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# Environmental

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- Steady State
- Sterilization
- Stress Relief
- Temperature/Humidity
- Thermal Cycling
- Thermal Shock
- Underfill Cure
- Vacuum
- Vivariums

# Environmental

S O L U T I O N S



*Images are for reference only. Some options and accessories may not be included with all configured models.*

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## > Tenney

Classic Tenney Series - Wide Range Testing

### Classic Tenney Series

The Tenney Classic Series of temperature and humidity test chambers deploys environmentally friendly technology that uses CFC-free refrigerants. The time-proven mechanical refrigeration systems are available in single or cascade systems and allow for years of worry-free use.

The Classic Series temperature and humidity test chambers are available in 10, 20, 30, 40, and 64 cubic feet models, all of which are available with single or cascading refrigeration systems.

#### ► Features

- Semi hermetic refrigeration system
- Vertical recirculation conditioning system
- Automatic defrost for door gaskets
- Control tolerance between  $\pm 0.3^{\circ}\text{C}$  and  $\pm 2\%$  RH typical after stabilization
- Non-corroding parts on all humidity capable units
- Low water protection



10, 20, and 30 cubic foot models

Overall dimensions in inches (mm) for the 10, 20, and 30 cubic foot models:

Model	Non-humidified	T10S	T10C	T20S1.5	T20C-3	T20C-4	T30S	T30C
	Humidified	T10RS	T10RC	T20RS1.5	T20RC-3	T20RC-4	T30RS	T30RC
Workspace	W	24(610)		30(762)			36(914)	
	D	27(686)		32(813)			40(1016)	
	H	28(711)		36(914)			36(914)	
Exterior	W	30(762)		41(1041)			46(1168)	
	D	47(1194)		55(1397)			64(1625)	
	H	74(1880)		84(2134)			84(2134)	
Temperature & Humidity								
Low	°C	-40°C	-73°C	-40°C	-73°C	-73°C	-40°C	-73°C
High	°C	+200°C	+200°C	+200°C	+200°C	+200°C	+200°C	+200°C
Change Rates in Minutes								
Time starting at Ambient to listed temperature. Based on empty chamber.	200°C	30	30	60	60	60	70	70
	150°C	20	20	40	40	40	50	50
	93°C	15	15	25	25	25	25	25
	65°C	10	10	15	15	15	15	15
	0°C	10	5	40	10	5	40	10
	-18°C	20	10	60	15	10	60	15
	-40°C	60	20	90	30	20	90	25
	-54°C	—	25	—	40	25	—	35
	-65°C	—	35	—	50	35	—	50
Live Load Capacity in Watts (Humidity System Off)								
Temperature	+10°C	600	1275	600	1200	1800	600	1600
	-18°C	450	1000	450	1000	1500	500	1400
	-40°C	100	850	100	850	1275	250	1200
	-54°C	—	600	—	700	1050	—	1000
	-65°C	—	400	—	500	750	—	700
Utilities, etc								
Refrigeration		(1)1.5HP	(2)1.5HP	(1) 1.5HP	(2) 1.5HP	(2) 2HP	(1) 2HP	(2) 2HP
Heater Capacity		2.5 KW		2.5 KW (3 KW If 208 Option)				
Humidifier	KW	1 KW		2 KW				
	GPH	0.5		1				
AMPS @ 230V. 1 Ph		28	30	32	34	35	34	35
AMPS Fuse		35	40		45			
Unit Weight	LBS.	850	950	1250	1350	1400	1500	1500

► Options:

- IEEE interface
- LinkTenn software for Windows®
- RS-422, 423, 232 or 485 interface assemblies
- 6-event relay board at 1 amp each
- Water demineralizer
- Water reservoir for humidity system (5 gallon)
- Recirculating system for humidity water
- Viewing window, thermally insulated and heated
- Interior light
- Shelving, adjustable and removable
- Water-cooled refrigeration system
- Alternate power supply wiring
- Automatic CO2 or LN2 cooling boost system
- Additional ports, gloves, etc.
- 5" or 6" rubber tire casters (3" phenolic casters are standard)
- GN2 purge system
- Refrigeration taps and pressure gauges
- Remote console for instrumentation
- Recording instruments
- Redundant thermal protection and alarm system
- External dryer for obtaining humidity as low as 5% (to 20°C)
- Alternate refrigeration and/or heating systems for faster temperature change rates or increased product load handling capabilities

All specifications are subject to change without notice.

Humidity capability: 20% to 98% RH in the dry bulb range of +20°C or +85°C as limited by a 3°C dew point. Test data based on 24°C ambient, sea level, 60 Hz. On 50 Hz or higher than 24°C, ambient performance may be reduced. Consult factory regarding any special cooling requirements.

40 and 64 cubic foot models

Overall dimensions in inches (mm) for the 40 and 64 cubic foot models:

Model	Non-humidified	T40S-2	T40C-4	T40C-6	T64S-7.5	T64C-6	T64C-15						
	Humidified	T40RS-2	T40RC-4	T40RC-6	T64RS-7.5	T64RC-6	T64RC-15						
Workspace	W	40(1016)			48(1219)								
	D	44(1118)			48(1219)								
	H	40(1016)			48(1219)								
Exterior	W	66(1676)			72(1829)								
	D	73.5(1867)			81.5(2070)								
	H	80.25(2038)			91(2311)								
Temperature & Humidity													
Low	°C	-40°C	-73°C	-73°C	-40°C	-73°C	-73°C						
High	°C	+200°C	+200°C	+200°C	+200°C	+200°C	+200°C						
Change Rates in Minutes													
Time starting at Ambient to listed temperature. Based on empty chamber.	200°C	35			45								
	150°C	25			30								
	93°C	10			15								
	65°C	5			10								
	0°C	5			5								
	-18°C	20	—	—	10	10	—						
	-40°C	120	—	—	25	30	—						
	-54°C	—	45	40	—	45	20						
	-65°C	—	60	50	—	65	35						
Live Load Capacity in Watts (Humidity System Off)													
Temperature	+10°C												
	-18°C	1000	—	—	4500	—	—						
	-40°C	100	—	—	1000	—	—						
	-54°C	—	1200	2000	—	1200	4000						
	-65°C	—	900	1500	—	800	2500						
Utilities, etc													
Refrigeration	(1) 2 HP	(2) 2 HP	(2) 3 HP	(1) 7.5 HP	(2) 3 HP	(2) 7.5 HP							
Heater Capacity	6	6	6	8	8	8							
Humidifier	KW	2	2	2	2	2	2						
	GPH	1	1	1	1	1	1						
AMPS	230V. 1 Ph	230V. 1 Ph	230V. 3 Ph	230V. 3 Ph	230V. 3 Ph	230V. 3 Ph							
S & C	RC & RS	41	50	50	38	46	71	80	71	80			
Fuse		50	60	60	60	70	100	110	70	80	100	110	
Unit Weight	LBS.	2740						3540					

Humidity capability: 20% to 98% RH in the dry bulb range of +20°C or +85°C as limited by a 3°C dew point. Test data based on 24°C ambient, sea level, 60 Hz. On 50 Hz or higher than 24°C, ambient performance may be reduced. Consult factory regarding any special cooling requirements.

