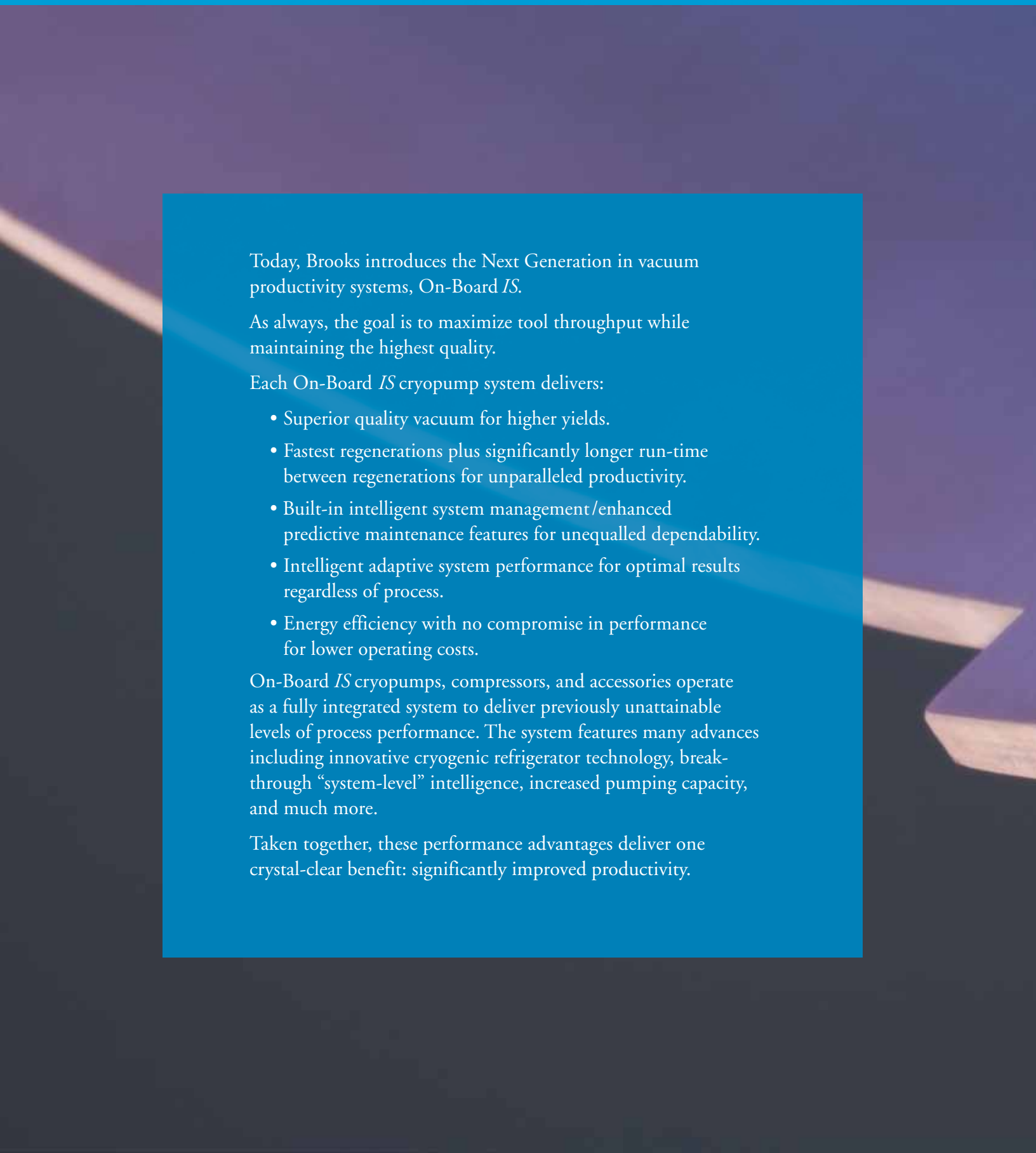
CTI-Cryogenics®

Selective Cryopumping Solutions for Improved Vacuum

BROOKS AUTOMATION

On-Board® *IS* Cryopump Systems



Today, Brooks 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, break-through "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 Waterpumps greatly expand system uptime and overall productivity.

On-Board Waterpumps 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.

BROOKS AUTOMATION

CTI-Cryogenics®

Brooks 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

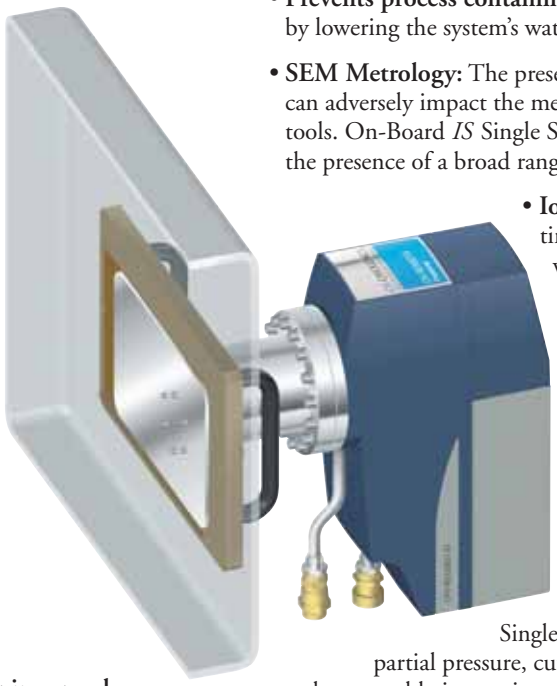
CTI-Cryogenics On-Board® *IS* Single Stage Cryopumps achieve optimal productivity in a broad range of vacuum process applications requiring high water-pumping speed

