

SYSTEM OF SYSTEMS INC.
1160 FAHS ST.
YORK, PA 17404



MIL-STD 810H
METHOD 521.4

ICING AND FREEZING RAIN (IFR) TEST CHAMBER



EXTERIOR FEATURES

Customized to Suit Largest Test Item Size



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Structure

- 6" Thick polyisocyanurate core insulated panel enclosure
- 24 ga. Smooth Stainless Steel Interior
- 24 ga. Embossed Stainless Steel with Polyester Gloss White Coating
- Interior Structural Support
- Stainless Steel channel footers
- Flush Sill Freezer Swing Door with heavy duty latch with inside push release to access evaporator unit and mist eliminator section
- Insulated Stainless Steel heated floor with Auto Drain or Circulate Process



Single Sliding Insulated Door

- Automated or Manual Operation
- Heated Windows
- Inside and outside lever handles
- Heavy duty track system provides easy glide performance
- Self-Regulating Dual Bulb Seals
- HMI Color Touch Screen with E-Stop & Reset Push Buttons
- Ethernet and USB Connection Ports

Control Panel

- NEMA 4, UL508A Control Panel with Allen Bradley Components.
- PLC Automated Process Control
- Remote Operation through Ethernet and Data Recording to CSV File
- Back-Up Digital Data Recorder with color touch screen and SD card



Heat Recovery System

- Captures the condensers wasted heat energy and reuses it to melt overspray and prevent ice-build up on the evaporator coils
- Industrial-Grade, fully insulated, glass-lined storage tank
- Anodes to provide corrosion protection
- Propylene Glycol with Freeze Protection to -30°C



Water System

- Inlet Water Filtration and Storage Tank
- Automated Chilled Water Tank Fill Process
- Automated Chilled Water Temperature Control to 1°C
- Multiple spray pumps and nozzle arrangements to suit ice density requirements.
- Auto Drain or Filtered Circulation Processes

INTERIOR FEATURES



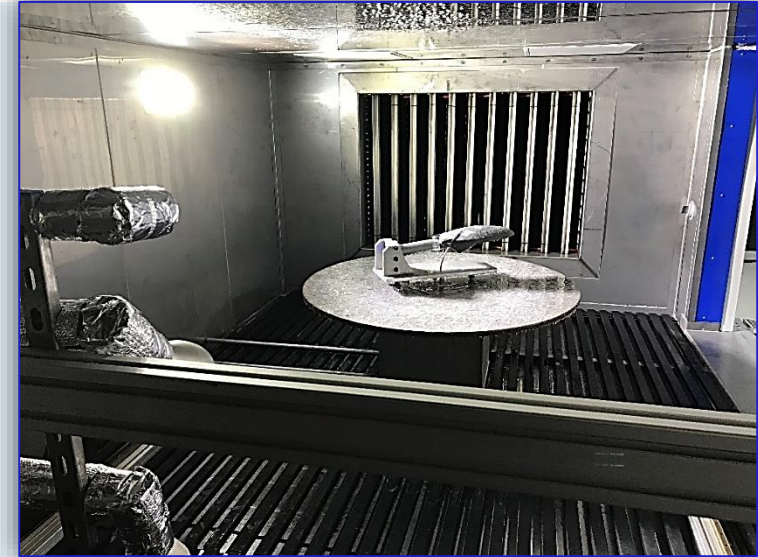
Rotating Table

- Automated Rotating Table provides even ice distribution on test items
- Adjustable rotation speed. 1 – 17 RPM
- Slip Ring RTD Test Item Temperature Sensors to provide real-time recorded temperature data
- Standard Stainless Steel Table Supports and Rotates 650 Kg Test Item



Supply Air Register and Nozzle Rack

- Customizable nozzle arrangement rack to provide multiple nozzle configurations and quick disconnect piping
- Manual or Automated Gantry to adjust spray pattern and supercool distance
- Horizontal Air Flow with Air Velocity Transmitter and Horizontal Water Spray Arrangement
- Temperature Transmitter at Air Stream Supply
- Stainless Steel Interior



Heated Return Air Register with Integrated Mist Elimination and Floor Drain

- Heated Grate Floor with Anti-Slip epoxy coating.
- Sloped Floor with Heated Drain to melt overspray and circulate cold water to be re-sprayed.
- Reverse Flow Nozzle Drain Pump evacuates water so that water lines and nozzles do not freeze during "Pause" spray Process.
- Heated Return Air Register with Mist Eliminator captures fine mist to eliminate frost build-up on Evaporator Coils.