Custom and standard environmental rooms to match your application and facility needs.

When your testing requires walk-in rooms, choose Tenney. Our test rooms feature automated process control, energy efficiency, and a vast range of features and options.

### Standard and Custom Walk In Rooms

Every Tenney environmental room features state-of-the-art equipment that reliably produces required conditions, structural integrity that keeps the room working properly through years of demanding test cycles, and measuring/monitoring equipment that precisely records all test data.

Tenney environmental rooms are used world-wide for many testing applications. Almost every tool, product or component that is used in the home, factory or field is tested with environmental simulation equipment. Tenney's engineering experience can deliver environmental rooms to meet your exact requirements:

#### ► Features

- Temperature range from -65 to +200°C
- Humidity range from 20% to 95% in the dry bulb range of +20 to +85°C, limited by a 3 degree dew point
- Modular panels consist of 4" foam polyurethane insulation
- 16 gauge stainless steel floors that can support 500 lbs per sq. ft.

#### ► Applications

- Automotive
- Appliance
- Microelectronics
- Electrical
- Microbiology
- Medical Research
- Energy Technologies



## Tenney offers walk-in environmental rooms in both standard and custom configurations to meet your process requirements.

### Standard Panelized Walk-In Chambers

The interlocking panelized chambers can be quickly shipped and assembled for less cost than a non-panelized chamber. The chamber panels interlock using a tongue and groove assembly that can be secured using cam latches and silicone sealant. The latches connect to metal banding links that are embedded in the panels to create a structurally strong chamber.

#### ► Construction

- Temperature range: -73°C to 85°C
- Humidity range: 20% to 95%
- Modular design for easy transport and setup
- 4" (100mm) insulated wall panels
- Interior lighting
- Optional 3" or 6" ports
- Thermally insulated and heated windows
- 36" x 78" door

#### ► Special Features

- Redundant over temperature protection and alarms
- Heavy duty floor supports 1000 lb/ft<sup>2</sup> of equally distributed weight
- Refrigeration taps and pressure gauges
- Optional water demineralization
- Optional external dryers to achieve very low humidity levels
- Optional charts



### Controls

The microprocessor-based controller allows the operator to program up to 40 profiles, including the common steps of ramp, soak, and guaranteed soak. The user-friendly 7" touch screen display also includes ports for Ethernet, USB, serial, and SD card connections.

The controller provides data logging, alarm and event monitoring, and remote access from any computer with internet access. The included dual alarm relays can be programmed as either process or deviation alarms.





## Flexibility

Each chamber panel consists of 4" (100mm) thick urethane foam between a stainless steel interior wall and a galvanized exterior wall. After the chamber panels are assembled, the walk-in room is self-supporting, eliminating the need for additional structure supports. The chambers can be ordered with different door sizes, access ports, and options as necessary.

## Efficient Tenney Humidity and Conditioning System

- Durable and reliable construction
- High quality compressors
- Tenney Vapor Flow®
- Easy access panel for maintenance
- Quiet operation

## Approximate Maximum Water Requirements Horsepower (GPM)

Customer's Inlet Water Temperature	oF	30HP	25HP	15HP	10HP	7.5HP	5HP	3HP	2HP	1HP
85	65	50	32	23	16	12	7	5	2.5	
75	32	28	18	18	9	7	3.5	3	1.5	
65	22	19	12	12	6	5	2.5	2.5	1	
55	16	14	12	9	4.5	3.5	2	1.5	.75	
45	13	11.5	7.5	7.5	4	4	1.5	1	.50	

- Water flow in gallons per minute rounded to the nearest .50 GPM.
- Consumption is based upon maximum flow rates. A regulating valve modulates actual required water to cool as needed.
- Minimum pressure recommended is 30 PSI.
- Maximum pressure recommended is 100 PSI.
- Water systems containing glycol require additional flow. Contact factory.
- Cooling performance and usage is dependent upon piping runs, fittings, valves, and vertical runs.
- For cascade refrigeration use the R-404A compressor side only for horsepower. R-404A cools the R-508B (SUVA 95) side.

All specifications are subject to change without notice.

## Options

- Flooring & Coverings
- Floor Coverings
- Windows and Ports
- Ramps
- Remotely Located Refrigeration
- Temp., Airflow and Humidity Control
- Chart Recorder Options
- Test Product Heat Dissipation
- Lighting & Insulation Options
- Room Air Exhaust and Fresh Air Input
- Safety Systems (heat overload, fire, gas monitoring, door locks, sound levels)
- Water and Air Supply Conditioning
- CO2 and LN2 Injection
- Extended Humidity Range
- Rigid Hard Walled Frame for Strength
- Stainless Steel Interior Hermetically Welded

## Single & Cascade Refrigeration

SINGLE: -40 to 85° C  
 CASCADE: -73 to 85°C



Drive-in room for vehicle testing.

Automated process controls and data recording.

Tenney rooms offer many safety features.



Modular panelized rooms for easy transport and set up.

## Steady State Environmental Rooms

The Tenney series of steady state environmental rooms provide a large, walk-in workspace for temperature and humidity testing.

- steady state temperature and humidity testing
- stability and shelf life testing
- cold room labs
- incubation

Rooms can be designed to include:

- heating
- refrigeration
- humidification
- dehumidification
- lighting

Our flexible, interlocking panelized construction can easily accommodate any arrangement and a variety of heights. The strong, lightweight panels provide optimum insulation, the stability to add on or rearrange, and years of worry-free service. Conveniently located control panel allows easy monitoring of all room functions, while state-of-the-art controls provide precise regulation of the simulated environment.



## Features

- Textured or smooth aluminum or stainless wall panels with integrated insulation
- Room panels can be easily rearranged and panels can be added to accommodate expansion to the room
- For heating, cooling, humidification, or dehumidification, air is circulated through a conditioning plenum in both ceiling and wall systems
- Maximum airflow uniformity
- Extremely quiet operation
- Programmable controls, timing devices, chart recorders, and remote access options

## Stability Test Chambers

- Meets all present and future ICH guidelines
- A large selection of standard chamber sizes: 10 - 58 cubic feet
- Available in four temperature or temperature and humidity combinations
- Chambers can be equipped with optional lighting systems for photostability testing
- Assistance with IQ/OQ protocols or complete chamber validation is available
- Optional computer interface with Windows-based software for multiple chamber monitoring
- Ideal for stability, shelf life, burn-in, and reliability testing; curing; and controlled temperature storage

## Forced Air Ovens

- Offer workspace of 1 - 28 cubic feet
- Temperatures from 10 degrees above ambient to 300 degrees C
- Timed cycle operation, programmable up to 99 hours
- Stainless steel shelves
- Optional recording instruments, windows, casters, and support stands
- Ideal for shelf life, stability, burn-in, and reliability testing; drying, curing, and aging



## Tenney Junior Compact Temperature Test Chambers

These Tenney Junior temperature test chambers are well-suited for use in electronic, military, and pharmaceutical quality assurance and reliability testing, as well as research testing and production processes. In keeping with the needs of today's lab, we specifically designed these benchtop and floor chambers to have a compact exterior, yet an ample interior workspace to maximize valuable floor space.

