Cincinnati Sub-Zero

Case Study

Custom heavy-duty chilling chamber for aerospace components meets size and performance challenges

SYSTEM HIGHLIGHTS

- Temperature Range: -40°F to -130°F (-40°C to -90°C)
- Cooling System: Cascade refrigeration with LN2 boost
- Pneumatic vertical lift door for effortless access to test space
- Heavy-duty roller system designed for frequent loading of substantial components
- Extra-thick chamber walls for superior temperature stability
- Programmable controls for automated test cycles
- Rapid recovery capabilities to maximize testing throughput
- Custom-engineered solution tailored to specific aerospace testing requirements

CHALLENGE

A global leader in precision control components for aerospace and defense applications needed a reliable solution for testing their 400-pound metal alloy aircraft components under extreme low-temperature conditions. The company required consistent performance at temperatures as low as -130°F (-90°C), the capability to handle heavy metal components weighing up to 400 pounds, rapid temperature recovery after introducing room-temperature components, sufficient interior workspace to accommodate various component configurations, and durable construction to withstand frequent production testing cycles.

The manufacturer's quality assurance protocols demanded that components undergo rigorous temperature cycling to ensure reliable performance in extreme aerospace environments.

SOLUTION

The Cincinnati Sub-Zero (CSZ) team delivered a custom-engineered T-series heavy-duty production chilling chamber specifically designed to meet the demanding cooling requirements of aerospace testing. The system features a cascade refrigeration system supplemented with liquid nitrogen (LN2) cooling to achieve and maintain ultra-low temperatures.

The robust chamber design includes a pneumatic vertical lift door for easy loading of heavy components, heavy-duty rollers and guides to facilitate moving 400-pound steel components in and out of the testing environment, reinforced chamber walls with enhanced insulation to maintain extreme low temperatures efficiently, and precise temperature control systems to ensure test accuracy and repeatability.