

TECHNICAL PROPOSAL

Model Number: C-H150-SP Humidity Test Chamber



(image for illustrative purposes only)

Description:

Humidity Test Chamber capable of testing assemblies, components and materials for tolerance to the applied environmental conditions

Specifications:

External dimensions (D x W x H):	1580 x 950 x 1745 (mm) approx.
Internal dimensions (D x W x H):	500 x 500 x 600 (mm)
Test Space:	150 litres
Temperature range:	-20°C +180°C
Temperature fluctuation:	within ±0.5°C
Temperature deviation:	≤±2.0°C
Temperature control resolution:	0.1°C
Heating time:	average 1.0°C/min over range
Cooling time:	average 1.0°C/min over range
Humidity range:	20%RH 98%RH
RH fluctuation:	±2.0%RH
RH deviation:	±2.5%RH
RH control resolution:	0.1%RH

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Temperature Humidity Control range:



Test Chamber Features:

- Stainless Steel interior SUS304 mounted on thermal breaks and insulated from outer cabinet
- Cabinet in box section steel and painted steel panels (GREY RAL7045)
- Maximum loading weight 600kg/m³
- 1 x 50mm diameter access port with silicone thermal barrier and plug
- 2 x shelf; adjustable position
- Full-opening hinged door with heated window and internal illumination (BLUE RAL5017)
- CE compliance
- Emergency Stop button on of chamber adjacent to controller
- Mains electrical power isolator
- Touch-screen programmable controller with RS232 (or Ethernet) and SD card
- Remote PC control; software and set-up provided (excludes suitable pc / laptop)
- Calibration report
- Installation drawings, operator and maintenance manuals (electronic copies)
- 1-year parts warranty

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Electrical Control System:

Controller features:	5-inch programmable touch-screen with LCD display. Program mode and constant operation (manual) mode. English menu. 120 programmes; 999 segments per programme; 99 repeat cycles. Display resolution: Temperature 0.1°C; Time 0.1 minute. Remote control by pc or laptop via RS485 adaptor with software provided.
Heating:	Nichrome Electrical Heaters controlled by solid-state relay
Air circulation fan:	Low-noise, multi-wing centrifugal
Control method:	PID control; BTHC Balanced temperature and humidity control
Graphical display:	Records and displays temperature and humidity over time. RAM with battery protection records set data, sampled data for up to 60 days. Data can be saved to SD memory card for quick and easy transfer to pc or laptop in excel format.
Additional features:	Multi-function warning with diagnostics, system management guide, power- cut protection, upper and lower limit protection, and self-diagnosis functions.

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Main components list:

Temperature-Humidity controller	Samwontech TEMI 2500	
Protection switch	Schneider Electric	
AC contactor	Schneider Electric	
Thermal relay	Schneider Electric	Salar Salar
Phase sequence relay	Carlo Gavazzi	
Time delay relay	Omron	
AC relay	Schneider / Omron	

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Refrigeration System:

Method:	Mechanical refrigeration 1 x 3hp compressor
Evaporator:	Copper coil with aluminium fin type heat exchanger
Condenser:	Stainless steel brazed heat exchanger
Expansion devices:	Thermostatic expansion valve; capillary tube
Refrigerant:	R404A eco-friendly refrigerant
Cooling system:	Resident air-cooled condenser

The cooling system uses a circulating refrigerant which absorbs and removes heat from the space to be cooled (the chamber) and rejects that heat outside. The system comprises four components: a compressor a condenser, an expansion (or throttling) device, and an evaporator. The refrigerant enters the compressor as a saturated vapour and is compressed to a higher pressure, which results in a higher temperature. This superheated vapor is at a temperature and pressure at which it can be condensed with cooling air (or in some cases cooling water). The hot vapor passes through a condenser where it is cooled and condensed into a liquid; the rejected heat is carried away by the air (or water).

The liquid refrigerant is then passed through an expansion valve where it undergoes an immediate reduction in pressure resulting in evaporation of part of the liquid refrigerant. This causes the temperature of the liquid and vapor refrigerant mixture to become much colder than the temperature of the enclosed space (the chamber working area) which is to be cooled.

The cold mixture passes through the evaporator. A fan circulates the warmer air in the chamber across the coil carrying the cold refrigerant liquid and vapor mixture. That warm air causes evaporation of the liquid part of the cold refrigerant mixture. At the same time, the circulating air is cooled thus lowering the temperature of the enclosed space to the required temperature. The evaporator is where the circulating refrigerant absorbs and removes heat which is then rejected in the condenser and transferred elsewhere by the air (or water) in the condenser. The refrigerant vapor from the evaporator is once again a saturated vapor which is returned to the compressor where the refrigeration cycle is completed. This system works well for target temperatures down to approximately -40°C.



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Main components list:

Refrigeration compressor / condenser unit	Tecumseh	
Oil separator	ALCO / ESK	
Condenser – Plate heat exchanger	Danfoss	
Pressure switch	Danfoss	
Dry filter	Danfoss	
Magnetic valve	Saginomiya	

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Safety devices and systems:

Refrigeration system

- Compressor over-temperature protection
- Compressor over-current protection
- Compressor over-pressure protection

Test Chamber

- Operator adjustable over-temperature control
- Over-temperature protection for the air treatment compartment
- Fan motor over-heat relay
- Power phase sequence and phase loss protector
- Current leakage protector
- Overload and short circuit protector

Utility requirements and operating conditions:

Ambient environments:

- Operating: Temperature 0°C ... +35°C; Humidity ≤85%RH
- Storage: Temperature 0°C ... +45°C (When ambient is sub-zero and the chamber is not being used, the water systems should be drained to prevent ice and the potential for pipes cracking)

Chamber site:	A flat and even surface with 800mm clear access around the chamber
Electrical supply:	230V 1-ph + N + E; 50Hz; 30A. The supply must be exclusive for the chamber
Water supply:	Demineralised water supply

Accessories:

- Operation and maintenance manuals; controller programming manual
- Software for remote chamber operation and monitoring (customer to supply pc or laptop)
- Plugs and caps for portholes

Delivery:

Packaged in wooden crate suitable for sea-freight and road transport.

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Installation:

Installation, commissioning and operator training can be provided at additional cost

Warranty:

Standard parts warranty 12 months

Note:

Our design, development and continuous improvement policies may result in component changes. Dimensions are approximate and subject to final design. If there are any critical dimension requirements, please inform us before acceptance of any purchase orders.

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