

EXPLORAVAC™

THERMO VACUUM TEST CHAMBERS



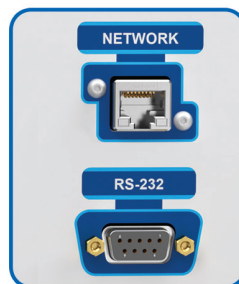
ExploraVAC™ MAX fully enclosed thermal vacuum test chambers offer a large viewport window with LED chamber lighting, integrated touch screen display, front door quick-latch closure, and a spacious LF 200 side test port for feedthrough connections.



Heating and Cooling Limits
Thermally isolated platen for sample temperature control from -180 to +400 °C. Chamber wall heating, with a maximum wall temperature of 140 °C, is available with set point and ramp rate controls.



Pressure Control
Altitude simulation with a ceiling of 280,000 feet using the dry scroll pump alone. When crossed over and evacuated by the high-vacuum turbomolecular pump, its pressure simulates deep space, in the 10^{-7} Torr range.



I/O Connections
A digital feedthrough back panel has multiple ports for running the system from a PC. With **AutoExplor™** software you can create, run, save, and repeat complex system recipes, log data, and retrieve real time system generated data.

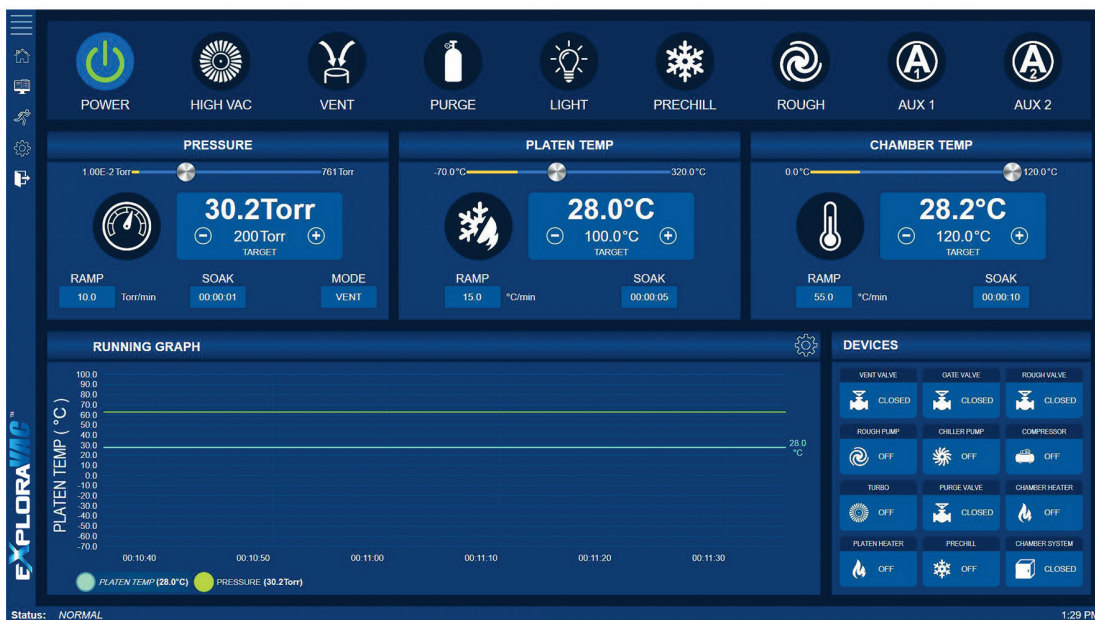
The **ExploraVAC MAX™** series of thermal vacuum test chamber instruments are designed to allow users to quickly tailor experiments and gather diagnostic data as the product is subjected to the extreme stress factors of vacuum and temperature. They empower the operator with complete laboratory control over internal chamber test conditions and are ideal for prototype device exploration during the product research and development phase. These instruments are built with innovation in mind and can be configured to meet your thermal vacuum product testing needs.



