** On-Board Single Stage Cryopumps cut pump downtime by 50%, eliminating hours of waiting. Process chambers are exposed to less water contamination at the time of substrate transfer.

SELECTIVE CRYOPUMPING SOLUTIONS FOR IMPROVED VACUUM

Single stage cryopumps are designed for easy integration with all On-Board Systems.

Additional Helium Compressors often not required.

On-Board IS Insitu Cryopump

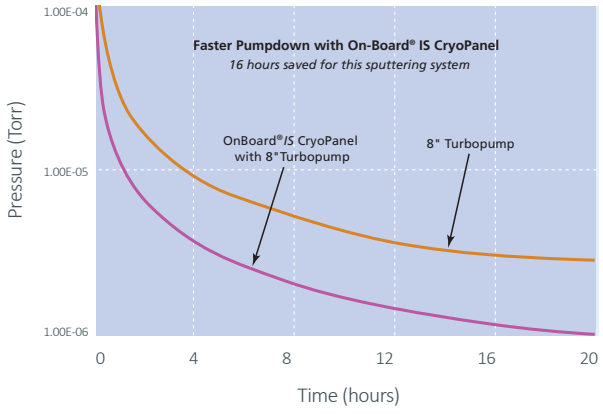
For installation in process chambers, transfer chambers, or load locks. Provides maximum water vapor pumping speed through a large surface area. A line of standard cryopanels is available, and custom designs can be provided for specific applications.

On-Board IS Inline Cryopump

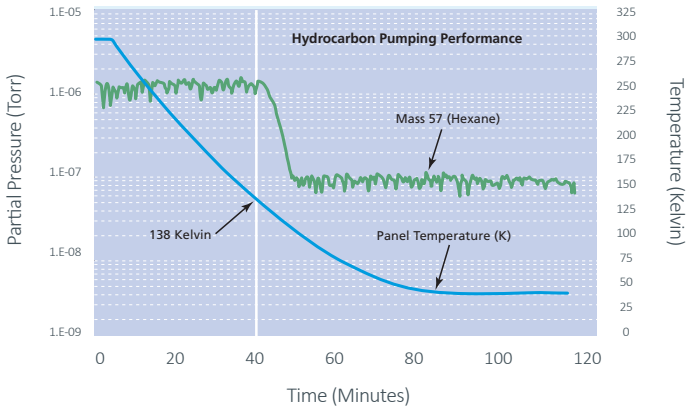
For installation "in series" with a turbopump or a diffusion pump to increase water vapor pumping speed, or as a high-conductance alternative to cooled baffle. The hollow tube cryopanel maximizes the conductance from the chamber to the throughput pump.

Technical Features

Water Vapor



Hydrocarbon Contamination



- **Reduces time to base pressure by 50% to 75%**
- **Delivers full pumping speed to 10^{-11} Torr and to a water vapor partial pressure of 10^{-13} Torr**
- **Delivers selective pumping of water vapor and other contaminant gasses through temperature control**
- **Eliminates the need for an expensive gate valve in many applications**

On-Board IS LowProfile Cryopump

For installation where space is at a premium "in series" with a turbopump or a diffusion pump to increase water vapor pumping speed, or as a high-conductance alternative to cooled baffle. The circular cryopanel maximizes the conductance from the chamber to the throughput pump.

On-Board IS Appendage Cryopump

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 control system.

Backed by GUTS®

That's why we invented GUTS – Guaranteed Up-Time Support.
You can call our GUTS line around the clock, around the world to get knowledgeable help in a hurry. We'll either get you up and running through phone support, or we'll take steps in 59 minutes or less to get a part, a gauge, a vacuum measurement system, a pump on site, or an experienced service engineer to help.

Our GUTS rapid response system delivers unsurpassed responsiveness worldwide to any vacuum problems. Every call to our GUTS line is answered by a capable, empowered Edwards employee with the resources to diagnose customer problems quickly and accurately. Our commitment is to get your system back on-line quickly.

Performance Specifications for On-Board IS Single Stage Cryopumps

Inline and Appendage Configurations **Pump Size**	**4"**	**6"**	**8"**	**10"**	**16"**
(inlet flange) ISO Flange Metal Seal	100 mm 6" O.D.	160 mm 8" O.D.	200 mm 10" O.D.	250 mm 12" O.D.	400 mm
Water Speed Conductance (N_2, Inline Configuration)	1,100 l/s 450 l/s	2,500 l/s 1,000 l/s	4,000 l/s 1,800 l/s	7,000 l/s 2,800 l/s	16,000 l/s 7,200 l/s
Insitu Designs **Water Speed**	For insitu designs, the water vapor pumping speed is proportional to cryopanel front surface area at 96 liters/sec/in^2. For example, 14,400 l/s can be achieved with a 10" by 15" panel. Standard insitu configurations are available. Custom cryopanels can be designed for any vacuum chamber.				

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

Clean operation. The pumping surface of On-Board Single Stage Cryopumps is cooled by a closed-cycle helium refrigeration system. There are no cold, dripping "special" refrigerant lines and no potential for refrigerant or vacuum leaks.

Small footprint. On-Board Single Stage Cryopumps selectively pump water, eliminating the need for an expensive gate valve. Refrigeration occurs at the pump, all compressors can be located remotely – hundreds of feet away if required, freeing expensive space near the point of vacuum processing.

Consistent vacuum. Pumping performance is extremely consistent, optimized by an automatic electronically controlled temperature system. The ability of the system to operate at 107K enables it to achieve water vapor partial pressures of 10-13 Torr.

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