

## Sustainable and Reliable Single-Compressor Refrigeration Systems for -40°C Testing

*A proven track record of “in the field” experience and a well-seasoned design demonstrates that environmental test chambers using the patented Tundra® refrigeration system provide high reliability and long term quality performance.*



Whether applied to precision microchips, larger hardware, or other product testing applications, the rugged and reliable CSZ test chambers with the Tundra refrigeration system help to assure a positive experience—for our customers and their end-users as well.

**“The Cincinnati Sub-Zero (CSZ) patented Tundra® refrigeration system is a pivotal piece of successful environmental testing programs all over the world. With an installed base use that approaches nearly a decade, Tundra units demonstrate sustained temperature performance over time.”**

### CSZ Tundra Refrigeration Testing System Benefits

Tundra system design can be used in any CSZ chamber from 3.5 to 15 HP for the Tundra and 12 to 30 HP for the Tundra II models. Unlike conventional single-stage systems that test products to -34°C, Tundra and Tundra II systems effectively test products, over and over, to -45°C and -54°C with only one compressor. Testing products at these temperatures no longer requires a cascade refrigeration system. In addition, a single compressor can help to lower initial and ongoing energy and operating costs, as well as test-time requirements.

### Additional Tundra System Benefits

- **Increased Capacity**  
Greater live load capability
- **Increased Performance**  
Rapid temperature change rates
- **High Reliability**  
Proven system with simplified design
- **Reduced Maintenance**  
Fewer parts to service
- **Operational Savings**  
Less equipment, energy, and time required

Delivering these benefits, Tundra has received positive user experiences for nearly a decade. Many Tundra customers are willing to share their experiences. See back side.



## CSZ Tundra Refrigeration Testing System Experiences

### Leading Electronics Manufacturer: Daily Testing with Dozens of Test Chambers for Consecutive Years

A leading manufacturer of electronics components is an innovative champion of meeting customer needs. Its microprocessors and chips, integrated within desktops, laptops, workstations, and servers, literally help to power electronics.

The company adheres to industry and customer standards. ISO-certified testing assures components are developed with both blueprint and operational surety. Research and development (R&D) departments use test chambers with CSZ Tundra refrigeration systems to test product efficacy and endurance. AMD uses more than a dozen CSZ units to meet its chip testing requirements.

**"I've been satisfied with the product ability to meet our requirements, in terms of size, price, operation, and features. We have a very good relationship with CSZ; they are very responsive."**

**Engineer, Leading Electronics Component Manufacturer**

### A Leading Computer Peripherals Manufacturer: 24-Hour Testing at -40°C on Two Units for Consecutive Weeks Over Years

A leading computer peripherals manufacturer secures its place via a clear commitment to customers. Since its separation from a larger parent company, this company has preserved its market share as a niche printing and imaging solution provider by adopting a 'customer for life' motto.

Product development uses pre-set profile tests to ensure its printing and imaging products are up to par. It temperature tests products from -40°C to 140°C. The engineers just monitor the testing and the Tundra units run smoothly.

**"It's bullet-proof... We use the Tundra units every day and have run them at -40°C for two weeks with no issues... Nothing is ever a problem."**

**Lab Technician,  
Leading Computer Peripherals Manufacturer**

### Department of Defense: Days of Repeated Testing to -20°C and -40°C with the Same Units, For Years

Various arms of the Defense Department must depend on product and product component functionality in a manner like few others. In this light, the organization operates a number of its own component testing facilities to support and monitor its product procurement and vendor purchasing programs. One of these facilities employs several different test chambers with the Tundra system.

Each of the Tundra chambers has been running in a series of tests for multiple years, testing down to the lowest temperatures possible. The larger machines, used primarily for battery testing, are programmed to go down to -20°C and then are taken down to -40°C. Even after a battery exploded in the chamber the unit continued to run!

**"I have a high appreciation level for these products; I cannot find any that are cheaper or perform better... We use a five-degree variant for tests, so we have to make sure our chamber testing stays within that range. We measure the equipment regularly and it's almost always dead on; it never needs an adjustment; it never dips on us."**

**Engineer, Department of Defense**

The long list of satisfied customers using patented and mature Tundra systems in advanced environmental testing programs is a testament to system design and fortitude. With a highly reliable and highly performing set of products and services, CSZ is your environmental testing partner and CSZ test chambers with the Tundra refrigeration system is the winning chamber option.

### About CSZ

CSZ Industrial, a division of Cincinnati Sub Zero Products, LLC., manufactures a wide portfolio of environmental test chambers, with sizes ranging from bench-top and reach-in to drive-in and full walk-in rooms. CSZ Testing Services, also a division of CSZ, is an A2LA Accredited test laboratory providing a full range of climatic testing services including temperature, humidity, thermal shock, altitude, corrosion, vibration, and shock testing. CSZ is part of the Gentherm family. A world-wide leader in thermal management products and technology.