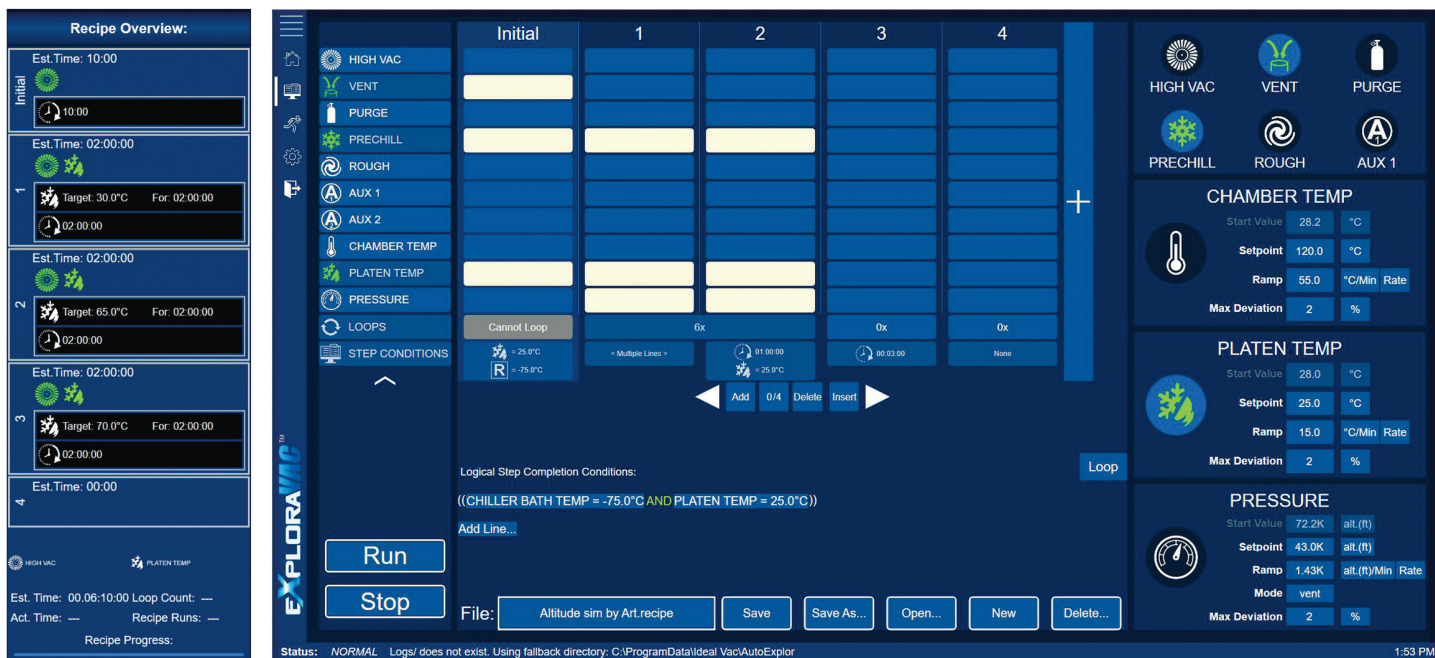
OUR PRODUCTS DEVELOP TOMORROW'S TECHNOLOGIES™

