

# Крионасосы ON-BOARD, Cryo-Torr

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# CTI-CRYOGENICS® ENHANCED ON-BOARD 8F CRYOPUMP

Today's sputtering processes demand the highest possible process tool availability. The new, enhanced On-Board 8F Cryopump improves tool availability – by cutting regeneration frequency significantly.

It delivers better vacuum recovery in processes such as aluminum, TiN, titanium, and other sputtering applications. So you can run more wafers between regenerations. And with regenerations being less frequent, it's easier for you to schedule them at the same time as shield or target changes.

Your results – more tool availability, and more product wafer output.

## Improved Vacuum Recovery Cuts Regeneration Frequency In Half

Many sputtering applications use a vacuum recovery step to maximize process performance. In this step, the process chamber must be pumped to a specified high vacuum level, within a specific time, after the feed gas is shut off. This step is a principal driver of cryopump regeneration frequency.

The enhanced On-Board 8F Cryopump maintains fast recovery performance longer, for fewer regenerations, in both argon- and nitrogen/argon-based sputtering. The figures illustrate its recovery performance for both process types, using a target recovery pressure of  $1 \times 10^{-7}$  Torr.

With recovery performance like this, you can cut your number of regenerations per month by 40% to 65%. And fewer regenerations mean that it's more likely you can regenerate only during times when you're doing a shield or target change.

(Note: Because pumping speeds for all gases are the same as in the On-Board 8F and Cryo-Torr 8F, no process requalification is required.)

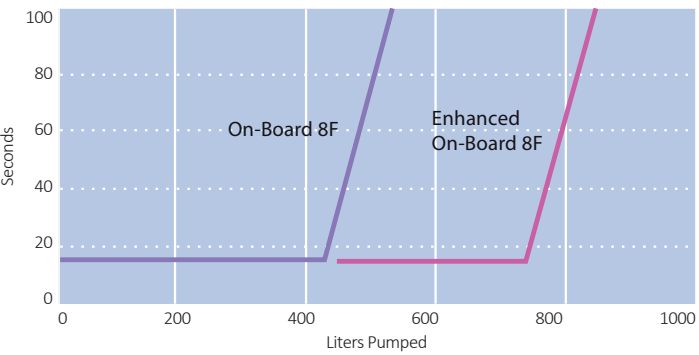


## Features and Benefits

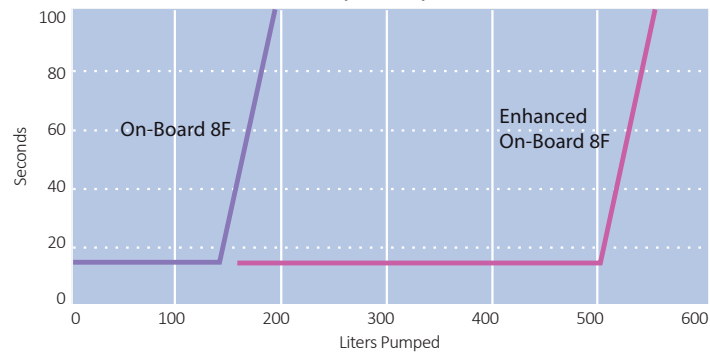
- Cuts Regeneration Frequency In Half
- Improves Sputtering Tool Availability
- Delivers Better Vacuum Recovery
- Increases Product Output Between Regenerations
- Backed by GUTS® (Guaranteed Uptime Support)

Recovery Performance Data

Recovery Performance Argon Processes



Recovery Performance N2/Argon Processes (>50%N2)



In any vacuum process, recovery performance depends upon process specifics, including target recovery pressure.

Contact CTI-Cryogenics to discuss your application.

Cryopump Performance

<b>Pumping Speeds</b>	
Hydrogen	2200 l/s
Air	1500 l/s
Water Vapor	4000 l/s
Argon	1200 l/s
<b>Argon Throughput</b>	700 SCCM (9 Torr-l/sec)
<b>Hydrogen Capacity</b>	12 std. liter (5x10-6 Torr)
<b>Crossover</b>	150 Torr-liter
<b>Nominal Regeneration Time*</b>	
First and Second Stage	2.5 Hour
Second Stage**	< 1 Hour

This cryopump is easily integrated into all process tools currently equipped with either On-Board 8F or Cryo-Torr 8F Cryopumps, either via factory installation (for new process equipment) or via in-fab retrofit to installed process equipment. Contact your CTI-Cryogenics representative for details.

