

TECHNICAL WHITE PAPER

# TEMPERATURE-HUMIDITY-SALT FOG INTEGRATED TEST SYSTEM FOR UTM INTERFACE

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## DESIGN OVERVIEW

Environmental Test Chambers perform a key integrating function in today's dynamic and integrated manufacturing environment. Failure to fully integrate Environmental Test Design with other mechanical systems subjected for integration to fulfill the needs of simulating multiple atmospheric conditions under control in a minute/confined work-spaces for research tests the design problem may result in design that are unable to meet the required research objectives. However typical approaches of Environmental simulation design have tended to isolate the issue of concern with respect to specific objectives and environmental simulation technologies.

Environmental Test Chamber component of the manufacturing is directly proportional to design problem from both performance and economic prospective. The design validity involves various parameters of critical nature to arrive at a design methodology considering the importance of system control, equipment selection, specification, unit load size etc.,. Valid design compliments the outcome of compliance to product specification, manufacturing processes, layout and production control.

The system integration nature of Environmental Simulation design requires that a design methodology be maintained with the perspective that Environmental Chamber supports the intended research.

Environmental chamber design as a whole requires that logical and physical aspects of the subsystems are maintained in appropriate circuit to achieve the outcome and that design be justified on both performance and economic perspective.

The cost involved in design of custom design equipment/s involves various factoring costs viz., tools, prototypes, man-hours, expertise, external resources, consultancy, methodology & developmental charges and other design overhead costs considered on the basis of the challenges forecasted.

## TEMPERATURE-HUMIDITY-SALT FOG INTERGRATED TEST APPARATUS



CHARECTERISTICS	DESCRIPTION
Test Enclosure Dimension	90 MM Diameter and 48 MM Height
Temperature	0°C to 300°C
Humidity Limits	40% RH to 95% RH
Salt Spray Test	Adjustable from Ambient to 50 °C (122 °F) – Chamber Adjustable from Ambient to 65 °C (150 °F) – Saturator

## DESIGN DESCRIPTION

Temperature-Relative Humidity-Salt Fog Integrated Test Apparatus for UTM Interface is designed to meet the specific test requirement of integration test, for this application, test enclosure is designed for the rig interface in split units, for this from the RC (Remote conditioning) unit purge the conditioning air to test enclosure.

Remote conditioning unit is placed 1-2m from the test enclosure, and unit consists of Refrigeration system, Heating system, Humidity and de-humidification system. There will be insulated stainless steel flexible hose for and return air-conditioning between conditioning unit to test enclosure.

Test enclosure is manufactured with Stainless steel inner and outer enclosure with 25mm thick insulation in two split units. Center of the test chamber will have provision for test specimen placing with silicon plug for sealing's.

Remote condition unit is equipped with, control panel as well simulation system and made with CRCS with powder coating.

Inside of the RC unit will have insulated conditioning unit to simulate the high, low Temperature and Humidity.



Interiors will be made with brush finish 18swg high quality stainless steel

Internal test chamber and outer body is isolated using mineral wool ensuring no air pockets and zero conduction and heat losses.

Multi-level diagonally joined airlock silicone rubber sealing the door and chamber with conduction free isolation mounts.

The RC unit will be mounted on 2" Heavy-duty castor wheels and leveling pads ensuring easy erection & movement of the system.

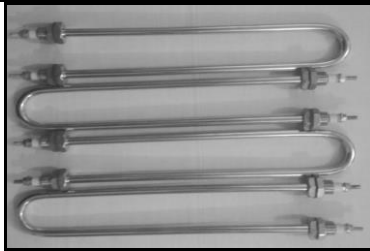
## INTEGRATED SUB-SYSTEMS



**WORK-SPACE:** Compact work space is designed with high grade Titanium material for light weight and high strength, and the embaded heating system is provided inner layer of work spce with high density ceramic insulation is provided for high temperature operation. The test chamber having purging provisions for DM water jet for wash, nacl solution spary for fog simulation, conditioning air inlet/outlet, drain etc.