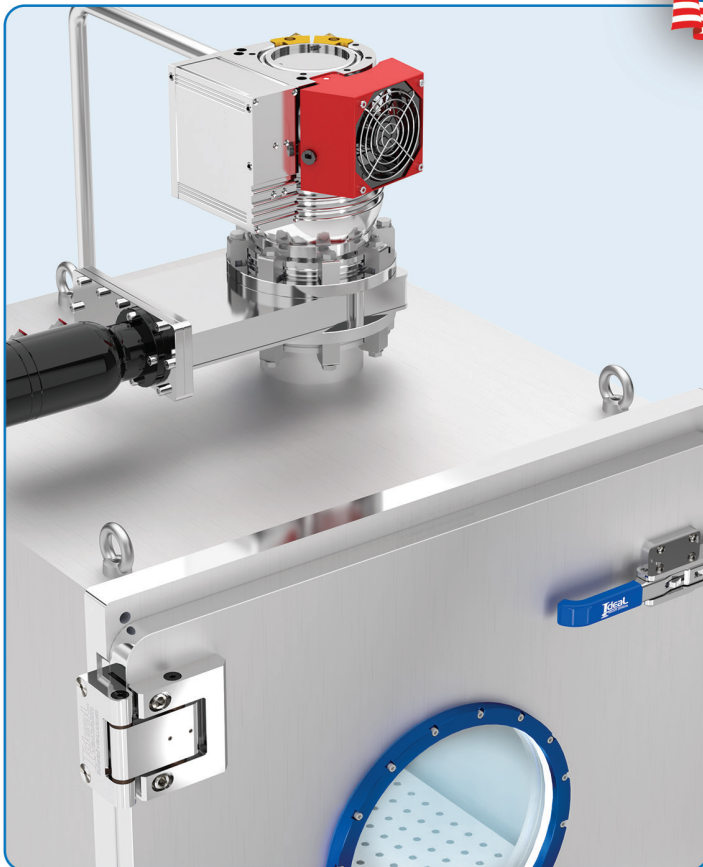


Ideal Vacuum's innovative **AutoExplor™** software is the leading edge in the field of thermal vacuum test chamber automation and control. It brings life and functionality to our **ExploraVAC™** series of thermal vacuum test chambers. It is intuitive and easy to use. In just minutes, a new operator can learn how to use its many functions and features. The software gives the operator the power to precisely set all test conditions and confirm that they were met. Features include manual device control, automated recipe control, data logging, and test report generation. Complex multistep test recipes can be created, where each step may control the on/off state, setpoint, and ramp rate of multiple device functions. The user can quickly generate Environmental Thermal Vacuum Test Reports from recipe data log files. This software ships factory-installed on systems with a built-in touch screen display or may be installed on a PC for remote control.



The *Recipe Creation* section facilitates designing and updating recipes in a step-by-step process, where each step has its own set of device setpoints, ramp rates, and stated conditions. The conditions dictate when the system moves to the next step. The left column shows all the devices and controls installed on the system. The main center section is a scrollable zone which shows each independent step and the controls that are active for that step. Recipe steps are fully programmable to meet any series of unique test condition requirements, including step looping and logical condition grouping (multiple conditions can be joined together with AND or OR to meet the test condition requirements).





ENTRY LEVEL & BASIC (Rough Vacuum)

Rough vacuum is used to store delicate chemical samples, as a pristine environment for spectroscopy, in vacuum coating processes, to remove water or other residual vapors, in plastic curing, and in freeze drying. Whatever the end application, Ideal Vacuum's **ExploraVAC** Entry Level and Basic vacuum systems deliver 20 mTorr at the push of a button.

CHEMICAL RESISTANT

Many chemicals and chemical processes, such as epoxy and plastic curing, freeze drying, chemical storage, harsh environmental testing, and thermal bakeout, involve or release corrosive, caustic, or organic chemicals such as ozone, mineral acids, and organic acids. Ideal Vacuum's **ExploraVAC** Corrosive Chemical Tolerant vacuum systems are equipped with chemical-series, oil-free dry scroll vacuum pumps with impressive resistance against most chemical vapors.

VACUUM OVEN

Vacuum ovens are used by the medical, pharmaceutical, dietary supplement, and cannabis industries to quickly and gently dry heat-sensitive substances and extracts. Vacuum ovens are used by the plastic, rubber, and paper industries to remove dissolved or trapped gases, cure and crosslink resin, and outgas residual monomer to increase strength and rigidity in finished products. Ideal Vacuum's **ExploraVAC MAX** Vacuum Oven system has full chamber heating up to 140 °C and delivers pressures down to 20 mTorr.

