THERMOTRON INDUSTRIES

PREFABRICATED PANEL WALK-IN TEST CHAMBERS

Modular Design

Modular Design:

Panel chambers are modular in concept:

- **Allows for unit to fit through most loading dock doors**
- **Easier move-in**
- **Lower cost than solid welded construction.**
- **Assembled from prefabricated wall,ceiling and floor panels.**
- **The Conditioning Module interfaces directly to one of the side wall panels.**

What is Tested in Walk-in's

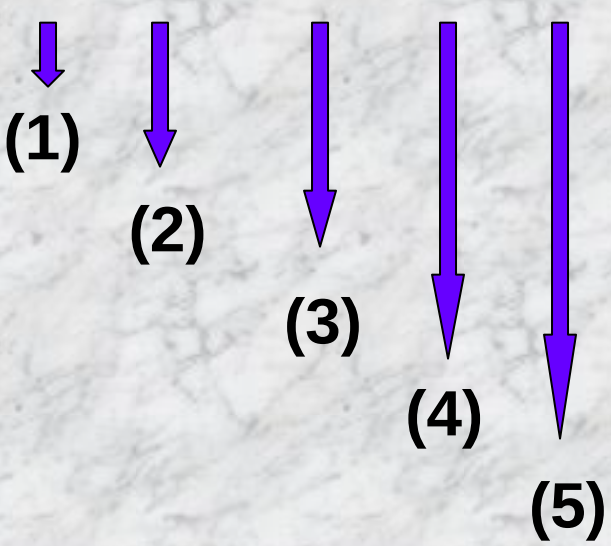
What are tested in a Walk-in Chamber?

- Circuit boards.
- Printers.
- Computers.
- Auto Electronics
- Missiles
- Copy Machines
- Radar Systems
- Packaging

Model Number Designation

Model Designation:

WP-499-THCM2-10-10



(1) WP: Walk-in Panel construction.

(2) 499: Cubic Feet of box interior.

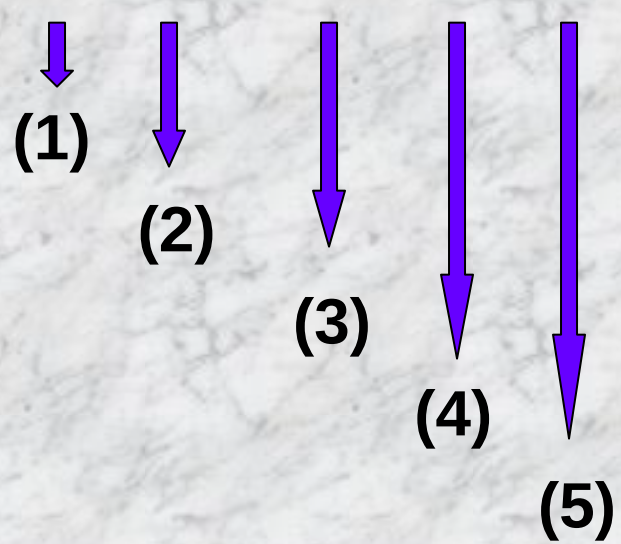
(3) THCM: Temperature-Humidity Conditioning Module.

TCM: Temperature only Conditioning Module.

Model Number Designation

Model Designation:

WP-499-THCM2-10-10



(4) 2: Number of fans

Example: 1 = 1 fan
2 = 2 fans
3 = 3 fans
4 = 4 fans

(5) 10-10: Refrigeration Size

Example:

10-10: Cascade system with two 10 hp compressors in cascade arrangement.

10: Single Stage system using one 10 hp compressor.

PANEL Size/Layout

Panel sizes:

- 12” X 12” corner panel
- 23” wall panel
- 46” wall panel

Box Layout :

The panel box size can be configured using a combination of the above listed panel sizes.