\* cold to cold  
\*\* Specify FastRegen Control Module for Sputtering

Edwards continually updates its products to match the evolving needs of the semiconductor industry and any specifications given here are subject to change without notice.

Backed by GUTS®

All CTI-Cryogenics products are backed by the GUTS (Guaranteed Up-Time Support) rapid response network, our comprehensive customer support program. When you call the GUTS service center, you are guaranteed immediate, competent response and action by a vacuum expert from our worldwide technical support staff. We’re at work for you 24 hours a day, 365 days a year.



The background of the entire page is a high-magnification, angled photograph of a silicon wafer. The wafer is divided into a grid of square dies. Each die has a complex pattern of circuitry, with various colored regions (blue, green, yellow, red) representing different functional blocks or materials. The perspective is from above, looking down at the wafer, creating a sense of depth and precision.

# CRYO-TORR® CRYOPUMPS





# CRYO-TORR CRYOPUMPS - STILL AS DEPENDABLE AND ECONOMICAL AS EVER.

Edwards' CTI-Cryogenics Cryo-Torr® cryopumps are the rugged, dependable high vacuum pumps that helped make possible the explosive early growth of today's semiconductor business in the 1980s.

Today, Cryo-Torr® pumps still pack great performance into a package that's perfect for laboratory and industrial applications where quality, dependability and low cost are key requirements.

If your application calls for dependable vacuum, Cryo-Torr® pumps will give you the throughput and rugged dependability you expect – at an economical price.

Because they deliver the highest gas pumping speeds of any high vacuum technology, cryopumps are ideal for processes requiring fast pumping of inert, non-toxic, or non-corrosive gases. Cryopumps capture molecules onto cryogenically cooled surfaces, removing them from the process environment. Cryopumps have no moving parts and no oils exposed to your process, enabling them to generate clean, reliable vacuum quickly and dependably.

## FEATURES & BENEFITS

- **Solid performance**
- **Perfect for laboratory and industrial applications**
- **Clean, dependable vacuum**
- **Low cost**
- **Backed by GUTS® 24-hour global support**

## Cryo-Torr® Configurability

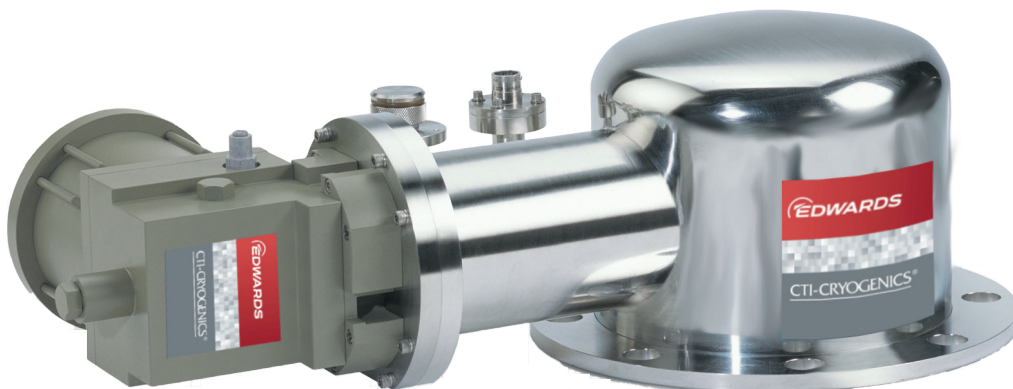
Edwards was first to offer both a “flat” Cryo-Torr® cryopump configuration for low-profile applications, and a “straight” configuration for traditional applications. Cryo-Torr® cryopump sizes range from 4-inch to 400mm flange inner diameters (ID). In addition, custom configurations are available for ultra-high vacuum applications.