PLASTIC & EPOXY CURING

Quality, high-strength, low-outgassing, and low-leaching plastics and epoxies are possible through heated vacuum treatment to remove bubbles and dissolved gases in the liquid resin and bake out unreacted monomer in the finished product. Ideal Vacuum's **ExploraVAC** Epoxy Outgassing and Curing vacuum systems deliver pressures as low as 20 mTorr and have a heated platen for precise sample temperature control.

ALTITUDE SIMULATION, RAPID COMPRESSION & DECOMPRESSION

Aerospace and aeronautical engineers must design parts, components, and electronics that operate under variable pressure experienced during takeoff, cruising at high altitude, and landing. Ideal Vacuum's **ExploraVAC** Altitude Simulation, Rapid Compression, and Decompression systems deliver precise pressure and altitude control from local elevation to 280,000 ft with a maximum simulated rate of rise of 22,500 feet per minute.

AEROSPACE, AERONAUTICAL ENGINEERING, & ENVIRONMENTAL TESTING

Aerospace, aeronautical, and mechanical engineers must design, test, and validate parts, components, and devices that can survive any temperature, pressure, and atmospheric composition. Ideal Vacuum's **ExploraVAC** Aerospace, Aeronautical Engineering, and Environmental Testing vacuum system is capable of temperature control from -70 to 400 °C, pressure control down to 20 mTorr, and has an internally regulated purge gas port for introduction of any user-selected gas or gas mixture.

DEEP FREEZE DRYING

Freeze drying is used by the medical, biological science, and material synthesis communities to remove solvent and contaminants while maintaining sample shape and inner geometry down to the cellular or microscopic level. Ideal Vacuum's **ExploraVAC** Deep Freeze Drying vacuum systems have a high surface area platen that delivers temperatures down to -70 °C and a chemical resistant vacuum pump to handle condensable vapors.

HIGH VACUUM

High vacuum is necessary for precision scientific instrumentation, optical and semiconductor coating and processing, and to simulate the deep vacuum found in space. Whatever the end application, Ideal Vacuum's **ExploraVAC** High Vacuum systems deliver 1×10^{-7} Torr at the push of a button.

SPACE SIMULATION

Satellites, CubeSats, and spacecraft must be prepared to experience constant high vacuum and huge temperature swings as they orbit the earth. Ideal Vacuum's **ExploraVAC** Space Simulation systems have a heated and cooled platen that delivers precise device temperature control from -70 to 400 °C and can apply pressures as low as 1×10^{-7} Torr.

UNIVERSAL

When you need one chamber to do everything, Ideal Vacuum's **ExploraVAC** Universal test chamber comes equipped with all features necessary for chemical tolerance, rough vacuum, pressure control from ambient to 20 mTorr, high vacuum, temperature control from -70 to 400 °C, and user-selected gas purging.

Our **ExploraVAC** thermal vacuum test chambers are configurable with many different chamber sizes and options to meet your product testing needs. They are available with our modular aluminum vacuum cube chambers. Our modular Ideal Vacuum Cube chambers provide the ultimate on-site, user-reconfigurable, environmental simulation system. 9, 12, or 24-inch modular Ideal Vacuum Cubes have chamber plates that may be easily swapped out by the operator and quickly reconfigured for different applications.

