

Environmental Test Chambers





Delta Design Environmental Test Chambers

Rugged, dependable, precision instruments designed with testing and processing ease in mind.

The Delta Design 9000 Series Temperature Chambers offer a wide choice of temperature ranges and capacities in addition to smart electronics. Field-proven by satisfied customers for over four decades, Delta chambers are quality instruments that provide service longevity and integrity unique in their field.

Over the years, Delta has added advanced features to the proven basic chamber design and has refined system components and programming capability to deliver outstanding quality and value.

The Delta family of precision chambers range in test volume from 1/3 cubic foot to 5-3/4 cubic feet, delivering ranges of from -73°C to +315°C, precisely controlled by advanced electronic circuitry. And each chamber is equipped with an adjustable over-temperature protection device.

All chambers are temperature expandable to -184°C, utilizing optional LN₂ cooling. Standard chamber coolant is 1050 psi LCO₂. Models 9059 and 9064 have a 1-1/4" diameter access port on the left side. The Model 9076 has three 7/8" diameter access ports in the rear.

Each chamber is equipped with a Model 9010 temperature controller that allows a program to be repeated up to 9,999 times. Each program step consists of temperature, time and rate of change parameters. Soak time can be up to 100 hours. Built-in controller external interfaces provided are IEEE-488 and RS232. The controller features pushbutton convenience, backlit LCD, battery-backed memory and settable bus address and baud rates. An optional programmer, Model 9020, is available for more extensive test routines.







Standard Temperature Chamber includes:

- Model 9010 Controller with built-in 10-step programmer
- Thermometer
- 1050 psi CO₂ valve
- CO₂ hose/filter
- Instruction manual

Standard Specifications:

- Temperature Accuracy-Setpoint to actual ±1.0°C
- Temperature Deviation-After Stabilization ±0.1°C
- Repeatability ±0.25°C
- Line Voltage Stabilization ±0.25°C for 105-125VAC or 220-240VAC line voltage change
- Failsafe Adjustable over-temperature



	9023	9028	9039		9059	9064	9076	OPTIONS				
Test Volume	0.37 cubic feet (10.5 liters)	0.45 cubic feet (12.7 liters)	0.92 cubic feet (26.05 liters)		1.85 cubic feet (52.4 liters)	2.2 cubic feet (62.3 liters)	5.78 cubic feet (163.7 liters)	DOORS				
Internal Dimensions	8"H x 10"W x 8"D (20.32 x 25.40 x 20.32 cm)	7"H x 16"W x 7"D (17.78 x 40.64 x 17.78 cm)	10"H x 16"W x 10"D (25.40 x 40.64 x 25.40 cm)		11"H x 19.5"W x 15"D (27.94 x 49.53 x 38.10 cm)	12"H x 20"W x 16"D (30.48 x 50.80 x 40.64 cm)	20"H x 20"W x 25"D (50.80 x 50.80 x 63.50 cm)	9015 CONTROLLER				
Overall Dimensions	12.75"H x 17.5"W x 20.75"D (32.38 x 44.45 x 52.70 cm)	12.25"H x 28.75"W x 20.875"D (31.11 x 73.02 x 53.02 cm)	17.875"H x 27.5"W x 24"D (46.40 x 69.85 x 60.96 cm)		17.25"H x 32"W x 25"D (43.82 x 81.28 x 63.50 cm)	21.5"H x 32.875"W x 30.0"D (54.61 x 83.66 x 76.20 cm)	36.25"H x 38.25"W x 37.5"D (92.08 x 97.16 x 95.3 cm)	The Model 9015 Programmer provides automatic sequencing for temperature testing and temperature-dependent processing. Temperature program parameters controlled are Rate of Temperature Change,				
Temperature Range	-73°C to +315°C or -100°F to +600°F OPTION -184°C (-300°F) with optional LN ₂	-73°C to +315°C or -100°F to +600°F OPTION -184°C (-300°F) with optional LN ₂	-73°C to +315°C or -100°F to +600°F OPTION -184°C (-300°F) with optional LN ₂		-73°C to +315°C or -100°F to +600°F OPTION -184°C (-300°F) with optional LN ₂	-73°C to +315°C or -100°F to +600°F OPTION -184°C (-300°F) with optional LN ₂	-73°C to +315°C or -100°F to +600°F OPTION -184°C (-300°F) with optional LN ₂	Soak Time, Temperature Setpoint and Deviation Limits, and the Number of Passes. Additionally, three relays are provided for turning external devices on and off. The state of the three relays is programmable for each segment. Program parameters are entered by front panel buttons with data displayed on an LCD. The program is stored in a battery-backed memory in the event of power loss and retrieved when power is restored. The program may have up to 30 segments and may be repeated up to 9999 times before being automatically shut down. A program review function is provided to allow the operator to sequentially step through all program parameter for the current segment may be displayed without disturbing the operation. Setpoint can range from -184°C to +135°C with a temperature resolution of 0.1°C; soak time from 1 minute to 99 hours, 59 minutes; rate of 99.9°/minute maximum and process deviation limits of 2° to 99.9° or no limits. The programmer incorporates a settable process deviation limit alarm with a front panel indicator and alarm output at the rear panel. A "program lock" position is provided with removable key to safeguard the entered program.				
Heat-up Rate	24°C / minute	20°C / minute	14°C / minute		10°C / minute	8°C / minute	8°C / minute	1 Blank with Tray Available for Models 9023, 9028, 9039				
Cool-Down Rate	31°C / minute	25°C / minute	36°C / minute		22°C / minute	20°C / minute	12°C / minute	2 Blank—No Tray Available for Models 9059, 9064, 9076*				
LCO ₂ Consumption	5.6 lbs / hr @ -53°C (-65°F)	6.5 lbs / hr @ -53°C (-65°F)	7 lbs / hr @ -53°C (-65°F)		9.62 lbs / hr @ -53°C (-65°F)	11.6 lbs / hr @ -53°C (-65°F)	15 lbs / hr @ -53°C (-65°F)	3 Ten 3/8" dia. Ports with Tray Available for Models 9023, 9028, 9039				
Air Circulation	Vertical air flow pattern	Horizontal air flow pattern	Vertical air flow pattern		Horizontal air flow pattern	Vertical air flow pattern	Horizontal air flow pattern	4 Window and Five 3/8" dia. Ports with Tray Available for Models 9023, 9028, 9039				
Power Requirements	120VAC, 50 or 60 Hz, single Ø, 1800W 208VAC, 50 or 60 Hz, 3-wire, single Ø, 1800W 208VAC, 50 or 60 Hz, 4-wire, single Ø, 1800W 240VAC, 50 or 60 Hz, single Ø, 1800W	120VAC, 50 or 60 Hz, single Ø, 1800W 208VAC, 50 or 60 Hz, 3-wire, single Ø, 1800W 208VAC, 50 or 60 Hz, 4-wire, single Ø, 1800W 240VAC, 50 or 60 Hz, single Ø, 1800W	120VAC, 50 or 60 Hz, single Ø, 1800W 208VAC, 50 or 60 Hz, 3-wire, single Ø, 1800W 208VAC, 50 or 60 Hz, 4-wire, single Ø, 1800W 240VAC, 50 or 60 Hz, single Ø, 1800W		120VAC, 50 or 60 Hz, single Ø, 1800W 208VAC, 50 or 60 Hz, 3-wire, single Ø, 1800W 208VAC, 50 or 60 Hz, 4-wire, single Ø, 1800W 240VAC, 50 or 60 Hz, single Ø, 1800W	120VAC, 50 or 60 Hz, single Ø, 1800W 208VAC, 50 or 60 Hz, 3-wire, single Ø, 1800W 208VAC, 50 or 60 Hz, 4-wire, single Ø, 1800W 240VAC, 50 or 60 Hz, single Ø, 1800W	208VAC, 50 or 60 Hz, 3-wire, single Ø, 4800W 208VAC, 50 or 60 Hz, 4-wire, single Ø, 4800W 240VAC, 50 or 60 Hz, single Ø, 4800W	5 Ten 3/8" dia. Ports —No Tray Available for Models 9059, 9064				
Net Wt. (approx.)	47 lbs (21.3 Kg)	55 lbs (24.9 Kg)	85 lbs (38.6 Kg)		98 lbs (44.5 Kg)	115 lbs (52.2 Kg)	232 lbs (105.9 Kg)	6 Window Door for Chamber Model 9076				
Shipping Wt. (approx.)	47 lbs (21.3 Kg)	70 lbs (31.8 Kg)	100 lbs (45.4 Kg)		105 lbs (47.6 Kg)	235 lbs (106.6 Kg)	413 lbs (188.5 Kg)	9111 TEMPERATURE MONITOR				
												