Box Sizing

Panel Walk-in Box Sizing:

Model	Exterior Dimension	Interior Dimension
WP-286	5’10” X 7’9” X 8’6”	5’2” X 7’1” X 7’10”
WP-323	5’10” X 7’9” X 9’6”	5’2” X 7’1” X 8’10”
WP-364	5’10” X 9’8” X 8’6”	5’2” X 9’0” X 7’10”
WP-410	5’10” X 9’8” X 9’6”	5’2” X 9’0” X 7’10”
WP-499	7’9” X 9’8” X 8’6”	7’1” X 9’0” X 7’10”
WP-563	7’9” X 9’8” X 9’6”	7’1” X 9’0” X 7’10”
WP-605	7’9” X 11”7” X 8’6”	7’1” X 10’11” X 7’10”
WP-683	7’9” X 11’7” X 9’6”	7’2” X 10’11” X 7’10”

Box Sizing

Panel Walk-in Box Sizing:

Model	Exterior Dimension	Interior Dimension
WP-769	9’8” X 11’7” X 8’6”	9’0” X 10’11” X 7’10”
WP-867	9’8” X 11’7” X 9’6”	9’0” X 10’11” X 8’10”
WP-904	9’8” X 12’10” X 8’6”	9’0” X 12’2” X 7’10”
WP-1020	9’8” X 12’10” X 9’6”	9’0” X 12’2” X 8’10”
WP-1097	11’7” X 13’6” X 8’6”	11’11” X 12’10” X 7’10”
WP-1237	11’7” X 13’6” X 9’6”	11’11” X 12’10” X 8’10”
WP-1261	11’7” X 15”5” X 8’6”	11’11” X 14’9” X 7’10”
WP-1422	11’7” X 15’5” X 9’6”	11’11” X 14’9” X 8’10”

Doors

Standard Door Sizes:

Nominal Door Size	Panel Size
36”w X 78”h	46” panel
48”w X 78”h	69” panel
60”w X 78”h	69” panel

Custom Available Doors:

Nominal Door Size	Panel Size
72”w X 84”h Hinged Bi-parting	92” panel
84”w X 96”h Hinged Bi-parting	92” panel

Note: a 9’6” high box is required for a 96” high door.

Conditioning Modules

Conditioning Modules:

32 Standard system designs. They are self-contained and incorporate a prefabricated panel in its construction to provide positive seal between the box and conditioning module. This also allows ease of installation.

Temperature Ranges

Single Stage Refrigeration Performance:

Temperature Range:

-34°C to +85°C

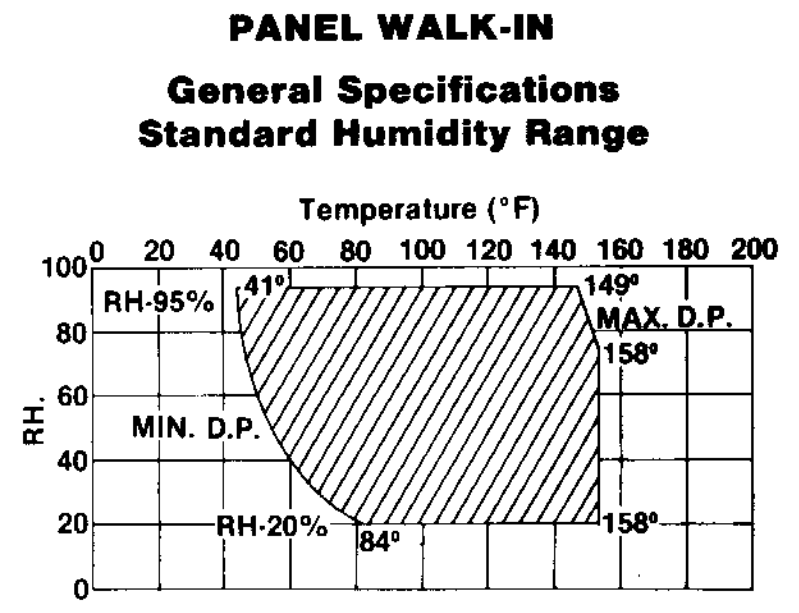
Cascade Refrigeration Performance:

Temperature Range:

-68°C to +85°C

Note: Due to urethane panel construction the high temperature limitation is +85°C

Humidity Ranges



Humidity:

The THCM Conditioning Modules incorporate Humidity Control.

