

Quest II in reefer containers



New climate control saves 65% energy in reefers



FOOD & BIOBASED RESEARCH
WAGENINGEN **UR**



'FBR has a remarkable talent to use their scientific knowledge for practical solutions. We have seen that in many of our projects'

Henrik Lindhardt, head of reefer innovation, Maersk Line, Copenhagen, Denmark

How the energy is saved

The internal air circulation i.e. the fan speed is adjusted to the actual heat load. The compressor operation is optimised for operational state.

Effect on produce quality

A faster temperature pulldown is realised in hot-stuffed containers. There is no adverse effect on produce quality. A statement which is based on multiple real world pilot tests.

Internal air circulation adjusted to heat load

The internal fan capacity in reefer containers suffices for temperature pulldown of hot-stuffed containers. Full fan capacity is usually not needed after pulldown. Quest II therefore adjusts the internal air circulation to actual heat load to save energy when heat load permits so.

Compressor operation concentrated in its most efficient operational state

Traditional chilled mode operation controls the compressor with the sole objective to control supply air temperature exactly to its setpoint. Quest II compressor control has a dual objective: control time-averaged supply air temperature exactly to its setpoint AND exploit acceptable high-frequent temperature variations to concentrate compressor operation in its most efficient operational state. The resulting supply air temperature fluctuations are milder than those common in start-stop operated refrigerated road transport equipment and in many cold stores. Yet, to be on the safe side, extensive produce research was part of the Quest II development project.

Benefits

- Reduced energy consumption of reefer units
- Reduced carbon footprint of international food supply chains
- Proper precooling of cargo prior to stuffing is less important

Technology takeaways

- A well thought-out control method for (transport) refrigeration units
- Computer model to simulate climate control strategies

Our expertise & facilities

- Profound understanding of the dynamics of (micro-)climate in reefer containers, and how it interacts with carried commodities.
- Computer model to simulate climate control strategies
- Climate chamber for reefer unit software functionality testing



Information

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