### ► Features

- All models feature vapor-tight, continuously welded stainless steel interiors.
- Structural reinforcement is used at all critical points.
- A combination of fiberglass and polyurethane insulation surrounds the temperature chamber to maximize insulating characteristics, thus ensuring minimal thermal transfer.



Overall dimensions in inches/mm

Model		TJR	TUJR
Workspace	W	16 / 406	
	D	11 / 279	
	H	11.75 / 298	
Exterior	W	37 / 940	25-5/8 / 650
	D	22-1/2 / 572	21-7/8 / 560
	H	31-3/4 / 807	60 / 1524
Temperature Range			
Low	°C	-75	
High	°C	+200	

Utilities, etc			
Refrigeration	(2) 1/2 HP		
Heater Capacity	500 W		
Amps@120V / 1Ph / 60Hz	18		
Amps Fuse	20		
Unit Weight lbs/kg	292 / 132	336 / 152	

Change Rates in Minutes - Chamber Empty	
Ambient to 200°C	60 minutes
Ambient to 185°C	50 minutes
Ambient to 160°C	40 minutes
Ambient to 140°C	30 minutes
Ambient to 105°C	20 minutes
Ambient to 70°C	10 minutes
Ambient to 25°C	0 minutes
Ambient to -15°C	10 minutes
Ambient to -40°C	20 minutes
Ambient to -54°C	30 minutes
Ambient to -65°C	40 minutes
Ambient to -73°C	55 minutes
Ambient to -75°C	Ultimate

Live Load Capacity in Watts (humidity system off)		
Temperature	-40°C	170
	-54°C	145
	-65°C	105
	-73°C	60
	-75°C	Ultimate

All specifications are subject to change without notice.

► Options:

- GN2 Purge System
- Dry Air Purge System
- LinkTenn 32 Controller Software
- Tempguard IV Overtemperature Protection
- Viewing windows up to 6" x 8" and thermally insulated
- Interior lighting
- Shelving, adjustable and removable
- Automatic CO2 or LN2 cooling boost system
- Recording instruments
- External dryer for obtaining humidity as low as 5%
- Alternative power supply options for many global current schemes
- Cart system to allow chamber to be moved within a facility
- Stacking option for bench model
- Intrinsically safe interior

All specifications are subject to change without notice.

## T2 Series Wide Range Temperature and Humidity Test Chambers

The Tenney T2 temperature and humidity cycling chamber simulates a wide range of temperature and humidity conditions while utilizing minimal floor space. We specifically designed these environmental chambers to have a compact exterior and an ample interior workspace.

The T2 Temperature and Humidity Cycling Chamber design allocates space within the interior of the cabinet for all standard options. This greatly improves the mobility of the unit as well as the overall appearance.

### ▶ Standard Features:

- Vapor-tight, continuously welded stainless steel interiors
- Minimum footprint
- Units are mobile
- Touch screen controller provides precise control over chamber operations and monitoring, and is mounted at eye level (VT III and Watlow F4 are not touch screen)
- Low workspace height to ease the loading and unloading of product
- Accurate control and display with minimum maintenance
- Vertical recirculation conditioning system



Model		T2RC	T2C
Workspace inches-(mm)	W	16 (406)	17 (432)
	D	13.5 (343)	13 (330)
	H	16 (406)	16 (406)
Exterior inches-(mm)	W	26 (660)	27 (686)
	D	26 (660)	27 (686)
	H	67 (1702)	65 (1651)
Temperature Range & Humidity			
Low	° C	-75	-75
High	° C	+200	+200
Change Rates in Minutes			
Ambient to °C Chamber Empty	200°C	90 Minutes	90
	150°C	40 Minutes	40
	100°C	25 Minutes	25
	93°C	17 Minutes	17
	65°C	9 Minutes	9
	2°C	5 Minutes	5
	-7°C	7 Minutes	7
	-12°C	10 Minutes	10
	-40°C	30 Minutes	30
	-54°C	45 Minutes	45
	-65°C	70 Minutes	70
	-73°C	100 Minutes	100
	-75°C	Ultimate	Ultimate
Utilities, etc			
Refrigeration		(2)1/2 HP + 1/2 HP	(2)1/2 HP + 1/2 HP
Heater Capacity		500 W	500 W
Humidifier	W	500	-
	GPH	0.15	-
AMPS @ 115V, 1Ph		18	18
AMPS Fuse		20	20
Unit Weight	LBS/Kg	350/158	350/158

### ► Options:

- IEEE/488 interface
- LinkTenn software for Windows® that permits your computer to control up to 10 chambers
- RS-422, 423, 232 or 485 interface assemblies
- Upgrade to VersaTenn III (standard on T2RC)
- Water reservoir for humidity system (5 gallon)
- Recirculating system for humidity water
- Additional ports
- Event relay board
- Water demineralizer
- Viewing window, 6" x 7", thermally insulated and heated (no manual wiper required)
- Interior light
- Shelving, adjustable and removable
- Automatic CO2 or LN2 cooling boost system
- Automating boost heating system
- GN2 purge system
- Recording instruments
- Redundant thermal protection and alarm system
- External dryer for obtaining humidity as low as 5% (to 20°C)
- Alternate power supply wiring

All specifications are subject to change without notice.

- Humidity capability: 20% to 95% RH in the dry bulb range of +20°C to 85°C as limited by a 3°C dewpoint. Test data based on 24°C ambient, sea level, 60Hz.
- On 50 Hz or higher than 24°C ambient, performance may be reduced. Consult factory regarding any special cooling requirements. CFC-free refrigerants are used exclusively on all Tenney chambers.

### ETCU Temperature Humidity Cycling Chambers

The Tenney ETCU Ultimate Series Temperature Humidity Cycling Chamber features scroll compressor technology that provides quiet operation, fast transition rates, and reliable operations.

The chambers incorporate a ceiling plenum to diffuse conditioned air vertically through the chamber. The top to bottom air circulation guarantees stable and consistent performance over the testing period.

Multiple heating and cooling systems are available, as well as a diverse list of options that together will create the chamber to accommodate your specific application.

