



KLINGE CORPORATION

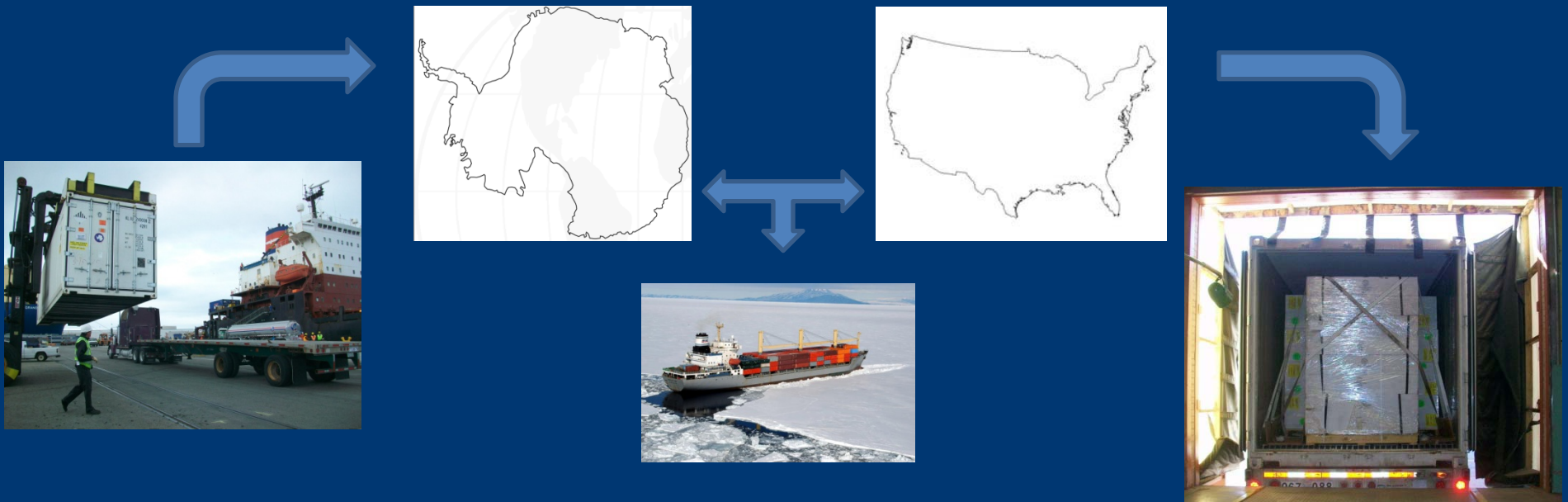
*Leading Manufacturer of Specialized
Transport Refrigeration Equipment*

**Keeping Your Cargo Safe:
Reliable Refrigeration Technology for
Maintaining Critical Core Temperatures**

www.klingecorp.com

The past two years, three Klinge Corp refrigerated containers made the final leg of an incredible journey more than a year in the making.





The 40' refrigerated container systems conceptualized by U.S. Antarctic Program support staff and designed by Klinge Corp were entrusted with the transport of several million dollars worth of ice core samples collected from Antarctica.



The success of the mission was a testament to the hardworking and dedicated employees from both companies and to the benefit of having numerous fail-safes in place for such valuable cargo. The Wall Street Journal published an article about the project and discussed the ice core's path from Antarctica to the Colorado lab, including Klunge Corp's role in making sure everything stayed safely frozen.

The project started out with a Statement of Work and request for quote which required a redundant container system for the transport of a product that represented years' worth of hard work and effort.



“While we knew this product was important, it was not until we met the scientists, National Ice Core Laboratory (NICL) employees, and project leaders from RPS that we understood how much had gone into obtaining these samples. From the intense core drilling process at the main arch, to flying the ice to McMurdo Station on the coast of Antarctica, to the coordination of a ship from half way around the world, the importance of these ice cores was never in question,” said Klinge’s Project Manager, Allan Klinge.