MODULAR VACUUM CHAMBERS

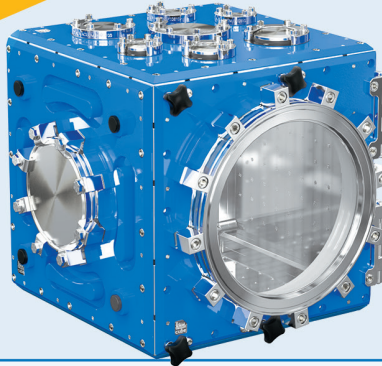
CUBE

9x9x9



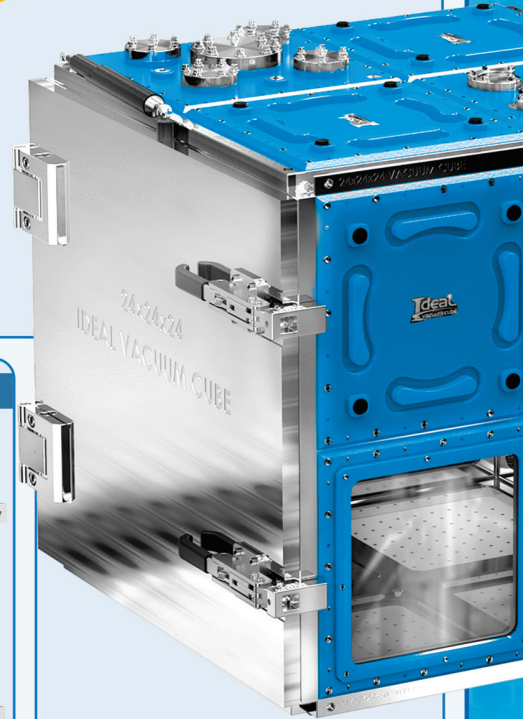
CUBE

12x12x12



CUBE

24x24x24



WELDED

12x12x12



WELDED

16x16x16



WELDED

20x20x20



WELDED

24x24x24



ExploraVAC systems can also be ordered with welded steel chambers with 12, 16, 20, or 24-inch interior cubic dimensions, providing up to 8 ft³ of chamber volume. System options include chamber heating up to 140 °C, a heated and cooled platen from -180 to +400 °C, chemical resistant dry scroll vacuum pumps, high-vacuum turbomolecular pumps for space simulation down to 10⁻⁷ Torr, pressure control for altitude and rapid depressurization simulation, and a purge port for introduction of pressurized gas up to 250 PSIG.