#### ► Features

- Quiet Operation
- Fast Transition Rates
- High Reliability
- Refrigeration System
- Temperature and Humidity Testing
- Versa Tenn V control system
- Automatic Humidity Vent

#### ► Options:

- IEEE488 Interface
- LinkTenn 32 for Windows® That Permits Your Computer to Control up to 10 Chambers
- 6-event Relay Board
- Water Demineralizer System
- Circular Recording Instruments
- Alternate Refrigeration and/or Heating Systems for Faster Temperature Change Rates or Increased Product Load-Handling Capabilities
- Additional Ports

Contact TPS for details and availability. All performance data is for 230 or 460v and 60 Hz operations. Chamber operations utilizing 50 Hz power utility will derate performance approximately 17%.





Model	ETCU-09			ETCU-16			ETCU-30				ETCU-64				
Interior Volume	9 cu. ft.			16 cu. ft.			30 cu. ft.				64 cu. ft.				
	256 liters			460 liters			850 liters				1,812 liters				
Interior Dimensions	24 x 25 x 26			36 x 26 x 30			40 x 36 x 36				48 x 48 x 48				
WxDxH - inches (mm)	(610 x 635 x 660)			(914 x 660 x 762)			(1016 x 914 x 914)				(1219 x 1219 x 1219)				
Exterior Dimensions	34 x 73 x 78			46 x 74 x 82			50 x 87 x 88				58 x 99 x 100				
WxDxH - inches (mm)	(864 x 1854 x 1983)			(1169 x 1881 x 2084)			(1271 x 2211 x 2237)				(1474 x 2516 x 2542)				
Nominal Horsepower	3.5 x 3.5	6 x 6	10 x 10	3.5 x 3.5	6 x 6	10 x 10	3.5 x 3.5	6 x 6	10 x 10	15 x 15	3.5 x 3.5	6 x 6	10 x 10	15 x 15	
Rated Horsepower	2.5 x 2.5	5 x 5	10 x 10	2.5 x 2.5	5 x 5	10 x 10	2.5 x 2.5	5 x 5	10 x 10	15 x 15	2.5 x 2.5	5 x 5	10 x 10	15 x 15	
Compressor Type	Scroll			Scroll			Scroll				Scroll				
Noise (dBA)	Heating	60	60	60	60	60	60	60	60	60	60	60	60	60	
	Cooling	68	75	75	68	75	75	68	75	75	75	68	75	75	
Heating Elements (Kw)	230/460	6	12	12	6	12	12	6	12	12	24	6	12	12	24
	208V	4.5	9	9	4.5	9	9	4.5	9	9	18	4.5	9	9	18

Model	ETCU-09			ETCU-16			ETCU-30				ETCU-64			
Cooling Rate (min)														
190°C to -65°C	49	34	14	78	36	19	155	76	31	20	256	125	52	42
71°C to -65°C	36	26	11	40	28	15	119	59	26	17	197	97	44	33
85°C to -40°C	27	18	8	32	20	12	95	42	21	12	157	69	36	24
Heating Rate (min)														
-65°C to 190°C	35	16	16	32	22	22	60	30	30	20	110	53	53	27
-65°C to 71°C	17	8	8	14	11	11	27	13	13	10	45	23	23	13
-40°C to 85°C	16	8	8	12	10	10	27	13	13	11	45	23	23	14
Water Cooled	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Air Cooled	Y			Y	Y		Y	Y			Y	Y		
208/230V-1 Ph	Y	N/A	N/A	Y	N/A	N/A	Y	N/A	N/A	N/A	Y	N/A	N/A	N/A
208/230V-3 Ph	Y	Y	N/A	Y	Y	N/A	Y	Y	N/A	N/A	Y	Y	N/A	N/A
460V-3 Ph	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Air Delivery (Blower HP)	.5 HP			(2) .5 HP			(2) .75 HP				(2) .75 HP			
Airflow (CFM)	750			1600			1600				1600			
Temp Unif. (Std Dev/9 Pt)	+/-0.5°C/+/-1°C			+/-0.5°C/+/-1°C			+/-0.5°C/+/-1°C				+/-0.5°C/+/-1°C			
Temp Control	+/-0.3°C			+/-0.3°C			+/-0.3°C				+/-0.3°C			

- Single Stage Refrigeration Temperature Range: -35°C to 200°C
- Performance is based upon an empty chamber operating at 24°C (75°F) ambient air and may vary slightly at other ambient temperatures. Voltages below those listed may affect performance. All performance data is for 240 or 480V / 60Hz operation.
- Liquid nitrogen is available as an option on all systems. When Liquid Nitrogen is provided, the heater KW is automatically upgraded to the maximum for that chamber size. Consult factory for current draw of any liquid nitrogen equipped chambers.
- Airflow circulation is based on blower wheel performance curves. Actual circulation rate will vary depending on the cooling option selected.
- Temp. uniformity standard deviation from mean, measured at -25°C and 100°C.
- 9 Point Uniformity measured in accordance with ASTM E145 section 4 at temperatures of -25°C and 100°C.
- Test chamber performance may be affected by the addition of certain optional accessories.
- Chamber operation utilizing 50Hz power utility will derate performance approximately 17%
- It is Thermal Product Solutions' policy to constantly improve quality, features and performance. Thermal Product Solutions reserves the right to change specifications without notice.

## ETCU Series Solar Panel Testing Environmental Test Chambers

The ETCU series was designed specifically for solar panel testing and features integrated options to provide reliability, quiet operation, and proven performance for your testing requirements. The ETCU series uses the latest in HFC environmentally friendly refrigerants, which generate much lower compressor temperatures.

### Construction

All models feature vapor-tight, continuously welded stainless steel interiors. Structural reinforcement is used at all critical points. Through-wall ports are continuously welded. A combination of fiberglass and polyurethane insulation surrounds the chamber to maximize insulating characteristics, thus ensuring minimal thermal transfer.



	ETCU 110 Environmental Test Chamber For Solar Panel Testing Specifications	ETCU 132 Environmental Test Chamber For Solar Panel Testing Specifications
Temperature Range	-60°C to +200°C	-60°C to +200°C
Humidity Range	20% to 98% in the dry bulb temperature range of 20°C to 85°C limited by a 3°C dew point	20% to 98% in the dry bulb temperature range of 20°C to 85°C limited by a 3°C dew point
Interior Dimensions W x D x H in. (cm)	40" wide x 79" deep x 60" high (101.6 x 200.7 x 152.4)	48" wide x 79" deep x 60" high (121.9 x 200.7 x 152.4)
Exterior Dimensions W x L x H in. (cm)	65.5" wide x 119" long x 112" high (166.4 x 302.3 x 284.5)	75.5" wide x 119" long x 112" high (191.8 x 302.3 x 284.5)
Standard Voltage	460V 3 Phase 60 Hz.	460V 3 Phase 60 Hz.
Cabinet Type	Floor Model	Floor Model