This made the procurement of a reliable transport solution back to Los Angeles and from there to NICL in Denver a critical part of the mission. Even more important, the ice cores were not permitted to rise above -25°C at any point during their 1.5-month travel from the southern hemisphere, across the equator, and through the southwestern US—otherwise, some of the most critical research related to analysis of the gases contained in the cores would not be possible.



Klinge was able to apply its experience in this specialized area to the shipment of the ice cores back to NICL. In fact, Klunge expanded on the built-in redundancies in the system by including not only two refrigeration units, but two back-up generator sets, as well.

Each piece of equipment automatically switches to its back-up in the case of a loss of performance or power to provide the ultimate peace of mind when shipping this valuable cargo.

The sophisticated, yet simple to maintain, redundant Klunge design ensured a successful transfer of the ice back to NICL. The ultimate vote of confidence, of course, comes from the fact that the Klunge containers have returned again from the ice and completed this journey again in 2011.



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**HOW DID WE DO IT?
The Technology Behind Mission
Success**

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The refrigerated container systems designed by Klinge Corporation were also required to pass several tests:

- Redundancy
- 24 Hour temperature maintenance test under ambient conditions of -50° to $+50^{\circ}$
- Standard operational procedure test



The fuel tank was also required to hold up to 180 gallons of fuel (run for 5 days) and double-walled for secondary containment.



FAIL-SAFE SYSTEM: NEW TECHNOLOGY

The success of the mission was a testament to the hardworking and dedicated employees from both parties and to the benefit of having numerous fail-safes in place for such valuable cargo.



DUAL REFRIGERATION UNITS



DUAL GENERATOR SETS



TEMPERATURE CONTROL



SATELLITE COMMUNICATION



DATALOGGER



ALARMS



DUAL REFRIGERATION UNITS

Primary & Back-up Systems. The refrigeration unit automatically switches to its back-up in the case of a loss of performance or system failure.

» Total redundancy—Two complete and separate refrigeration systems, each with their own thermostat and control circuit.



» Each reefer unit is capable of maintaining the required cargo bay temperature as low as -30°C (-22°F) automatically, using cooling and defrost cycles during operation.



DUAL GENERATOR UNITS

The Refrigerated Container System Generator Set System is comprised of two (2) NMG-115-11 Generator Sets (primary and backup), a Control/Changeover Box, a Fuel Tank, a 15 KVA Transformer and a Battery Box housing a pair of batteries.

The generator set automatically switches to its back-up in the case of a loss of performance or system failure.

Facing the refrigeration end of the container, the left, front-most genset is the primary unit, while the right, rear-most genset is the automatic backup unit.