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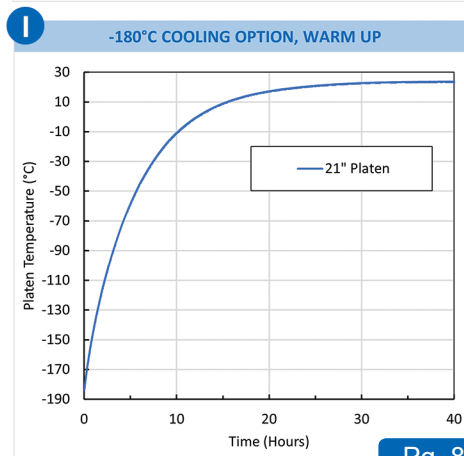
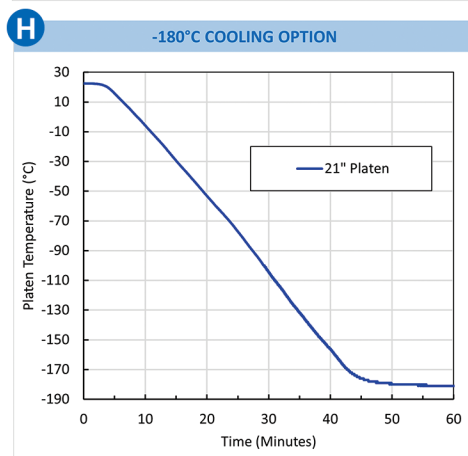
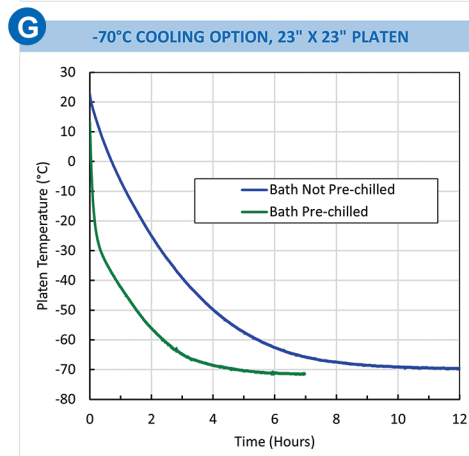
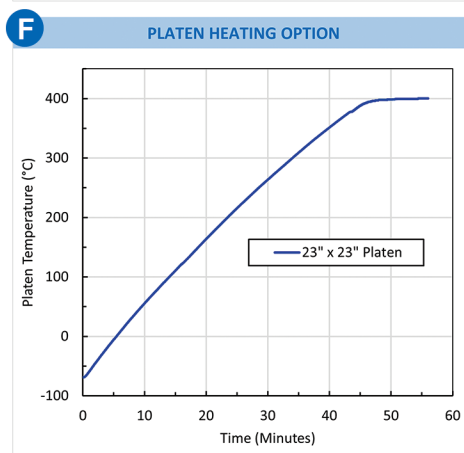
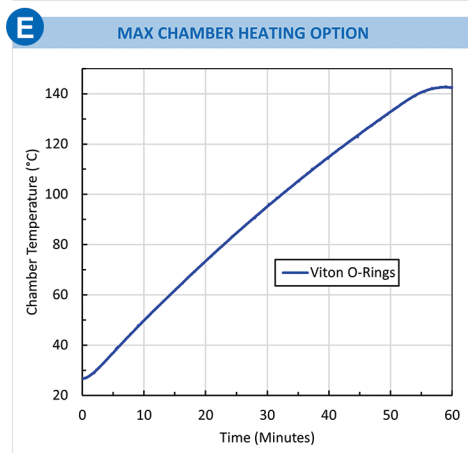
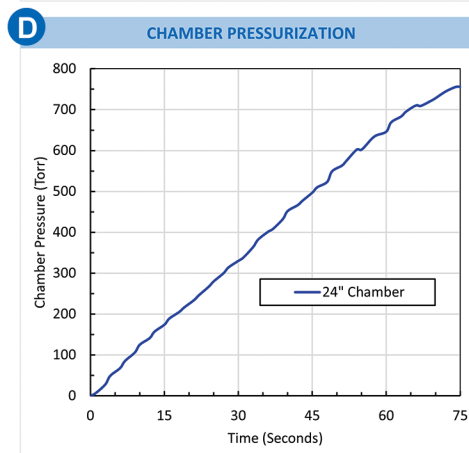
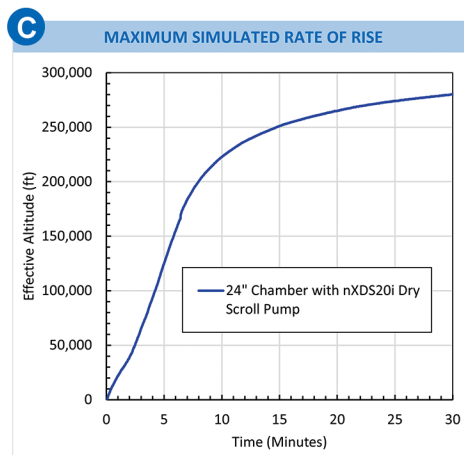
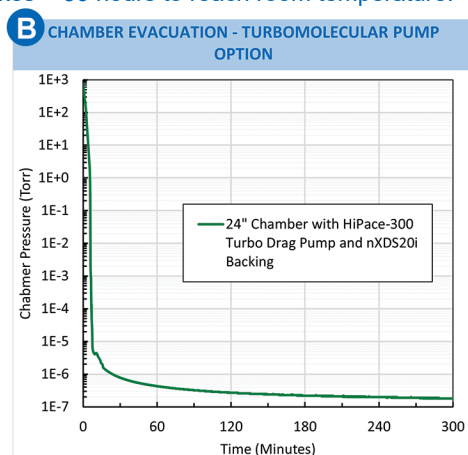
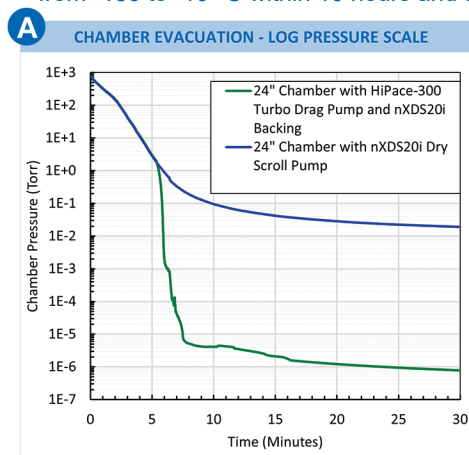
ExploraVAC TEST CHAMBERS