In fact, Edwards has a number of specialized cryopump configurations from which to choose. Chances are we have the right pump to meet your requirements.

## Peripherals

We also offer a full palette of peripherals so you can complete your Cryo-Torr configuration quickly.

- Helium Compressors
- Helium Flex Lines
- Vacuum Valves
- Regeneration Accessories
- Cables
- Temperature Indicators



## Cryo-Torr® pumps are backed by GUTS®

**When you need vacuum, you don't want to wait for it.**

That's why 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, a part, component, or experienced service professional is on the way.

Our GUTS rapid response system delivers unsurpassed responsiveness worldwide to any vacuum problem. 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.

## Cryo-Torr® Cryopumps

Cryo-Torr® Pump Model	4F	8	8F	250F	10	10F	400
Configuration	Flat	Straight	Flat	Flat	Straight	Flat	Straight
Vacuum Flange ID (Metal Seal, ANSI, and ISO)	100 mm	200 mm	200 mm	250 mm	290 mm	300 mm	400 mm
<b>Gas Pumping Speeds</b>							
Water Liters/Sec	1,100	4,000	4,000	6,500	9,000	9,500	16,000
Air Liters/Sec	370	1,500	1,500	2,200	3,000	3,600	6,000
Hydrogen Liters/Sec	370	2,500	2,200	3,200	5,000	6,000	12,000
Argon Liters/Sec	310	1,200	1,200	1,800	2,500	3,000	5,000
<b>Gas Capacities</b>							
Hydrogen Standard Liters	3	17	8	16	24	24	15
Argon Standard Liters	210	1,000	1,000	1,000	2,000	2,000	2,500
<b>Throughput</b>							
Argon Sccm	700	700	700	700	1,500	1,500	500
Argon Torr-Liters/Sec	9	9	9	9	19	19	6
Crossover Torr-Liters	100	150	150	150	300	300	300
<b>Cooldown Time</b>							
60 Hertz	75 min	90 min	90 min	100 min	100 min	100 min	150 min
50 Hertz	90 min	110 min	110 min	120 min	120 min	120 min	180 min
<b>Cryopump Weight</b>							
Lbs	37	45	42	48	85	90	160
Kg	17	20	19	22	39	41	73

Standard products shown. Please contact Edwards for custom cryopump configurations and specifications.



# ON-BOARD® CRYOPUMP SYSTEMS



# THE PUMPS THAT LAUNCHED THE VACUUM REVOLUTION

When our CTI-Cryogenics On-Board cryopump systems were introduced, they launched a revolution in vacuum productivity that continues today.

On-Board cryopump systems featured fast regeneration, greatly reducing downtime between production cycles.

They were the first to deliver enhanced temperature control, for improved consistency in vacuum pumping speeds

and higher productivity. And they were the first to offer remote monitoring and control of pumps scattered around large facilities or even around the world.

Today, Edwards' first-generation On-Board® cryopump systems continue to offer a perfect blend of productivity,

reliability, vacuum consistency, central monitoring and price.

CTI-Cryogenics On-Board® cryopump systems from Edwards: still delivering high productivity around the clock, around the world.

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 furnace

## FEATURES & BENEFITS

- **Fast Regeneration and multipump control reduces downtime and increases productivity**
- **Consistent vacuum performance that adapts to changing process conditions**
- **Remote monitoring enables predictive maintenance and higher productivity**
- **On-Board configurability – seemingly endless choices**
- **Backed by GUTS®**



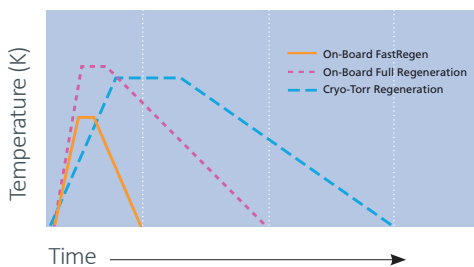
## Fast Regeneration

### Answering the call for greater uptime

Although capable of pumping enormous quantities of gas, cryopumps must eventually be “regenerated” to allow frozen gases to be removed, renewing their vacuum capabilities.