#### ► Features:

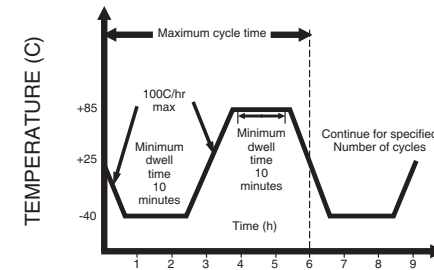
- Meets the following standards:  
UL 1703 sections 35 and 36  
IEC 60068 section 2.78  
IEC 61215 sections 10.11, 10.12 and 10.13  
IEC 61646 sections 10.13  
IEC 62108 sections 10.6, 10.7, 10.8  
ASTM E1171-04 sections 6.5, 6.6 and 6.7
- Temperature and Humidity Testing +85°C and 85%
- Tenney VersaTenn V control system
- Large Chamber Space Tailored to Standard Solar Panel Sizes
- Quietest Operation
- High Reliability Refrigeration System
- Improved Cost of Ownership
- Automatic Humidity Vent
- Panel Mounting Clips

#### ► Options:

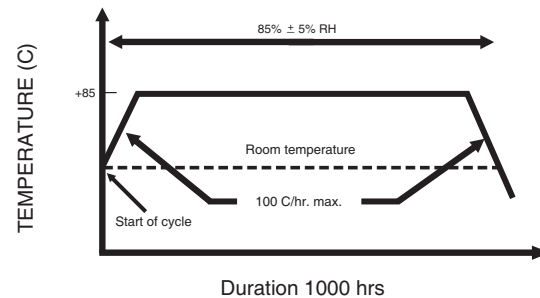
- IEEE488 Interface
- LinkTenn 32 for Windows® That Permits Your Computer to Control up to 10 Chambers
- 6-event Relay Board
- Water Demineralizer System
- Circular Recording Instruments
- Alternate Refrigeration and/or Heating Systems for Faster Temperature Change Rates or Increased Product Load-Handling Capabilities
- Additional Ports, etc.

Specifications and Product Information is subject to change without notice.

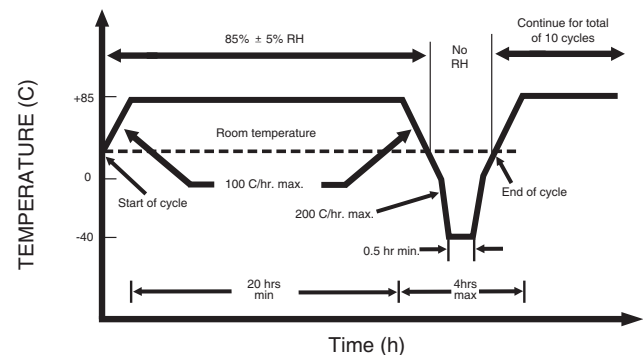
#### Thermal Cycling Test



#### Damp Heat Test



#### Humidity Freeze Test



## Benchmaster Temperature-Humidity Test Chambers

Tenney's Benchmaster temperature and humidity test chambers are capable of simulating a wide range of temperature or temperature and humidity conditions. The five cubic foot work space will readily accept equipment as large as a 19" relay rack.

In keeping with the needs of today's lab, we designed these temperature and humidity test chambers to have a compact exterior that maximizes the interior workspace.

### ▶ Standard Features:

- Vapor-tight interior liners made of 100% continuously welded stainless steel
- Temperature and humidity environmental chambers with humidity capabilities are constructed of 100% non-corroding parts and have a low-water protection system
- Uniform conditions are assured through the use of a vertical-down recirculating conditioning stream
- VersaTenn III Controller on Temperature and Humidity Chambers
- Watlow F4 Controller on Temperature Only Chambers



Overall dimensions in inches/centimeters

Model		BTC	BTRC
Workspace	W	20/51	
	D	19.25/49	
	H	22/56	
Exterior	W	57/145	62 /157
	D	34/86	
	H	34.5/88	
Temperature Range			
Low	°C	-73	
High	°C	200	
Utilities, etc.			
Refrigeration		(2) 1 HP	
Heater Capacity		2 KW	
Humidifier	Watts	750	
	GPH	0.3	
AMPS@230V, 1 Ph		24	24
AMPS, Fuse		35	
Unit Weight	LBS	500	

Humidity capability: 20% to 98% RH in the dry bulb range of +20°C (68°F) to +85°C (185°F) as limited by a 3 degree dew point.

► Options:

- IEEE/488 interface
- LinkTenn software for Windows that permits your computer to control up to 10 chambers
- RS-422, 423, 232, or 485 interface assemblies
- Water demineralizer
- Water reservoir for humidity system (5 gallon)
- Recirculating system for humidity water
- Viewing window, 6" x 8" , thermally insulated and heated
- Interior light
- Shelving, adjustable and removable
- Automatic CO2 or LN2 cooling boost system
- Automating boost heating system
- GN2 purge system
- Recording instruments
- Redundant thermal protection and alarm system
- External dryer for obtaining humidity as low as 5% (to 20°C)
- Alternate power supply wiring
- Chamber cart with casters

All specifications are subject to change without notice.

### Tenney Strat Altitude Chambers

Tenney's Tenneystrat Altitude Chambers simulate altitudes up to 200,000 feet. With an overall temperature range of -70°C to +177°C, humidity capabilities of 20% to 98% RH, and workspace sizes ranging from 5 to 64 cubic feet, this highly developed line of altitude chambers offers one of the broadest selections in the industry.

We are confident that our solid altitude chamber construction and precise operating systems will provide the exacting performance and a high degree of reliability for your altitude testing needs.

#### ► Features

- Continuously welded, stainless steel, vapor-tight interior liners
- Control tolerance is  $\pm 0.3^{\circ}\text{C}$  and  $\pm 2\%$  RH typical after stabilization
- Linear pressure transducer to measure altitude
- Non-corroding humidity system
- Low-water protection on humidity system
- Vertical-down recirculating conditioning stream



Overall dimensions in inches/centimeters

Model		T5ST	10ST		15ST		27ST			36ST			48ST			64ST			
System Horsepower Size		4	6	15	6	15	6	15	20	6	15	20	15	20	30	15	20	30	
Workspace inches (mm)	W	21/53 (533/1346)	24/61 (610/1549)		24/61 (609/1549)		36/91 (914/2311)			36/91 (914/2311)			48/122 (1219/3099)			48/122 (1219/3099)			
	D	21/53 (533/1346)	24/61 (610/1549)		36/91 (914/2311)		36/91 (914/2311)			48/122 (1219/3099)			36/91 (914/2311)			48/122 (1219/3099)			
	H	48/122 (1219/3099)	30/76 (762/1930)		30/76 (762/1930)		36/91 (914/2311)			36/91 (914/2311)			48/122 (1219/3099)			48/122 (1219/3099)			
Exterior inches (mm)	W	25/51 (635/1295)	51/130 (1295/3302)		52/130 (1320/3302)		63/160 (1600/4064)			63/160 (1600/4064)			77/196 (1956/4978)			77/196 (1956/4978)			
	D	63/152 (1600/3860)	99/203 (2515/5156)		111/236 (2819/5994)		111/241 (2819/6121)			123/272 (3124/6909)			123½ / 281 (3131/7137)			135½ / 312 (3435/7924)			
	H	78/183 (1981/4648)	84/210 (2134/5334)		84/213 (2134/5410)		90/229 (2286/5817)			90/229 (2286/5817)			91/231 (2311/5867)			91/231 (2311/5867)			
Utilities, etc																			
Heater Capacity		2	4		6		8			8			16			16			
Humidifier	Watts	1						2						3					
	GPH	1.05						1.0						1.5					
AMPS @ 230V, 33		33(1)	48	81	52	85	63	96	130	63	96	130	120	149	183	120	149	183	
AMPS, Fuse		45	70	110	70	120	80	125	175	80	125	175	150	200	250	150	200	250	
Cooling Water, 20°C GPM		-	3	6	3	6	3	6	9	3	6	9	6	9	12	6	9	12	
Unit Weight LBS/KG		1300/590	3150/1429		4850/2200		3150/1429			6550/2971			11,500/5216			13,050/5920			

