Cincinnati Sub-Zero

Case Study

Custom Cold Dual-Zone Environmental Chamber Enables Indoor & Outdoor Simulation for Testing Window Assemblies

CHALLENGE

A leading manufacturer of residential and commercial windows and doors required a large-scale test chamber to simulate both indoor and outdoor environmental conditions. The goal was to conduct reliable product and process testing on full window assemblies under varying temperature extremes. The chamber needed to accommodate sizable test specimens while providing precise environmental control, ease of access, and structural strength to support heavy loads.

SYSTEM HIGHLIGHTS

- Structural durability to withstand heavy floor loading up to 1,200 lbs. per sq. ft.
- Two 36" insulated doors with heated viewing windows allow for easy operator access and the movement of large window assemblies
- The dual-zone chamber simultaneously creates indoor and outdoor temperature conditions.



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SOLUTION

A large, dual-zone, walk-in chamber with over 3,000 total cubic feet of workspace volume was designed for usability, versatile testing, and precise temperature control. The chamber featured an outdoor condition zone of a 1,840 cu.ft zone to simulate outdoor conditions, and a 1,467 cu. ft zone to simulate indoor conditions. The outdoor zone is designed to hold a temperature range of -20°C to +40°C using a 3HP customer-supplied fan and fixture.

This custom chamber delivers precise environmental control, user-friendly operation, and long-term reliability. The provided solution will enable the manufacturer to confidently test and validate window performance across a wide range of real-world conditions with flexibility to meet future testing needs.

SYSTEM HIGHLIGHTS

- Dry-decking under the chamber for optimal air convection.
- Floor drain and removable ramp for easy access and cleaning.
- Interior LED lighting for clear visibility.
- Electronic humidity sensor for accurate humidity monitoring.
- Ceiling-mounted refrigeration system to save floor space.
- Integral air-cooled condensing unit with service taps for maintenance.
- UL 508A electrical subpanel, designed to NEC and NFPA standards.
- Integration of customer-supplied fan and fixture while maintaining consistent environmental performance.