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 Brooks 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.

On-Board® *IS* Insitu Cryopump

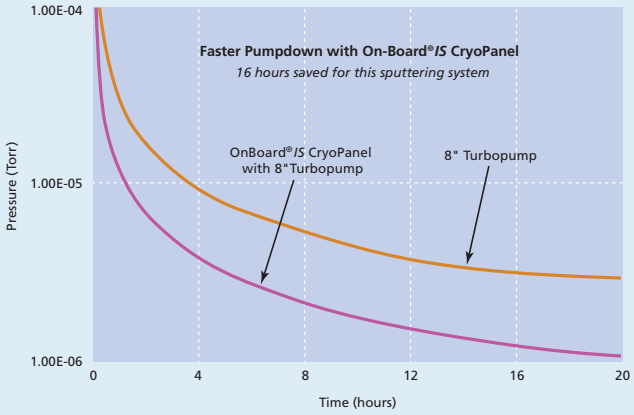
For installation in process chambers, transfer chambers, or load locks. Provides maximum water vapor pumping speed through a large surface area. A line of standard cryopanels is available, and custom designs can be provided for specific applications.

On-Board *IS* Inline Cryopump

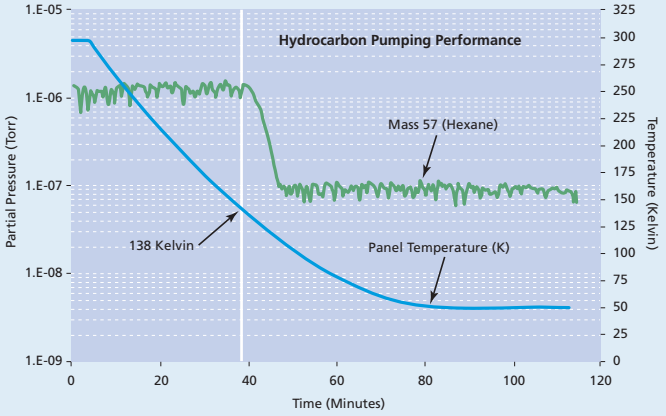
For installation "in series" with a turbopump or a diffusion pump to increase water vapor pumping speed, or as a high-conductance alternative to cooled baffle. The hollow tube cryopanel maximizes the conductance from the chamber to the throughput pump.

CTI-Cryogenics: Selective Cryopumping Solutions for Improved Vacuum

Water Vapor



Hydrocarbon Contamination



Technical Features

- **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 turbo-pump 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.

Single stage cryopumps are designed for easy integration with all On-Board Systems. Additional Helium Compressors often not required.

Performance Specifications for On-Board *IS* Single Stage Cryopumps

Inline and Appendage Configurations

Pump Size		4"	6"	8"	10"	16"
(inlet flange)	ISO Flange	100 mm	160 mm	200 mm	250 mm	400 mm
	Metal Seal	6" O.D.	8" O.D.	10" O.D.	12" O.D.	
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*

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.

CTI-Cryogenics On-Board® Cryopumps are 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 Brooks employee with the resources to diagnose customer problems quickly and accurately. Our commitment is to get your system back on-line quickly.

Brooks: *Delivering The Power of Blue*

Why is it that Brooks vacuum systems deliver more dependable production hours worldwide every day than everyone else combined? Perhaps it's our innovative, extraordinarily productive technology — whether it's a CTI-Cryogenics® cryopump or Granville-Phillips® vacuum measurement system. But we think it's *The Power of Blue:* Our total corporate commitment to deliver not only superior technology, but also unmatched performance, world-class global support, products and infrastructure and an expectation of "no surprises" — ever.

Our commitment to excellence begins the first time we speak with you and *that commitment never changes*. When you buy 'the blue label' you get a powerful global infrastructure of competent, committed support to ensure that all Brooks products deliver the performance and reliability you expect — always. Let our Brooks cryogenic vacuum pumping and measurement experts show you first-hand what total customer satisfaction is all about.

At Brooks Automation Global Customer Support, meeting your expectations is never enough. Our mission is to exceed expectations in all areas of customer responsiveness. From the industry standard of GUTS® to the pioneering e-Diagnostic implementation of GOLDLink® Support, Brooks is committed to serving you with the most advanced, innovative, highly productive tools available.

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