- Humidity capability: 20% to 98% RH in the temperature range of +20°C to +85°C as limited by a 3 degree dew point.
- Humidity not achieved simultaneously with altitude.
- Add suffix "R" to model number for humidity.
- Vacuum performance: All chambers achieve altitude up to 100,000 feet (8.2 mm Hg) in 35 minutes. Optional features extend altitude capabilities to 200,000 feet (0.17 mm Hg).
- Combined temperature and altitude to 60,000 feet maximum.
- Test data based on a 24°C ambient, sea level, 60 Hz. Performance slightly reduced on 50 Hz. Power requirements based on standard vacuum pump.

All specifications are subject to change without notice.

## Tenney Strat Junior

The 1.25 cubic foot Tenney Strat Junior is a full function temperature and altitude/vacuum test chamber. The unique size, the smallest in the industry, uses the popular Tenney Upright Junior platform, which is specifically modified and reinforced to achieve altitudes up to 40,000 feet.

The ST Junior altitude/vacuum test chamber includes a standard programmable controller, mechanical refrigeration, vacuum pump and a 2" port. A variety of optional accessories are also available including over temperature alarm, window, light, and computer interfaces.

Based on the most popular test chamber ever built, the Tenney Junior, the ST Junior test chamber combines proven reliability with innovation. Quick delivery and a solid warranty make the ST Junior test chamber the perfect choice for labs, small lot tests, reliability tests, and R&D.



### ► Features

- Altitude: Site level to 40,000 feet
- Temperature: 0 (32°F) to 100°C (212°F)
- Exterior dimensions: 28" W x 20" D x 65" H
- Workspace: 16" W x 11" D x 12" H
- Weight: 280 lbs
- 1/2 HP Refrigeration System
- 500 W Heater Capacity
- Mechanical Vacuum Pump
- Amps @ 115 V, 1Ø: 18A
- 20 Amp Fuse
- Versa Tenn 5 controllers
- 2" port



**Tenney**

Thermal Vacuum Chambers

**Tenney Thermal Vacuum Chambers**

Tenney's Thermal Vacuum Chambers are capable of simulating vacuum to  $10^{-7}$  torr; have overall thermal capabilities from liquid nitrogen temperature to  $+150^{\circ}\text{C}$ , and chamber sizes ranging from 2 to 8 cubic feet in diameter. Tenney has designed and manufactured numerous custom configurations by adapting standard proven modules that provide a reliable packaged thermal vacuum chamber to meet your testing criteria.

**Features**

- A highly polished stainless steel vacuum vessel
- An ultra-clean, high-speed vacuum pump
- Full-opening, O-ring sealed access door
- Refrigeration systems are designed to the same exacting standards used by Tenney in the manufacture of its extensive test chamber product line

Chamber Diameter dimensions ft. (m)	1.5 (0.5)	2 (0.6)	2.5 (0.8)	3 (0.9)	4 (1.2)	5 (1.5)	6 (1.8)
Chamber Lengths dimensions ft. (m)	1.5 (0.5) 2 (0.6) 3 (0.9)	2 (0.6) 3 (0.9)	2.5 (0.8) 3 (0.9) 4 (1.2)	3 (0.9) 4 (1.2) 5 (1.5)	4 (1.2) 5 (1.5) 6 (1.8)	5 (1.5) 6 (1.8) 8 (2.4)	6 (1.8) 8 (2.4)



All specifications are subject to change without notice.

### SVO Thermal Fluid Heating Vacuum Ovens

Tenney industrial vacuum ovens perform product testing and MIL-SPEC testing, and they can be incorporated into many commercial production processes. The chambers provide a complete vacuum system and control system that is pretested and ready to operate. You only need to connect the chamber to an electrical power source.

The basic vacuum ovens are designed to function at vacuum levels up to 20 mm Hg (80,000' altitude). Vacuum pump systems of greater capacities are available with vacuum capabilities up to 0.169 mm Hg (20,000').

#### ▶ SVO Models (High Temperature Vacuum Ovens)

- Vacuum conditioning as described for S Models.
- VersaTenn V Control System
- Brine heating system on workspace walls
- Achieves temperatures from approximately 10°C above ambient to +150°C
- Fully insulated workspace



#### ▶ Standard Accessories

- Viewing Window in Door
- Stainless Steel Shelves
- Flanged Access Ports
- Chart Recorder
- IEEE Communications
- LinkTenn 32 Software
- Extended Altitude Range



Model (S) Vacuum Only (SVO) Vacuum With Heat to +150°C	8S 8SVO	18S 18SVO	27S 27SVO	64S 64SVO
Interior Dimensions (WxHxD)	24"x24"x24" (61cm x 61cm x 61cm)	30"x30"x36" (76 cm x 76 cm x 91cm)	36"x36"x36" (91 cm x 91 cm x 91 cm)	48"x48" 48" (122 cm x 122 cm x 122 cm)
*Exterior Dimensions (WxHxD) (S Models Only)	40½"x64"x42½" (103cm x 163cm x 108cm)	46½"x70"x54½" (118cm x 178cm x 138cm)	52½"x76"x54½" (133cm x 193cm x 138cm)	58" x90" x68½" (147cm x 228cm x 174cm)
Shipping Weight Uncrated (Approx.)	1000 lbs	1500 lbs	2200 lbs	3800 lbs
Power Requirements	208V or 230V, 1Ph, 60 Hz (Other voltages optional)			

\* Add 2" (5cm) to (W x H x D) for SVO overall dimensions.

Control of conditions is as indicated on instrumentation furnished with chamber. Minor performance variations with window and accessories. Performance data is based on ambient temperature of +24°C (+75°F) at sea level on 60 Hz operation. For 50 Hz operation, performance will be reduced. Under certain programming conditions standard rates of change may vary. Consult factory for your specific requirements.