TYPE	ExploraVAC™ MAX		ExploraVAC™	
	PN	SPECIFICATIONS	PN	SPECIFICATIONS
Entry-Level	P1012103	24-in. SS Chamber & nXDS10i	P1012099	12-in. SS Chamber w/ Viewport & nXDS10i
Basic	P1012104	24-in. SS Chamber & nXDS20i	P1012091	20-in SS Chamber w/ Viewport & nXDS20i
Corrosive	P1012114	24-in. Aluminum Chamber & nXDS20iC		
Altitude Simulation	P1012106	24-in. SS Chamber, Pressure Control, Purge Port, & nXDS20i	P1012093	24-in. SS Chamber w/ Viewport, Pressure Control, Purge Port, & nXDS20i
Outgassing	P1012109	24-in. Aluminum Chamber, Wall Heating (140 °C) Thermal Platen (400 °C), & nXDS20iC	P1012096	20-in. SS Chamber W/ Viewport, Pressure Control, Thermal Platen (400 °C), & nXDS20iC
Vacuum Oven	P1012113	24-in. Aluminum Chamber, Wall Heating (140 °C) & nXDS20iC		
High-Vacuum	P1012105	24-in. SS Chamber, HiPace 300 Turbo & nXD-S20i	P1012092	20-in. SS Chamber w/ Viewport, HiPace 300 Turbo, & nXDS20i
Aerospace & Aeronautical	P1012107	24-in. SS Chamber, Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), & nXDS20i	P1012094	24-in. SS Chamber w/ Viewport, Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), & nXDS20i
Advanced High-Vacuum	P1012112	24-in. Aluminum Chamber, Wall Heating (140 °C), HiPace 300 Turbo, & nXDS20i		
Freeze Drying	P1012110	24-in. SS Chamber, Wall Heating (140 °C), Heated & Cooled Platen (-70 to 400 °C), & nXDS20iC	P1012097	20-in. SS Chamber w/ Viewport, Cooled Platen (-70 °C), & nXDS20iC
XtremeFreez	P1012138	24-in. Aluminum Chamber, Wall Heating (140 °C), Pressure Control, Purge Port, Heated and Cooled Platen (-180 to 400 °C), Recirculated Liquid Nitrogen System, HiPace 300 Turbo, & nXDS20iC	P1012134	24-in. SS Chamber w/ Viewport, Pressure Control, Purge Port, Heated and Cooled Platen (-180 to 400 °C), Recirculated Liquid Nitrogen System, HiPace 300 Turbo, & nXDS20iC
Space Simulation	P1012108	24-in. Aluminum Chamber, Wall Heating (140 °C), Purge Port, Heated and Cooled Platen (-70 to 400 °C), HiPace 300 Turbo, & nXDS20i	P1012095	24-in. SS Chamber w/ Viewport, Purge Port, Heated and Cooled Platen (-70 to 400 °C), HiPace 300 Turbo, & nXDS20iC
Universal	P1012111	24-in. Aluminum Chamber, Wall Heating (140 °C), Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), HiPace 300 Turbo, & nXDS20iC	P1012098	24-in. SS Chamber w/ Viewport, Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), Recirculated Cooling System, HiPace 300 Turbo, & nXDS20iC
9-in. Vacuum CUBE Ultimate			P1012116	9-in. Modular Vacuum Cube Chamber, Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), HiPace 80 Turbo, & nXDS10iC
12-in. Vacuum CUBE Ultimate			P1011530	12-in. Modular Vacuum Cube Chamber, Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), HiPace 80 turbo, & nXDS10iC
24-inch Vacuum CUBE Ultimate			P1012133	24-in. Modular Vacuum Cube Chamber, Pressure Control, Purge Port, Heated and Cooled Platen (-70 to 400 °C), HiPace 300 turbo, & nXDS20iC