Humidity Range:

20% to 95% relative humidity, limited by a dewpoint range of 5°C to +65°C and a maximum drybulb of +70°C

TCM1 Conditioning Module

TCM1 Module:

46” Panel

1 Fan - 1500 scfm

Model	Compressor	Heat
TCM1-3	(1) 3hp	4.5 kW
TCM1-3-3	(2) 3hp	4.5 kW
TCM1-5	(1) 5hp	7.5 kW
TCM1-5-5	(1) 5hp	7.5 kW

Example: (1) 3hp = single stage

(2) 3hp = cascade

TCM1 Performance

TCM1 Conditioning Module Performance

Time in minutes, for transitions, from +25 C with a empty chamber

		WP-286	WP-323	WP-364	WP-410	WP-499	WP-563	WP-605	WP-683
TCM1-3	to -18 C	30	33	36	38	42	45	48	51
	to -20 C	95	100	108	117	130	140	150	162
	to +85 C	47	50	54	58	64	67	72	76
TCM1-3-3	to -18 C	37	39	42	44	49	52	56	60
	to -40 C	71	75	81	87	97	104	111	119
	to -54 C	131	135	148	160	179	193	209	226
	to +85 C	47	50	54	58	64	67	72	76
TCM1-5	to -18 C	20	21	23	25	27	29	31	33
	to -20 C	38	43	47	50	55	59	63	67
	to +85 C	28	30	33	35	38	41	43	46
TCM1-5-5	to -18 C	20	21	22	23	26	27	29	31
	to -40 C	29	41	44	48	53	56	60	64
	to -54 C	53	66	72	77	85	91	198	105
	to +85 C	28	30	33	35	38	41	43	46

TCM2 Conditioning Module

TCM2 Module:

23” and 46” Panel

2 Fans - 3000 scfm

Model	Compressor	Heat
TCM2-5	(1) 5 hp	7.5kw
TCM2-5-5	(2) 5 hp	7.5kw
TCM2-705	(1)7.5 hp	12kw
TCM2-705-705	(2)7.5 hp	12kw
TCM2-10	(1) 10 hp	15kw
TCM2-10-10	(2) 10 hp	15kw

Example: (1) 5hp = single stage

(2) 5hp = cascade

TCM2 Performance

TCM2 Conditioning Module Performance

Time in minutes, for transitions, from +25 C with a empty chamber

		WP-499	WP-563	WP-605	WP-683	WP-769	WP-867	WP-904	WP-1020	WP-1097	WP-1237	WP-1261	WP-1422
TCM2-5	to -18 C	34	36	38	40	43	45	47	51				
	to -20 C	78	83	87	93	100	105	111	119				
	to +85 C	45	48	50	53	57	59	62	65				
TCM2-5-5	to -18 C	32	35	36	38	41	43	45	48				
	to -40 C	68	73	75	80	86	91	96	102				
	to -54 C	122	129	137	146	160	168	178	184				
	to +85 C	45	48	50	453	57	59	62	66				
TCM2-705	to -18 C	19	20	21	22	24	25	27	28	29	30	33	34
	to -20 C	44	46	46	52	56	59	62	66	66	73	77	81
	to +85 C	28	30	31	33	35	37	39	41	43	45	47	50
TCM2-705-705	to -18 C	19	20	21	22	24	25	27	28	29	30	33	35
	to -40 C	39	41	43	46	49	52	55	58	61	64	68	71
	to -54 C	56	59	63	67	72	76	80	85	91	94	99	105
	to +85 C	28	30	31	33	35	37	39	41	43	45	47	50
TCM2-10	to -18 C	13	14	15	15	16	17	18	19	20	21	22	23
	to -20 C	31	32	34	36	39	41	43	45	48	48	53	55
	to +85 C	23	24	25	26	28	30	31	33	35	36	38	40
TCM2-10-10	to -18 C	11	12	12	13	14	14	15	16	16	17	18	19
	to -40 C	23	24	25	26	28	30	31	32	33	34	37	39
	to -54 C	38	40	42	44	48	50	52	56	60	62	65	69
	to +85 C	23	24	25	26	28	30	31	33	35	36	38	40

TCM3 Conditioning Module

TCM3 Module:

(2) 46” Panels

3 Fans - 4500 scfm

Model	Compressor	Heat
TCM3-10	(1) 10 hp	15kw
TCM3-10-10	(2)10 hp	15kw
TCM3-15	(1)15 hp	18kw
TCM3-15-15	(2)15 hp	18kw