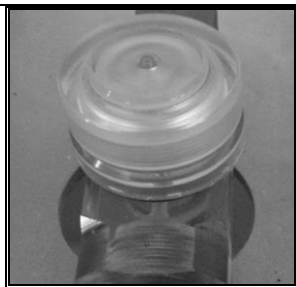
**REFRIGERATON:** Mechanical single stage refrigeration system with hermetic compressor.



**HEATING:** Stainless steel sheathed/ bare nichrom air heaters to achieve the set temperature



**HUMIDITY:** Self-pressurized fine-control condensation free humidity generator.

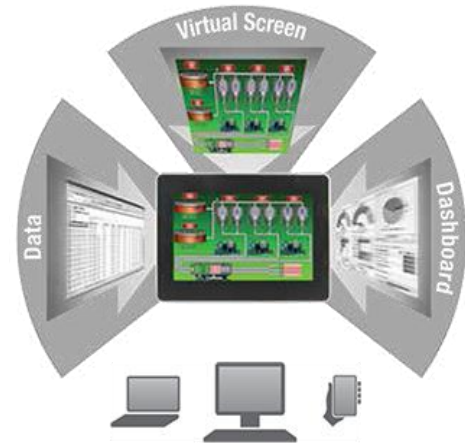
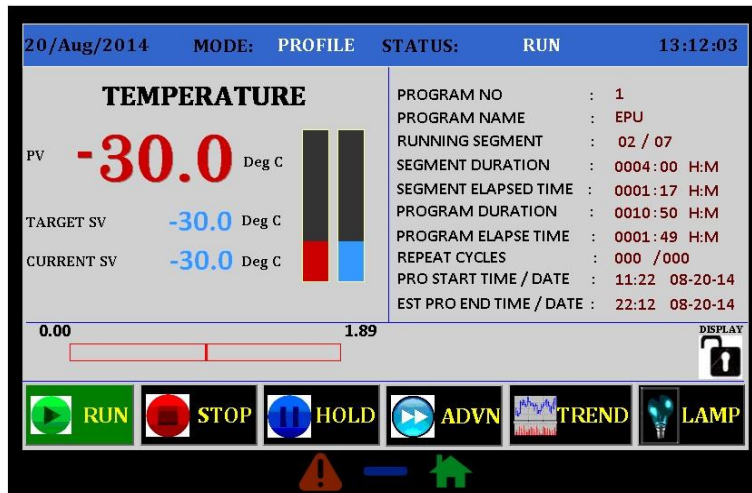


**SPRAYING:** Non-metallic-corrosive fine-fog simulation atomizer



**HUMIDIFIER:** Non-corrosive transparent saturated tower for producing the saturated air

# INSTRUMENTATION & CONTROL



*ET-touch* controller is custom designed to work with Envisys's Environmental Testing chambers. The controller hardware is built with high performance industrial grade colour touch screen which allows the user to experience clear view of the chamber parameters. The software is designed for user friendly operation with highest level of safety and optimized chamber performance.

## FEATURES

- 7" Resistive Analog Color Touch Screen with WVGA 16M Color capabilities, 800x 480 Pixels with LED back light
- **Up to 4 fully isolated serial communication ports (2- RS-232, RS 422/485)**
- **10 Base /100 base –TX Ethernet port for external device communication / Remote operation**
- Dual USB host port allows connecting USB Mouse/ Key board and external storage devices
- 3 User programmable soft keys with LED indication for pre-assigned functions
- On board 256MB user memory and extender SD card memory up to 2 GB
- Total programming capability up to 99 programs with each program having 99 Segments and 999 repeat cycles
- Graphical program editing for faster programming and program view
- Program based / segment based PID selection for accurate program control
- Maximum 6 PID configurations available in user selection in ZONE / SEGMENT
- Real time trend available with user scaling
- On demand Auto tuning
- 3 Level security for different user access