ACCESSORIES

PN	DESCRIPTION	PN	DESCRIPTION
P1012135	XtremeFreez™ 240 Liter Cryogenic Liquid Cylinder	P108390	CommandValve™ KF16 Smart Butterfly Valve
P1012136	XtremeFreez™ Cryogenic Vacuum Jacketed Hose	P108389	CommandValve™ KF25 Smart Butterfly Valve
P1012137	XtremeFreez™ Cryogenic Solenoid Valve	P108388	CommandValve™ KF40 Smart Butterfly Valve
P107361	Plug & Play Heater Control System	P1010261	XactGauge™ XGC-321 Convection Gauge KF-16
P1012100	AutoExplor™ Software Full Version	P1010260	XactGauge™ XGC-321 Convection Gauge KF-25
P1012101	AutoExplor™ Software Yearly Renewal	P1011205	GP 355 Micro-Ion Hot Cathode Gauge KF-25
P1012102	AutoExplor™ Basic Version Software	P103317	Pfeiffer HiPace-80 Turbomolecular Pump
P105130	Edwards nXDS10i Dry Scroll Vacuum Pump	P103385	Pfeiffer HiPace-300 Turbomolecular Pump
P105124	Edwards nXDS10iC Corrosive Resistant DSVF	P105686	Pfeiffer HiPace-80 Oil Fluid Lubricant Felt
P105132	Edwards nXDS20i Dry Scroll Vacuum Pump	P105687	Pfeiffer HiPace-300 Oil Fluid Lubricant Felt
P105129	Edwards nXDS20iC Corrosive Resistant DSVF	P105546	Edwards nXDS Scroll Pump Tip Seal Service Kit

- A. Pump down curves for a 24-inch welded vacuum chamber with only nXDS20i roughing pump (blue) and with both HiPace 300 turbomolecular and nXDS20i dry scroll vacuum pumps (green). The system pumps down to $\sim 10^{-5}$ torr in ~ 7 minutes.
- B. Pump down curve for a 24-inch welded vacuum chamber with both HiPace 300 turbomolecular and nXDS20i dry scroll vacuum pumps with an ultimate pressure of $\sim 10^{-7}$ Torr.
- C. Pump down curve for a 24-inch welded vacuum chamber plotted as simulated Altitude in units of feet with an nXDS20i dry scroll roughing pump. The ceiling is around 280,000 feet. Additional pumps can be configured to achieve any desired rate of rise and ceiling.
- D. Pressurization by venting of a 24-inch welded vacuum chamber. The chamber goes from vacuum to atmosphere in ~ 1.25 minutes. The chamber pressurization rate of ~ 10 Torr per second is more rapid pressurization than an object feels in free fall.
- E. Heating Ramp of an ExploraVAC MAX 24-inch welded aluminum chamber. A maximum temperature of 140°C is reached within ~ 55 minutes.
- F. Heating ramp of a 23-inch thermally-isolated platen. Temperature rises from -70°C to a maximum of 400°C within ~ 45 minutes.
- G. Cooling curves of a 23-inch thermally-isolated platen with a hassle-free, closed-loop refrigeration system. An ultimate low temperature of -70°C is reached in ~ 4.5 hours with prechilled coolant (green) and ~ 10 hours if coolant is not prechilled (blue).
- H. Cooling curve of a 21-inch thermally isolated platen with an XtremeFreezTM recirculated liquid nitrogen cooling system. An ultimate low temperature of -180°C is reached within ~ 45 minutes.
- I. Warm up curve of a 21-inch thermally isolated platen after being cooled with XtremeFreezTM liquid nitrogen cooling system. The platen is left to warm up naturally by its surroundings, no additional heat is added, and it is kept under vacuum. The platen warms from -180 to -10°C within 10 hours and takes > 30 hours to reach room temperature.



EXPLORAVAC™



Ideal
vacuum