Temperature Range	Control Tolerance	Heating Rate	Ultimate Vacuum	Uniformity	Vacuum Pump	Vacuum Measurement	Control Interface	Power supply	Amps
Approximately +15°C above ambient to +150°C	+/- .3C	Ambient to +100°C in 90 minutes	20mm/hg (20.88 Torr or 80,000')	+/-1C	Oil sealed rotary pump with gas ballast and solenoid valves for vacuum and vent	feet	RS232	230V / 1 PH / 60 Hz (others available)	will depend on size and voltage selection

All specifications are subject to change without notice.

### ZKG Thermal Vacuum Ovens

Tenney's ZKG Vacuum Oven provides a reliable oven for drying materials that require a vacuum to be applied during the drying process. Applications for these ovens include the drying of chemicals, electronics and chips, plastics and pharmaceuticals.

The ovens are efficient and incorporate important safety features and offer condensation free drying in a homogenous vacuum environment.

#### ▶ General Specifications

- Stainless steel interior with painted, cold-rolled steel pressure vessel
- Galvanized steel exterior with powder coating
- Electric Plate Heating, located inside pressure vessel
- Double rotary vane vacuum pumps to ensure high vacuum
- High or low temperature drying, with and without vacuum
- Large insulated, tempered glass window





Model	Interior Volume	Exterior Demensions			Interior Dimensions			Temperature Range	Control Tolerance	Heating Rate	Heating	Ultimate Vacuum
		D	W	H	D	W	H					
ZKG-025	8.5 Cubic Feet	37.2"	35.8"	66"	23"	23"	27"	Ambient to +200°C	< 1°C	> 2°C/minute (Nominal Temp. to Max. Temp.)	Electric Plates Located Inside Pressure Vessel	8mm/hg (8.28 Torr or 100,000 ft.)

Vacuum Pump	Control Interface	Power Supply	Amps	Standard Accessories
Double Rotary Vane Vacuum Pump and Others Optional	Watlow F4, Yokogawa Overtemp	208/230V 3Ph/60Hz	30	2 Shelves

*All specifications are subject to change without notice.*

- Specifications
- Stainless steel interior
- Galvanized steel exterior with powder coating
- Double rotary vane vacuum pumps to ensure high vacuum
- High or low temperature drying, with and without vacuum
- Large insulated, tempered glass window
- Tests to ISO ZBN61001-86 standard

## > Tenney

### Thermal Shock Chambers

#### Tenney Thermal Shock Chambers

These Thermal Shock Chambers were designed primarily to meet the requirements of MIL-STD 883, Method 1010 temperature cycling and MIL-STD 202, Method 107 thermal shock testing. These environmental chambers test the resistance of electronic components and assemblies to sudden and severe temperature changes.

The Tenney T-Shock Junior is a bench-top thermal shock chamber with a 1/4 cubic foot carriage capacity. It's designed to accommodate pilot runs and smaller production quantities of sophisticated, discrete components.

The T-Shock Junior provide an cost-effective alternative to larger capacity units.

#### ► Features

- Vapor-tight interior liners made of 100% continuously welded stainless steel
- Control system provides fully automatic, PID, chamber control through a user-friendly alpha-numeric display
- Available in horizontal or vertical configurations
- Available in two or three zone operations
- Carriage transport is automatically positioned and includes a large wire mesh stainless steel product basket



Carriage Capacity		Product Load	Refrigeration	Heat	Dimensions W x H x D inches (cm)		Model	Wt lbs.
Ft <sup>3</sup>	W x H x D inches (cm)	LBS.	HP	KW	Horizontal Model	Vertical Model		
TSJR Model (Air Cooled)								
.25	10.5 x 6 x 6.125 (26.7 x 15.2 x 15.6)	3	½ + ½ + LN2	2.5/5	63 x 41 x 22 (160 x 104.1 x 55.9)	N/A	TSJR	700
TS2 Models - Two Zone: Hot/Cold (Water Cooled)								
2	15 x 15 x 15 (38.1 x 38.1 x 38.1)	15	4 + LN2	9/2	88 x 57 x 74 (223.5 x 144.8 x 188)	89 x 72 x 58 (226.1 x 182.9 x 147.3)	TS2.02.04B	3700
2		11	10				TS2.02.10	4000
8	25 x 23 x 25 (V) (63.5 x 58.4 x 63.5)	35	6 + LN2	21/4	99 x 75 x 88 (251.5 x 190.5 x 223.5)	97 x 89 x 75 (246.4 x 226.1 x 190.5)	TS2.08.06B	4200
8	or 23 x 25 x 25 (H) (58.4 x 63.5 x 63.5)	35	30				TS2.08.30	4700
TSD Models - Dual Load: Hot/Cold/Hot (Water Cooled)								
2	15 x 15 x 15 (38.1 x 38.1 x 38.1)	28	4 + LN2	18/2	129 x 88 x 53 (327.7 x 223.5 x 134.6)	88 x 57 x 74 (223.5 x 144.8 x 188)	TSD.02.04B	4200
2		18	10				TSD.02.10	4500
8	25 x 23 x 25 (V) (63.5 x 58.4 x 63.5)	60	6 + LN2	42/4	156 x 88 x 72 (396.2 x 223.5 x 182.9)	99 x 75 x 88 (251.5 x 190.5 x 223.5)	TSD.08.06B	4700
8	or 23 x 25 x 25 (H) (58.4 x 63.5 x 63.5)	56	30				TSD.08.30	5200

### ► Thermal Shock Chambers Features

- Vapor-tight interior liners made of 100% continuously welded stainless steel
- Control system provides fully automatic, PID, chamber control through a user-friendly alpha-numeric display
- Available in horizontal or vertical configurations and two or three zone operation
- Carriage transport is automatically controlled and positioned and includes a large wire mesh stainless steel product basket

All specifications are subject to change without notice.

## Blue M

Stability and Shelf Life Chambers

### Blue M Steady State Food & Drug Stability Chambers

Blue M's Steady State chambers are available in four convenient sizes. With workspace sizes of 8, 16, 32, and 58 cubic feet and a variety of temperature and humidity combinations, these chambers provide the flexibility for a wide range of uses.

Watlow F4 Controller allows remote and unattended operation in setting up programs and setpoints. The F4 also allows easy control over both temperature and humidity settings in one controller. Common design elements of the chambers allow shelves to be interchanged between different models. Streamlined design allows TPS to ship chambers customized to the customer's needs in far less time than previous product lines. Customers with several CEO chambers, even if different sizes, now have consistent controls, utility requirements, and heat output, so plant management issues are greatly reduced.