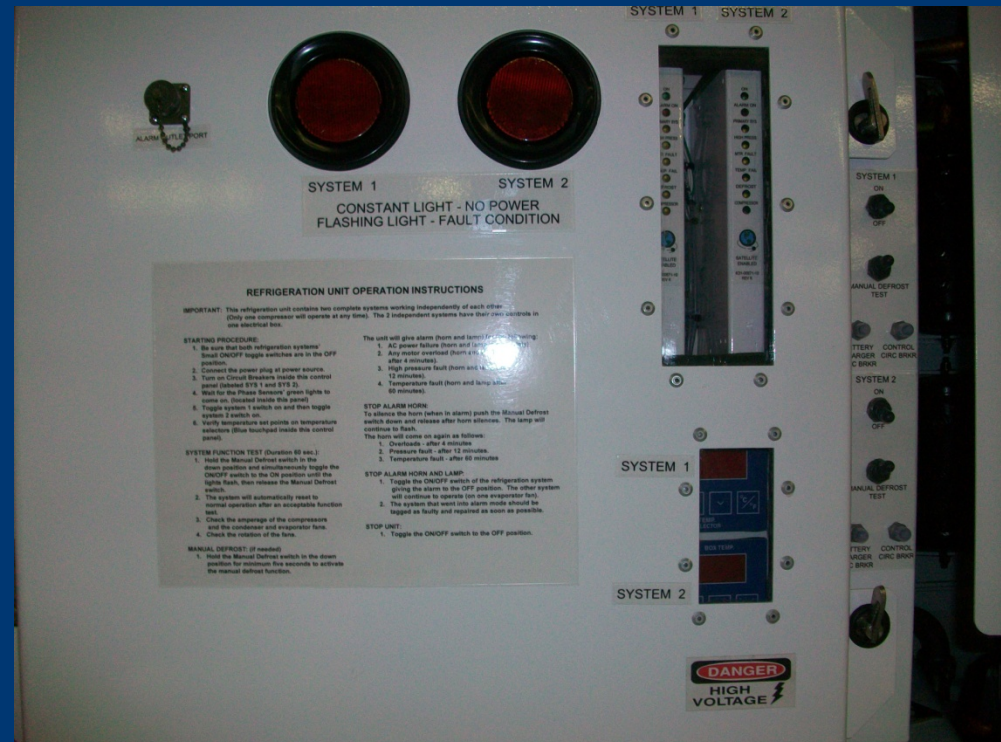


TEMPERATURE CONTROL

The temperature controller system is electronic solid state technology consisting of three parts:

1. Temperature selector
2. Defrost & return air probes
3. Microprocessor Thermostat

The temperature selectors (touch pads) are mounted one above the other, visible through a control box window for viewing of container internal temperature.

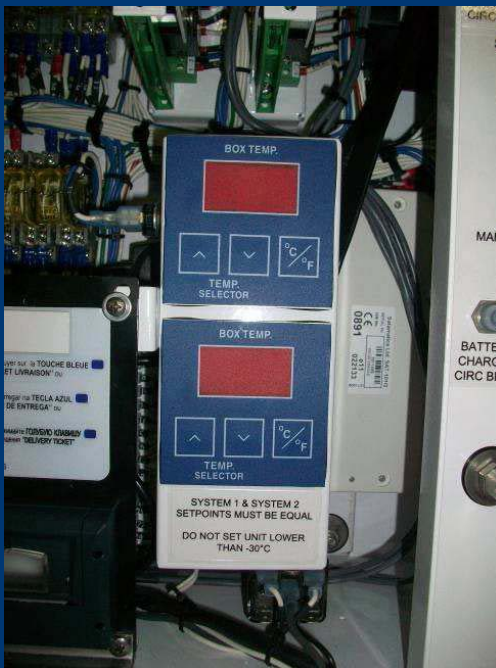




TEMPERATURE CONTROL

3. Microprocessor thermostat and Display

The Microprocessor (MPC) is the most flexible and simplest to operate controller available, while still being compact and reliable.



The MPC meets the stringent requirements for extremely temperature sensitive cargo, military applications and hazardous cargo transport.



DATALOGGER

The datalogger (temperature recorder) provides evidence of correct temperatures for every trip in the form of a delivery ticket numerical or graphical print out.

All data is stored with a date / time stamp in a large memory.

Data will not be lost if power is lost. The real-time clock is powered by an internal back-up battery.





SATELLITE COMMUNICATION

Tracks location, monitors box & ambient temperature, running condition, alarm status, fuel level, and much more.

The satellite unit is mounted in the control box behind the temperature selector mounting bracket. The satellite antenna is mounted to a two-position bracket, fastened to the container framework.

The bracket will allow the antenna to be positioned horizontally or vertically, for best satellite signal reception.





ALARMS

EXTERNAL ALARM MONITORING

The nose mount refrigeration unit is equipped with an external 2-socket receptacle to accept a 2-wire cable for sending all alarm signals to a remote location central alarm board. In the case of a generator set fault, the refrigeration unit alarm horn and light will activate.

ALARM NOTIFICATION BOX

Klinge has supplied an auxiliary alarm notification box for positioning on the bridge of the ocean going vessel. The alarm notification box has 3 LEDs, one LED for each container, for alarm notification. The LED will be lit when the container is operating properly, and will be off when the container has an alarm situation.







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Thank you for your attention.

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