Example: (1)15 hp = single stage

(2)15 hp = cascade

TCM3 Performance

TCM3 Conditioning Module Performance

Time in minutes, for transitions, from +25 C with a empty chamber

		WP-769	WP-867	WP-904	WP-1020	WP-1097	WP-1237	WP-1261	WP-1422
TCM3-10	to -18 C	20	21	22	23	23	24	25	26
	to -20 C	48	50	52	55	58	60	63	65
	to +85 C	34	35	36	38	40	41	43	45
TCM3-10-10	to -18 C	16	17	18	19	19	20	21	22
	to -40 C	35	36	38	40	40	42	44	46
	to -54 C	60	63	66	67	69	71	74	80
	to +85 C	34	35	36	38	40	41	43	45
TCM3-15	to -18 C	15	16	17	17	18	19	20	21
	to -20 C	36	38	39	42	44	45	47	49
	to +85 C	28	29	30	32	33	34	36	38
TCM3-15-15	to -18 C	13	13	14	15	15	16	17	17
	to -40 C	26	27	28	30	31	33	34	35
	to -54 C	43	45	47	50	53	54	56	59
	to +85 C	28	29	30	32	33	34	36	38

TCM4 Conditioning Module

TCM4 Module:

- (2) 46” Panels
- 3 Fans - 6000 scfm
- 24 Kw of Heat

Model	Compressor
TCM4-25	(1) 25 hp
TCM4-25-25	(2)25 hp

Example: (1) 25 hp = single stage
(2) 25 hp = cascade

TCM4 Performance

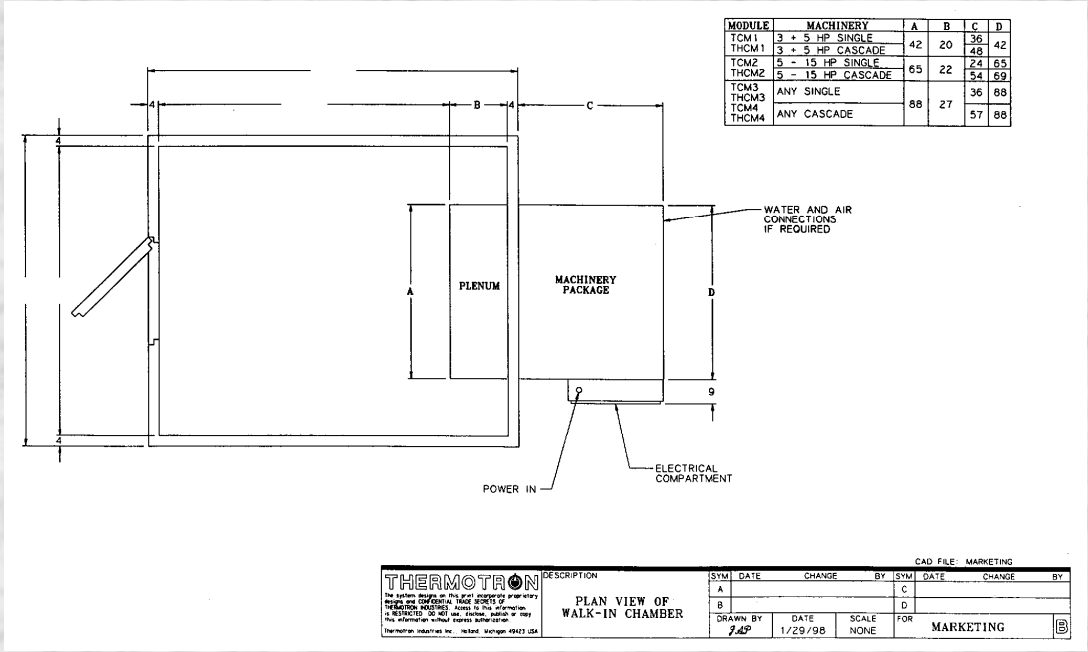
TCM4 Conditioning Module Performance

Time in minutes, for transitions, from +25 C with a empty chamber

		WP-769	WP-867	WP-904	WP-1020	WP-1097	WP-1237	WP-1261	WP-1422
TCM4-25	to -18 C	10	11	11	12	12	13	13	14
	to -20 C	24	25	26	28	29	30	32	33
	to +85 C	21	22	23	24	25	26	27	28
TCM4-25-25	to -18 C	9	9	10	10	11	11	12	12
	to -40 C	17	18	19	20	21	21	22	23
	to -54 C	27	28	29	31	33	34	35	37
	to +85 C	21	22	23	24	25	26	27	28

System Layout Plan View

The conditioning plenum extends into the interior of the panel box. When calculating workspace dimensions you must deduct the depth of the plenum.