#### ► Applications Include:

- International Committee of Harmonization (ICH) applications
- Accelerated shelf life studies
- Steady state testing
- Stability testing
- Burn-in
- Curing
- Controlled temperature storage
- Clean room processes
- Bio-medical research

#### ► Features:

- Remote and unattended operation in setting up programs and setpoints
- Easy control over both temperature and humidity settings
- Non-ramping, manual mode
- Serial communications capabilities via the EIA-232 and EIA-485 standards
- Modbus RTU protocol
- Direct printing to a serial printer
- Direct connection to a PLC, or computer workstation
- High definition, LCD display with four digital input lines
- 2 alarm outputs and eight digital event outputs





Model	Non-humidified	CEO 908-2		CEO 916-2		CEO 932-2		CEO 958-2	
	Humidified		CEO 908-4		CEO 916-4		CEO 932-4		CEO 958-4
Work Space inches/cm	W	33/84		33/84		33/84		60/152	
	D	28/71		28/71		28/71		28/71	
	H	15/38		30/76		60/152		60/152	
Exterior inches/ cm	W	39/99		39/99		39/99		70/178	
	D	32/81		32/81		32/81		32/81	
	H	46/117		61/155		91/231		91/231	
No. of Shelves		1		2		4		8	
No. of Shelf Guides		4		9		19		38	
Temperature Range	Low	0							
	High	99°C							
Utilities	Refrigeration (HP)		2-Jan					4-Mar	
	Heater Capacity		2 kW					6 kW	
	Humidifier	KW	1.5					3	
		GPH	0.5					1	
AMPS @ 208/230, 3-WIRE, 1Ph-60Hz		20	24	20	24	20	24	40	55
AMPS Breaker		30	30	30	30	30	30	50	70
Overcurrent protection recommended									
Unit Weight	LBS	375	400	425	450	524	550	1850	1900

Note: Casters add 2.5" to exterior height

Humidity capability: 20% to 96% RH on -4 models. Based on ambient conditions of 22°C and 50% RH, limited by a 5°C dewpoint temperature.

Control tolerance: ±0.3°C and ±2% after stabilization.

All specifications are subject to change without notice.

## Blue M

FRP Series Full Range Programmable Humidity Chambers

### **Blue M FRP Series / Full Range Programmable Humidity Chambers**

The FRP Series of humidity chambers is truly the work horse of the Blue M line of humidity chambers, offering an unequalled performance in MIL-STD testing. Its sophisticated yet easy to use control system allows versatility to go beyond military testing, tapping on a vast array of temperature and humidity capabilities while offering traditionally superior Blue M quality.

Blue M humidity chambers can be used for military standard test 883, method 1004 and 202, method 106 moisture resistance tests. Also the 810, method 507.2 electronic subassembly and component qualification, packaging studies and moisture studies can be implemented on the FRP Series of humidity chambers.



Model # -15 to +93° C	Inside Dimensions Inches (cm)			Overall Dimensions Inches (cm)			Full Load Amps	Voltage 60Hz AC	Cubic Feet Capacity (Liters)
	W	D	H	W	D	H			
FRP-09B	25 (64)	25 (64)	25 (64)	64 (160)	39 (94)	71 (180)	37	208V/1PH	9 (262)
FRP-09C	25 (64)	25 (64)	25 (64)	64 (160)	39 (94)	71 (180)	39	240V/1PH	9 (262)
FRP-13B	37 (94)	25 (64)	25 (64)	75-1/2 (191)	39 (94)	71 (180)	41	208V/1PH	13 (385)
FRP-13C	37 (94)	25 (64)	25 (64)	75-1/2 (191)	39 (94)	71 (180)	44	240V/1PH	13 (385)
FRP-27B	36 (91)	36 (91)	36 (91)	75 (190)	83 (210)	48 (121)	45 (114)	208V/1PH	27 (68)
FRP-27C	36 (91)	36 (91)	36 (91)	75 (190)	83 (210)	48 (121)	45 (114)	230V/1PH	27 (68)

All specifications are subject to change without notice.

## > Blue M

### **Blue M HRP Series / Continuous High-Temperature / High-Humidity Chambers**

Blue M HRP Series Chambers provide high-range steady state humidity. These chambers are designed to deliver large volume high-temperature/high-humidity conditions. HRP chambers incorporate horizontal airflow and a one-pass airflow system for an easy-to-use, highly effective, temperature/humidity system. This air system uses room ambient air for cooling, dehumidification and chamber exhaust. The system controls the input of room temperature air, the mixing of room air and chamber air, and the exhaust volume.

Processing silicone rubber compounds and other products requiring a high-moisture content for thorough, rapid curing. These chambers are also used to test rigid and flexible membranes and for aggressive high-temperature, high-humidity tests such as 85°C (185°F)/85% humidity.

#### **General Specifications**

- Temperature range: 15°C (59°F) above ambient to +150°C (+302°F)
- Humidity range: 10% to 98%
- Control system: Steady state recorder/controller



Model #	Inside Dimensions Inches (CM)			Overall Dimensions Inches (CM)			Full Load Amps	Voltage 60Hz AC	Cubic Feet Capacity (Liters)
	W	D	H	W	D	H			
-15 to +93° C									
HRP-09B	25 (64)	25 (64)	25 (64)	63 (160)	37 (94)	71 (180)	28	208V/1PH	9 (262)
HRP-09C	25 (64)	25 (64)	25 (64)	63 (160)	37 (94)	71 (180)	31	240V/1PH	9 (262)
HRP-13B	37 (94)	25 (64)	25 (64)	75 (191)	37 (94)	71 (180)	32	208V/1PH	13 (385)
HRP-13C	37 (94)	25 (64)	25 (64)	75 (191)	37 (94)	71 (180)	36	240V/1PH	13 (385)
HRP-27E	36 (91)	36 (91)	36 (91)	75 (191)	48 (122)	83 (211)	34	208V/3PH	27 (734)
HRP-27F	36 (91)	36 (91)	36 (91)	75 (191)	48 (122)	83 (211)	37	240V/3PH	27 (734)
HRP-27G	36 (91)	36 (91)	36 (91)	75 (191)	48 (122)	83 (211)	19	208V/3PH	27 (734)
HRP-64E	48 (122)	48 (122)	48 (122)	89 (226)	60 (152)	98 (249)	50	208V/3PH	64 (1816)
HRP-64F	48 (122)	48 (122)	48 (122)	89 (226)	60 (152)	98 (249)	56	240V/3PH	64 (1816)
HRP-64G	48 (122)	48 (122)	48 (122)	89 (226)	60 (152)	98 (249)	28	208V/3PH	64 (1816)

Specifications & Product Information is subject to change without notice.  
 Images for reference only. Options and accessories may not be included with all models.

### ► Standard Oven Options

- Nickel plated wire rod or stainless steel slotted shelves
- Door switch
- Motorized intake damper (two-position or proportional)
- Welded and sealed inner chamber
- 24-hour, 7-day digital process timer
- Circular chart recorder
- Reverse door hinge
- Glass observation panel(s)
- Floorstands
- Safety airflow switch on single-phase models
- Casters
- Comm-Link RS-485 to RS-232 converter

### ► Additional Options

- Additional lead-in ports
- Interior light
- Oversized one-pass airflow system for faster cool down
- Redundant overtemperature protection
- Rear access door(s)
- All stainless steel exterior construction
- Special control systems
- Vertical airflow
- Space-saving stack oven design
- Trace solvent safety package



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