



A piece of history

REFRIGERATION

Klinge Corp is one of the biggest names in reefer container technology and is still adding to its portfolio of equipment. But its origins go a long way back and off into other industry sectors

Klinge Corporation has just celebrated its 30th anniversary. It was founded to manufacture specialised transport equipment, including tank container refrigeration units and the first ever line of dual-refrigeration units specifically for the handling of dangerous chemicals.

But the Klinge name goes back twice as far; Paul Klinge established Paul Klinge A/S in the 1940s in Denmark and had a lot of operations in different fields. Paul Klinge's various ventures brought him honours, including the Danfoss Prize to recognise his significant business contribution and King Frederik IX's Recognition Prize for his meaningful contributions to Danish exports.

Paul Klinge first got involved in the reefer container sector in the 1970s when it was appointed worldwide agent for York Refrigeration. Paul's son Henrik joined the company around this time and, with Paul Klinge A/S taking over production of York machinery and moving most of the standard equipment production to Denmark under the Klinge Cool brand, Henrik established Klinge Corp in 1984 as a spin-off of the transport refrigeration division of York Refrigerants.

The family tree was extended in 2007 with Henrik's son Allan Klinge joining Klinge

Corp to establish a project management department for the company's increasing number of multi-year government contracts. Allan now serves as vice-president and sales manager.

Into the cold

Over the years Klinge Corp has developed its range of highly specialised refrigeration units for transport applications. Its client industries include:

- offshore oil and gas, for which it supplies ATEX-certified explosion-proof reefer containers;
- chemical manufacturing, where it still supplies dual-refrigeration units as well as 'blast' or deep storage freezers;
- pharmaceutical manufacturing, which has a similar set of requirements;
- seafood and meat processing, which requires blast and deep storage freezers;
- government agencies and aid organisations, which use reefer containers to move potable water and other emergency provisions;
- polar research facilities, which need to move ice cores using dual-refrigeration units; and
- military forces, to which it supplies reefer containers built to specific standards.

The dual-refrigeration concept,

which offers failsafe operation using two independent systems, in fact dates back to before the foundation of Klinge Corp. It was designed specifically to meet the requirements for the transport of Division 5.2 organic peroxides under the International Maritime Dangerous Goods (IMDG) Code; such substances must be carried under temperature control in order to prevent auto-ignition.

The International Maritime Organisation (IMO) later extended the requirement to self-reactive and flammable solids of Division 4.1. Dual mechanical refrigeration systems are seen as meeting the requirements, providing that:

- the two systems are independent of each other;
- each system on its own is capable of maintaining adequate temperature control; and
- explosion-proof electrical fittings are used within the coolant compartment to prevent ignition of flammable vapours from substances that have a flashpoint less than 5°C above the emergency temperature.

Dual control

The dual-refrigeration concept has been developed further over the years; the current NMR-262 model has two full capacity reefer units with automatic switchover. The latest development features two independent motor housings, rather than the current dual-wound motor, as well as additional security measures for locking out unauthorised users and preventing access to the control box without the necessary tools.

In addition, new higher-efficiency

evaporator and condenser coils will be used as well as an option for remote monitoring of the equipment via satellite, GSM or a direct cable link to the control box.

The dual-refrigeration system will also feature new ATEX Zone 1-rated evaporator motors for increased safety in the cargo area and also have an option for increased heating capacity.

“Our customers have been using the NMR-262 system for close to three decades because of its reliability and its compliance with international transport regulations for the transport of certain dangerous goods,” says company president Henrik Klinge.

Control for tanks

Temperature control for tank containers is a different matter altogether. Klinge Corp produces glycol-based heating and cooling systems for such units, with particular effort made to keep the units as small as possible. Allan Klinge explains why: “The small design allows our customers to transport the maximum amount of cargo, while providing the amount of capacity necessary to maintain the required temperature.

“Our control box is front-mounted for easy access by the user or the steamship line. This is a major benefit for our customers,” he adds.

Klinge’s standard model, TCR-109, is side-mounted and is used by companies worldwide to transport hazardous and non-hazardous chemicals, pharmaceuticals, food products and beverages. The control box is front-mounted for easy access by operators.

The next generation, the TCR-110, is due to be launched onto the market in the third

quarter of this year. Klinge says this will provide between 40 and 50 per cent more cooling capacity from the same size of side-mounted unit. This will allow users to fit the units to their tank containers easily; the new model will also have a smaller front-mounted control unit.

In the event that tank containers are to be used to carry Division 4.1 or 5.2 substances that require dual refrigeration systems, a side-mounted TCR-109/110 unit can be coupled with an extra-high capacity front-mounted dual TCR-262 model, providing effective redundancy. These dual systems have two independent microprocessor thermostats that control and monitor the cargo temperature. The TCR-262 model is also available with an integral generator set for back-up power supply.

Latest in line

Klinge Corp’s most recent developments address transport refrigeration units certified as compliant with the EU’s ATEX Directive, 94/9/EC. This stipulates that organisations must protect employees from explosion risk in potentially explosive atmospheres, such as in chemical manufacturing facilities, oil rigs, oil tankers, and so on.

Klinge Corp currently offers explosion-proof refrigerated containers for Zone 1 and 2 hazardous areas and plans to introduce ATEX Zone 2 tank container refrigeration equipment in both single and dual system versions in the third quarter of 2015. As required, all of these units are also certified to CE requirements for equipment.

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