Limitations

Limitations of Panel Walk-in Chambers:

- **Maximum Temperature Range: +85 C.**
- **Maximum Humidity Range: Limited by +65 C Dewpoint and a +70 C Drybulb.**
- **Maximum floor loading of 600 pounds per square foot or 2929 kg. per square meter. Note: A optional 12 gauge interior spreader plate is recommended for rolling loads.**
- **Moderate temperature change rates.**

Why Choose a Panel?

Why choose a panel construction unit over a welded constructed chamber?

- **Lower initial cost.**
- **Lower freight cost.**
- **Simpler move-in .**
- **Flexibility-multiple sizes available with various combination of Conditioning Modules**

Where Thermotron Shines

Applications where Thermotron Shines!

- Cascade applications. Low temperatures!
- Humidity Applications.
- Low-Humidity Applications.
- Special configurations and test requirements.
- Large loads and change rates.

Customized Walk-in Chambers

Customized Walk-in Chambers

Over half of the walk-in chambers we sell are customized in nature. They are not price book systems. They may use a standard basic Conditioning Module but are modified to meet the particular special customer requirement.

Optional Accessories

- **Interior Suspended Ceiling**: Reduces the interior workspace height by 12”. Helpful to reduce the air supply velocity and for more even distribution of the airflow.
- **Air-Cooled Condenser**: Eliminates the requirement for cooling water. The condenser is remotely located from the chamber, outside or on the roof.
- **“CE” Mark**: Is available for units being shipped to Europe.

Optional Accessories

- **Dry Air Purge: Utilizes compressed air as the supply source. Helpful in minimizing moisture in the chamber.**
- **Door Openings: Nominal openings.**
  - **36” X 78” Hinged Door**
  - **48” X 78” Hinged Door**
  - **60” X 78” Hinged Door**
  - **72” X 84” Bi-parting Hinged Door**
  - **84” X 96” Bi-parting Hinged Door**

Optional Accessories

- **Humidity Water Purification System:**

  A 5 micron pre-filter and demineralizer for purifying the humidity inlet water.

- **LN2 injection:**

  Liquid nitrogen injection through a cooling coil located in the conditioning plenum. Note: You cannot direct inject due to the nitrogen will displace the oxygen.

Optional Accessories

- **Interior Lighting: Additional lights**
  - Incandescent, mounted on the interior ceiling.
  - Fluorescent, 48”, operational range of 0°C to +85 °C
- **Electrical Outlets**:

  Outlet installed on the interior side walls. The customer to provide the power drops, overload protection and actual power interface

Optional Accessories

- **Refrigeration Quiet Package:**

  Applying sound deadening material to the machinery section walls with internal cooling system to reduce the overall noise levels produce by the machinery.

- **Ramp**:

  External ramps by the entrance door to assist in bringing products into the walk-in.

Optional Accessories

- **Remote Refrigeration Package:**

  The refrigeration machinery package can be remotely located up to 50 line feet from the chamber. This can be provided to reduce chamber overall footprint.

- **Spreader Plate:**

  Stainless steel plate on the chamber interior floor to increase point loading capabilities and rolling loads.

Custom Accessories

- **Reinforced Floor Assemblies:**

  We can manufacture solid welded sectional floor assemblies which can support large rolling loads of products similar to fiber cable spools. We can also provide reinforced modular floor panels

- **Ante Rooms:**

  Entrance rooms attached to the personnel door area to provide intermediate airlock if entering the during test conditions without upsetting the internal conditions..

Custom Accessories

- **Low-Humidity Capabilities:**

  Design and build systems which allow testing below the normal 5°C minimum dewpoint conditions.

- **Multiple Refrigeration Systems:**

  Customized systems to test at faster rates than our normal systems with larger loads.

PANEL WALK-IN CHAMBER

Thermotron has the capability to out perform the competition with equipment capacity!!

Many of the competition wants to sell only standard systems. We have flexibility that many cannot compare.

Market Segment

Thermotron Walk-in Market:

The Panel Walk-in Chambers make up approximately 11% of Thermotron's Total Product Incoming Orders!!!!

NOTE: Based on January to August Incoming Orders.

Walk-in Market Segment:

Appliance	2.1%
Aerospace	5.3%
Automotive	18.7%
Computer	11.8%
Defense	11.7%
Electronics	13.6%
Furniture	2.1%
Advanced Materials	2.6%
Pharmaceutical	2.4%
Telecommunications	29.7%