											Monitoring of temperature excursions between two preset limits is provided by the Temperature Monitor. If limits are exceeded, power to the monitor unit is removed, a warning lamp is illuminated, and an audible alarm is activated. When temperature is again within limits, the monitor may be reset for continued operation. A combination pyrometer scale provides reading at a glance with both Fahrenheit and Centigrade ranges.	
											9145 BURN-IN SYSTEM	
											The Delta Design Burn-In System utilizes a versatile circuit board approach which allows the mounting of any combination of device sockets. An internal load rack design accommodates a density of greater than one device per cubic inch of chamber space (for 14-pin DIP devices), mounted in a useable space of 7" x 10" per board. The environmental chamber provides flexible rear wall seals which allow the circuit board connectors of the device under test to be outside the high temperature environment. The Model 9145 comprises: Temperature Chamber with Controller; Cart; Power Control Module; Chamber Door; Internal Rack for PC boards; 6-Pin PC Connector for each board position with three wires from each connected to a bus bar. The cart assembly provides standard rack mounting space for instruments and power supplies. Operating temperature range is +40°C to +315°C and -73°C to +315°C using optional CO2 or LN2 coolant. The chamber design provides temperature gradients of ±3°C up to +150°C. Additional features: Adjustable Mechanical Over-Temperature Protection Device Loss of Airflow Protection Device Ambient Air Venting Power Control Module with Automatic Shutdown Mounting Space for Power Supplies and Instruments	
												

Delta Design

9000 SERIES

Environmental Test Chambers

CARTS



Carts are available for most chambers. The Model 9901 Cart is an open framework design and is used with a Model 9076 chamber. The Model 9904 Cart holds a test chamber and two 50-pound LCO₂ siphon bottles. It is used with a Model 9023,

9028, 9039, 9059, or 9064 test chamber. All carts have casters, two of which swivel and are lockable.



DELTA DESIGN, INC.

12367 Crosthwaite Circle, Poway, CA 92064-6817
858-848-8000 Fax 858-848-8180 info@deltad.com

WWW.DELTAD.COM