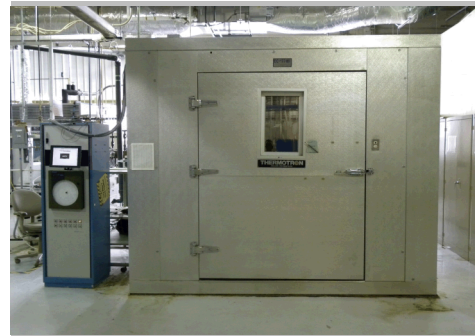


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SNL NM Climatic Laboratory

TA I, Building 860
Lab Lead: Miguel Atencio

Overview Topics

- Lab Capabilities
- Climatic Environments
- Calibration Program
- Preventative Maintenance Program
- Scheduling a test
- Lab POCs
- Questions/ Comments

Temperature and Humidity Chamber

- Temperature Range (-73C to 177C) or (-100F to 350F)
- Relative Humidity Range (10% to 95%)
- Internal Dimensions (38"x38"x38") with a 3" Inlet Port
- Data acquisition via Graphtec logger
- Type-T thermocouples and RH sensors used to measure environment
- Manual and programmable control
- Quantity: 5



Walk-In Temperature and Humidity Chamber

- Temperature Range (-65C to 93C)
(-85F to 200F)
- Relative Humidity Range (10% to 95%)
- Internal Dimensions (13'L x 8'H x 9'W)
- Two 6" ports and two 2" ports on chamber
- Large component capability
- Data acquisition via Graphtec logger and Thermotron controller
- Type-T thermocouples and RH sensors used to measure environment
- Manual and programmable control
- Quantity: 1



Temperature and Altitude Chamber

- Temperature Range (-73C to 177C) or (-100F to 350F)
- Altitude Range (Ambient to 185,000 ft) or (630 Torr to 0.25 Torr)
- Internal Dimensions (36"x36"x36")
- 3" port on 2 opposite sides of the chamber.
- Data acquisition via Russells controller & Graphtec logger.
- Thermocouples & dual capacitance diaphragm gauges used to measure environment
- Manual and programmable control
- Quantity: 1



Temperature Shock Chamber

- Temperature Range (-73C to 177C) or (-100F to 350F)
- Basket moves within chambers in 8 seconds
- Internal Dimensions (34"x 28"x 26") or (14.3 ft³)
- Data acquisition via Graphtec logger and Russell's controller
- Type-T thermocouples used in chamber to measure environment
- Manual and programmable control
- Quantity: 1



Accelerated Corrosion Chamber

- Cyclic environments:
 - Salt fog, humidity fog, temperature, humidity, salt spray, rain tests
- Data acquisition via Graphtec and Singleton controller
- Manual and programmable control
- Quantity: 1



VTR Temperature Chambers

- Temperature Range (-73C to 177C) or (-100F to 350F)
- Internal Dimensions (24"x24"x24") and a 3" port on one side of the chamber
- Enables testing of classified hardware
- Data acquisition via Graphtec logger and Thermotron controller
- Type-T thermocouples and RH sensors used to measure environment
- Manual and programmable control
- Quantity: 2



Climatic Environments

- Temperature
 - High Temperature (177C) or (350F)
 - Low Temperature (-73C) or (-100F)
 - Cyclic Temperature
 - Temperature Shock (8 second transition time)
- Humidity
 - (5% to 95% RH)
- Low Pressure (Altitude testing)
 - Ambient pressure to 185,000 ft. above sea level (630 Torr to 0.25 Torr)
- Accelerated corrosion
 - Salt fog
 - Humidity fog
 - Salt spray
 - Rain testing
- Combined Environments
 - Temperature + humidity
 - Altitude + temperature
 - Salt fog + temperature

Calibration Program

- Performed by PSL Partners in Org. 2541
- Lab hardware calibrated on an annual basis
 - Test chambers
 - 14 unique pieces of equipment made by 5 different vendors
 - Test sensors
 - Thermocouples, RH sensors, pressure transducers, etc.
 - Data acquisition systems
 - Graphtec data logger & other measurement devices

Calibration Program Continued

- 9 pt. mapping used to characterize chamber
 - Temperature measurements taken at the bottom 4 corners, top 4 corners and center
- NIST traceable PSL standards used to compare with lab equipment sensors
- 3 test measurements for each temperature are taken by PSL personnel at intervals not less than 5 minutes or more than 15 minutes
- Typically 4 different temperature set points are used to characterize operating range of chamber

Preventative Maintenance Program



- Established in 2012
 - PM Plans written by Climatic Lab personnel
 - Executed by SNL Machine Repair (Org. 2728)
- Routine PM activities
 - Most performed on an annual basis
 - Maintain capability & minimize unexpected breakdowns
 - Mechanical components
 - Compressors, evaporators, condensers, etc.
 - Electrical components
 - Fans, resistance heaters, electrical panels, etc.
 - Findings corrected during PM
- Unexpected breakdowns
 - Minimize downtime
 - Same day response from Machine Repair Partners
 - Minimize test interruption (hours to days) vs. (weeks to months) prior to PM Program

Maintenance Program Continued 1

- Record Keeping
 - Annual PM sheets
 - Dates PM performed
 - Technicians who performed PM
 - Tasks performed
 - Miscellaneous notes section
 - Pictures (if applicable)
 - Breakdown sheets
 - Date of breakdown
 - Description of failure mode
 - Actions taken by Machine Repair
 - Completion date
 - Repair time & cost

Maintenance Program Continued 2

- Record keeping used to track equipment specific maintenance activities/ trends
- Informed decisions can be made on whether to fix or replace with new
- Necessary to maintain aging test capability
 - Avg. age of test equipment = 14 years old
- Avg. Yearly PM cost
- PM funding source

Scheduling a test

- Climatic lab test request form
 - Customer POC information
 - Hardware classification
 - Description of services requested
 - Description of test hardware
 - Test Specs/ Associated test plans
 - ES&H Hazards
 - Special Requirements/ Documentation
 - Lab POCs

Scheduling a test

- Climatic lab personnel test request review
- Climatic lab personnel perform WP&C
- Additional meetings (TOR/ MOR) if necessary
- Climatic lab personnel contact customer with available test dates
- Test date agreed upon and scheduled
- All 860 Environmental Labs have a similar, yet different process

Climatic Lab POCs

- Miguel Atencio- Lab Lead
 - moatenc@sandia.gov 505-284-8002
- Tom Souther – Lab Technologist
 - tmsouth@sandia.gov 505-844-7492
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Questions/ Comments