AUTOMATED CONTROLS AND TOUCHSCREEN



Customizable HMI Color Touch Screen

- Standard 10" Color Touch Screen
- Built In Data Logger stores data in CSV format
- Customizable Levels of Automation
- Remote Access

Back-Up Data Recorder



- Digital Color Touchscreen Data Recorder
- Provides protected data format Text File
- Provides multiple graphing formats
- Records graph screens and saves to SD Card

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CHAMBER TEMPERATURE: -9.27 °C

TABLE RTD 1 TEMPERATURE: 1.1 °C

TABLE RTD 2 TEMPERATURE: -1.5 °C

NOZZLE WATER TEMPERATURE: 1.8 °C

HOT WATER PRESSURE: 57 PSI

CHAMBER VELOCITY: 1 m/s

HOT WATER TEMPERATURE: 52.1 °C

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All Equipment in Auto - Ready

SOFT RIME ICE

CHamber Light Turn OFF

HARD RIME ICE

GLAZE ICE

Manual Control | System Status | Alarm Log | System Set-Up | Analog Scaling

Home Screen

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Return To Home

Step 1: Stabilize Temperature SP 0.0 °C

Step 2: Pre-Soak Duration 60 MIN

Step 3: Ice Accretion Temperature SP -10 °C

Step 4: Ice Harden Duration 240 MIN

PRE-CHILL WATER IS ON

Data Log Setup

Data Log File Save Location and Filename

Storage Card2\hrio.csv

Storage Card2\Insert File Name.csv <<<
Space between Storage and Card

Prepare Chamber

CHILLED WATER TEMPERATURE 1.50 °C

GLAZE TEST MODE

TEST DATA RECORDING

Set Test Parameters

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GLAZE TEST MODE

TEST DATA NOT RECORDING

Status: OFF

Elapsed Time: 0 Minutes
Time Remaining: 0 Minutes

Water Spray Mode

Elapsed Time: 0 Minutes
Time Remaining: 0 Minutes

PRE-SOAK OFF

START ICE ACCRETION

START ICE HARDENING

Chamber Readiness Requirements:

	Low Alarm	REAL	High Alarm
Pre-Soak Mode Temp	-0.9 °C	-8.4 °C	2.1 °C
Ice Mode Temp	-10.1 °C	-8.4 °C	-7.9 °C
Test Item Temperature #1		0.7 °C	
Test Item Temperature #2		-1.4 °C	
Nozzle Water Temperature	-2.0 °C	1.8 °C	5.0 °C

Test Parameters OK

Alarms

Clear Alarm

TURN OFF TEST

Home

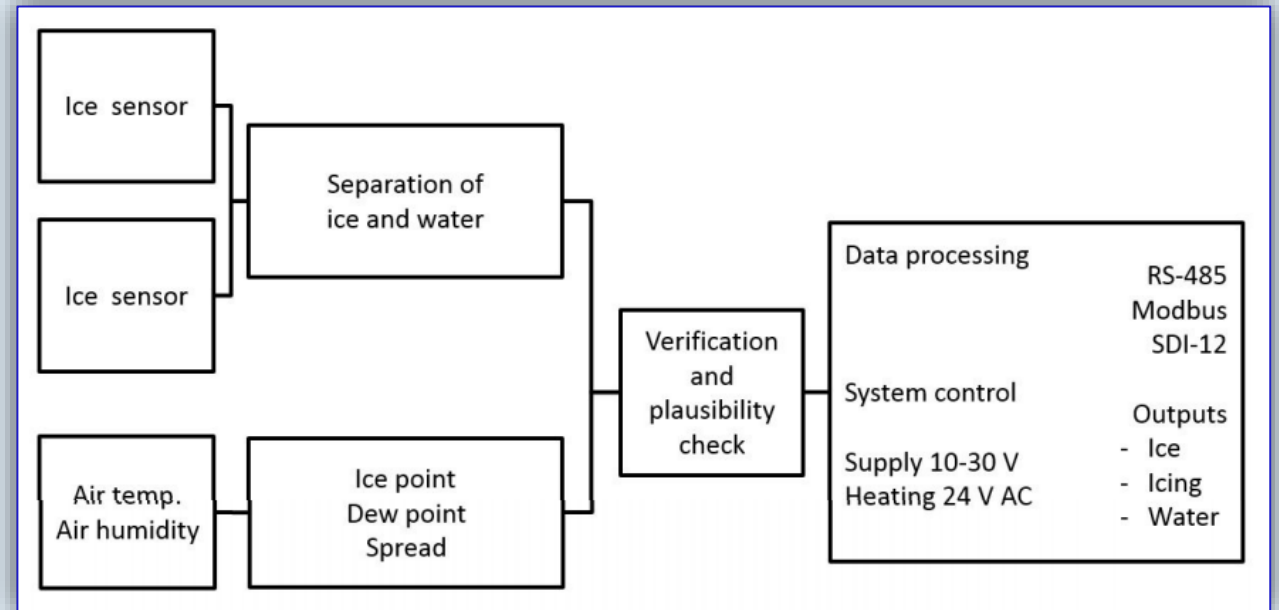
System Status



Controls

Optional Icing/Freezing Rain Items

- Ice thickness recorder. Measure the thickness of the ice in real time with built in Calibration. Provides hands free testing capability.
 - Measures and Records Ice thickness from 0.01mm to 80mm
 - Measures and Records: Dew Point, Frost Point, Air Temperature, Air Humidity
 - Communication with system PLC to fully automate a test
- Built to support any test items size or weight.
- Portable/Containerized System Design available



OPTIONAL ADD ON PROCESSES:

- MIL-STD 810H Method 506.6
 - Procedure I – Rain & Blowing Rain
 - Procedure III - Drip Test
- UL50 Rain Test
- MIL-STD 810H Method 524.1 Freeze/Thaw