

**Reliable Execution.
Proven Performance.**



At ROCH Mechatronics Inc., we understand that modern industries require products capable of performing reliably under extreme tropical environmental conditions. To support product validation, performance evaluation, and quality assurance, we offer advanced Walk-in Tropical Test Chambers designed to simulate high-temperature, high-humidity, and controlled climatic conditions within a spacious containerized testing environment.

Designed to accommodate large assemblies, heavy equipment, automotive components, electrical systems, industrial machinery, and complete product prototypes, our Walk-in Tropical Test Chambers provide precise and uniform environmental conditions for comprehensive tropical climate testing. These chambers enable manufacturers, research institutions, and testing laboratories to evaluate product durability, operational reliability, material stability, and long-term performance under accelerated environmental exposure.

Built with robust construction, precision air circulation, advanced refrigeration and humidity control, and intelligent PLC-based automation, ROCH Walk-in Tropical Test Chambers deliver exceptional temperature and humidity uniformity, repeatable test conditions, and dependable performance. Suitable for both indoor and outdoor installations, they comply with international testing standards while supporting critical product qualification, research, and validation programs.

Guided by our vision of "Developing Sustainable Future Technologies" and driven by our commitment to "Working Beyond Horizon," we continue to deliver innovative environmental testing solutions trusted by the automotive, aerospace, defence, railway, electronics, renewable energy, heavy engineering, and research sectors, helping organizations accelerate product development and enhance product reliability with confidence.

Quality and reliability are at the core of every Weathering Simulator manufactured by ROCH Mechatronics. Designed for accurate and repeatable environmental testing, our systems are built to meet international quality and safety standards.

Certifications & Compliance

- **ISO 9001:2015** Certified Quality Management System
- **CE Certified** for Safety and Compliance
- **GMP-Compliant** Manufacturing Practices
- Adherence to International Weathering and Environmental Testing Standards
- **MSME Registered** Manufacturing Enterprise

Awards & Recognition

- Innovation in Environmental Testing Solutions
- Trusted Supplier of Advanced Testing Chambers
- Excellence in Scientific Equipment Manufacturing and Export
- Emerging Leader in Durability Testing Technologies

Through advanced engineering and strict quality control, ROCH Mechatronics delivers reliable Weathering Simulators for product durability testing, research, and quality assurance applications worldwide.

WALK-IN TROPICAL TEST CHAMBER



Make: Roch Mechatronics Inc

WALK-IN TROPICAL TEST CHAMBER



The Walk-in Tropical Test Chamber is a large-capacity environmental testing system designed to simulate high-temperature and high-humidity tropical conditions for evaluating the performance, durability, and reliability of products under controlled climatic environments. Built within a rugged ISO container, the chamber provides a spacious testing area capable of accommodating large equipment, heavy assemblies, and complete product systems for comprehensive environmental testing.

Engineered with advanced temperature and humidity control technology, precision air circulation, and intelligent PLC-based automation, the chamber ensures uniform environmental conditions and repeatable test results. Its robust containerized design enables easy transportation, outdoor installation, and reliable operation in demanding industrial environments.

Ideal for industries such as automotive, aerospace, defence, railways, electronics, renewable energy, and heavy engineering, the Walk-in Tropical Test Chamber supports product qualification, reliability assessment, quality assurance, and research & development. By accurately replicating tropical climatic conditions, it helps manufacturers validate product performance, enhance durability, and ensure compliance with national and international environmental testing standards.



- 30 ft ISO design for easy transportation and outdoor installation.
- Spacious walk-in chamber for testing large equipment and complete assemblies.
- Precise temperature and humidity control for tropical climate simulation.
- Uniform air circulation for consistent environmental conditions.
- Advanced PLC-based control system with HMI touchscreen interface.
- High-performance refrigeration and humidification system.
- Heavy-duty insulated double door with metal loading ramp.
- Hydraulic trolley for easy loading and unloading of heavy test specimens.
- Dedicated 12-ton genset for reliable power supply during operation.
- High-density polyurethane insulation for excellent thermal efficiency.
- Robust weather-resistant construction for continuous outdoor use.
- Comprehensive safety features, including alarms, emergency stop, and protective interlocks.
- Reliable and repeatable test conditions for accurate product validation.
- Energy-efficient design for continuous industrial operation.
- Suitable for automotive, aerospace, defence, railway, electronics, heavy engineering, and research applications.
- Designed to support compliance with national and international environmental testing standards.



- Automotive component and vehicle testing
- Aerospace equipment qualification
- Defence and military equipment validation
- Railway systems and onboard equipment testing
- Electrical and electronic product evaluation
- Renewable energy equipment testing (solar panels, batteries, inverters)
- Heavy engineering machinery and industrial equipment testing
- Power generation equipment validation
- Telecommunications equipment and outdoor cabinet testing
- Marine and offshore electrical equipment testing
- Research and development (R&D) applications
- Quality assurance and product reliability testing
- Product qualification and environmental compliance testing
- Industrial manufacturing and product validation
- Universities, research institutions, and government testing laboratories
- Environmental simulation for large assemblies and complete product systems



The Walk-in Tropical Test Chamber operates by creating a precisely controlled tropical environment to simulate high-temperature and high-humidity conditions for evaluating the performance, durability, and reliability of products.

The test specimen is placed inside the chamber through the insulated access door. Once the test cycle is initiated, the PLC-based control system regulates the refrigeration, heating, humidification, and air circulation systems to achieve the programmed temperature and humidity conditions. High-performance circulation fans ensure uniform distribution of conditioned air throughout the chamber, providing consistent environmental conditions around the test specimen.