Enabled by integrated controls, On-Board® cryopumps regenerate in one-half to one-third the time of traditional cryopumps. Not only are On-Board’s “full” regenerations faster, its highly sophisticated control system also assures that the regeneration process is truly complete, maximizing tool or process productivity.

### Regeneration Summary



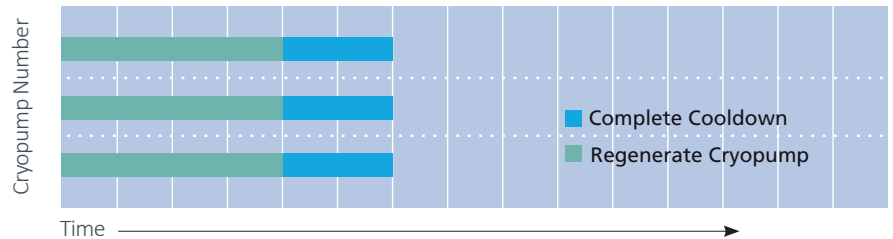
Moreover, On-Board’s FastRegen® capability further increases uptime by swiftly removing only the process gasses, restoring its performance in a fraction of the time required by a full regeneration.

## Coordinated Multi-pump Regeneration

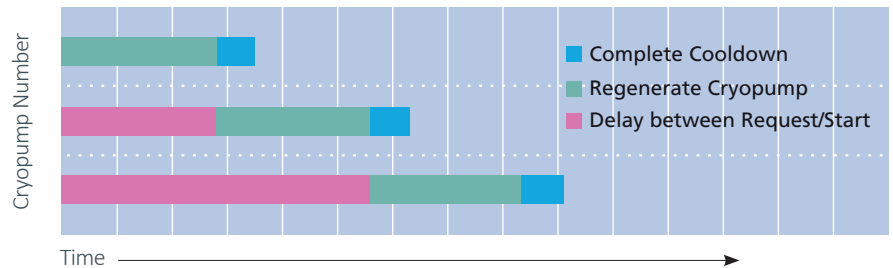
### Boosting productivity through networked intelligence

For multiple cryopump systems, On-Board’s pump-to-pump communications network can be used to link cryopumps together and regenerate them in “groups” rather than “one-at-a-time.” By coordinating the regeneration tasks between pumps, On-Board’s group regeneration capability can return multiple pumps to full productivity in only slightly more time than what would take to regenerate a single, “non-intelligent” cryopump.

### Group Regeneration



### Serial Regeneration



# SPECIFICATION

## On-Board® Configurability

### Seemingly endless choices

Edwards was first to offer both a “flat” CTI-Cryogenics cryopump configuration for low-profile applications, and a “straight” configuration for traditional applications.

On-Board cryopump sizes range from 4-inch to 400mm flange inner diameters (ID). We can provide the right configuration that meets your application requirement.

Your choices, however, don’t end with the selection of cryopumps. From a complete line of highly-reliable helium compressors to flexlines of nearly every shape and length, our extensive family of CTI-Cryogenics accessories is designed to meet virtually every vacuum requirement.

## Backed by GUTS®

Regardless of your application, one thing is certain: when you need vacuum, you don’t need unplanned downtime. 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

immediate steps to get a part, a pump, or an experienced service engineer on-site to help.

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Argon Torr-Liters/Sec	9	9	9	9	19	19	6
Crossover Torr-Liters	100	150	150	150	300	300	300
Full Regeneration (Typical)	<1.4 hrs	<2.7 hrs	<2.7 hrs	<3.3 hrs	<2.2 hrs	<2.2 hrs	<3.8 hrs
Fast Regeneration (Typical)	<0.7hrs	<1.0 hrs	<1.0 hrs	<1.5 hrs	<1.0 hrs	<1.0 hrs	<1.6 hrs
<b>Cryopump Weight</b>							
Lbs	47	55	52	58	95	100	170
Kg	21	25	24	26	43	45	77

Standard products shown. Please contact Edwards for custom cryopump configurations and specifications.



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