Multiple temperature and humidity sensors continuously monitor the chamber environment and provide real-time feedback to the controller, which automatically adjusts the operating parameters to maintain the desired test profile with high accuracy. The chamber can perform both continuous and cyclic environmental tests based on predefined testing programs.

Upon completion of the test cycle, the chamber safely returns to ambient conditions, allowing the test specimen to be removed for inspection and performance evaluation. This controlled testing process enables manufacturers to validate product quality, durability, and long-term reliability under simulated tropical climatic conditions.

The **Walk-in Tropical Test Chamber** is designed with a robust, insulated structure to ensure accurate environmental simulation, excellent thermal stability, and long-term industrial performance.

- **Heavy-Duty Chamber Body:** Fabricated from high-quality mild steel (MS) with a powder-coated finish or stainless steel, providing structural strength and corrosion resistance.
- **Interior Construction:** Constructed using SS 304 stainless steel, offering excellent corrosion resistance, durability, and easy maintenance
- **Thermal Insulation:** High-density Polyurethane Foam (PUF) insulation minimizes heat loss, enhances energy efficiency, and maintains uniform chamber conditions.
- **Insulated Access Door:** Equipped with a heavy-duty insulated single or double door with airtight sealing and a viewing window (optional) to prevent heat leakage.
- **Air Circulation System:** High-capacity circulation fans and specially designed air ducts ensure uniform temperature and humidity distribution throughout the chamber.
- **Heating System:** Electric finned heaters provide precise and rapid temperature control.
- **Refrigeration System:** High-efficiency refrigeration unit with eco-friendly refrigerant ensures stable cooling performance over the specified temperature range.
- **Humidification & Dehumidification System:** Integrated humidity generation and moisture removal systems maintain precise relative humidity conditions.
- **Control Panel:** PLC-based control system with a color HMI touchscreen for programming, monitoring, data logging, and automatic operation.
- **Safety Features:** Integrated with over-temperature protection, overload protection, low/high-pressure protection, emergency stop, alarms, and safety interlocks for safe operation.
- **Observation Window & Lighting:** Fitted with a heated observation window and internal LED lighting for convenient monitoring of test specimens during operation.
- **Cable Access Port:** Insulated cable entry port allows external monitoring and instrumentation without disturbing chamber conditions.
- **Flooring:** Heavy-duty non-slip stainless steel floor designed to support large and heavy test specimens with ease.

A. 30 Ft MS Stationary Container with Cooling Capacity @ -40°C

Container Technical Specifications

External Dimensions of Container (ft):

8867 (L) (30 ft) × 3500 (W) (12 ft) × 3524 (H) (11.7 ft)

External Wall Panels:

3 mm thick MS corrugated sheet construction.

Internal Wall Panels:

SS 304 plain sheet cladding backed with waterproof plywood.

Insulation:

150 mm PUF insulation suitable for maintaining -40°C holding temperature.

Floor:

2 mm SS 304 chequered plate.

Doors:

Double doors with 180° opening.

Total quantity: 3 Nos.

Exhaust Opening:

Cut-out provided for exhaust.

Door Hardware:

Galvanized (GI) container door hinges and lockset.

Door Seal:

Multi-leaf heavy-duty rubber door sealing.

B. Cooling System Refrigeration Unit

- German make condensing unit using R404 refrigerant.
- Cooling Capacity: 10 kW @ -45°C evaporating temperature.

Power Supply:

- 400 V
- 3 Phase
- 50 Hz AC

Outdoor condensing unit complete with:

- ODU fan
- Vibration isolators
- Refrigeration valves
- Safety devices
- Control panel
- Thermostat
- Pressure gauge

Evaporator Unit

Bluecold make evaporator unit.

Cooling Capacity:

10 kW @ -45°C evaporating temperature

Power Supply:

- 400 V
- 3 Phase
- 50 Hz

B. Cooling System Refrigeration Unit

- German make condensing unit using R404 refrigerant.
- Cooling Capacity: 10 kW @ -45°C evaporating temperature.

Power Supply:

- 400 V
- 3 Phase
- 50 Hz AC

Outdoor condensing unit complete with:

- ODU fan
- Vibration isolators
- Refrigeration valves
- Safety devices
- Control panel
- Thermostat
- Pressure gauge

Evaporator Unit

Bluecold make evaporator unit.

Cooling Capacity:

10 kW @ -45°C evaporating temperature

Power Supply:

- 400 V
- 3 Phase
- 50 Hz

Electrical Control Panel

- MCB
- VMR
- Contactor
- Terminal Block (TB)
- Indicator Lamps (IL)
- Push Buttons (PB)
- Internal wiring
- Digital cold room temperature display outside the chamber for both refrigeration units.

AC Accessories

- Pressure Release Valve (PRV)
- Cable tray
- Mounting hardware
- Emergency switch with hooter
- Temperature data logger
- 4-channel USB data recording
- HMI & PLC (Kinco make)
- RS-485 communication connectivity

Erection & Commissioning

- Refrigeration piping with cabling.
- Pressure testing using nitrogen.
- Nitrogen vacuuming of refrigeration system.

C. Genset Drive System

- Geared motor-driven trolley system.
- Heavy-duty fabricated trolley with guide rails.
- Hydraulic jacking cylinder.
- Suitable for lifting a 12-ton genset.
- Designed for smooth in/out movement of the genset.

D. High Altitude Pressure Simulation System

- Atmospheric pressure reduction inside the container.
- Capable of achieving up to 50 kPa pressure drop.
- Designed for genset cranking tests.

System Includes

- Skid-mounted vacuum system.
- PLC-based HMI.
- Selectable pressure range:
 - 10 kPa to 50 kPa
- Data storage facility.
- HHV make vacuum pump with filter.
- Pressure transducer.
- Stainless steel connections.