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Thermal performance of transports is the beginning of cold chain compliance

The Australian food transport industry is expected to do its share of the hard lifting as the government steps up its attack on the country's serious food loss and waste, which has reached 7.3 million tonnes of food every year.

The AFCCC is one of 17 organisations selected by the Federal Government for a new body called Stop Food Waste Australia. Its job will be to drive collaboration among relevant organisations and implement innovative solutions to achieve the goal of halving the country's food waste by 2030.

The transport sector, an essential part of the food cold chain, is also under the microscope because of the essential role it has in the distribution of the COVID 19 vaccine. There have already been failures in cold chain deliveries in the US, with thousands of vaccine doses having to be dumped because they were not kept at the right sub-zero temperatures.

AFCCC chairman Mark Mitchell said the transport sector could contribute to the national Stop Food Waste plan immediately by improving its cold chain transport processes. He has warned that the transparent and practical exchange of temperatures between stakeholders at critical control points, which occurs when food changes custody or is cross-docked, often does not work well in the Australian transport industry.

However, there are many other areas where the refrigerated transport sector of the cold chain can make improvements for the common good. It begins with the selection process used by industry to develop the best transport refrigeration package involving truck and trailer body thermal efficiency.

There is an Australian standard for the thermal performance of refrigerated transport equipment that covers air tightness, or the K coefficient in truck bodies and trailers, heat leakage, reserve refrigerating power and effectiveness of refrigerating power.

Heat leakage occurs in two ways: transfer or heat flow through construction materials, and flow or leakage through construction joints, doors and seals.

Fleet owners who have submitted their vehicles for thermal imaging and K value tests are able to make design refinements in components and systems that ultimately could improve operational economies and help freight companies meet regulatory and compliance standards and minimise environmentally damaging emissions.

K value is the thermal conductivity or a value of the amount of heat, in watts, that is transferred into a truck or trailer body through leakage or failure of construction materials.

It follows that refrigeration power must exceed heat leakage and reserve refrigerating power must further exceed heat leakage to allow for the thermal performance of the truck body, multiple door openings, defrost cycles and removal of respiratory load from live produce.

It is possible to test the effectiveness of refrigeration power. Firstly, the refrigeration unit must reach classification temperature and hold it for eight hours. Secondly, the truck or trailer must hold the classification temperature with 35% additional heat leakage after the load is added, for a further four hours.

Tests have shown remarkable fuel efficiency when refrigerated trailers have thicker insulation installed in their walls, floor and ceiling, resulting in a lower K value. In such cases, there have been savings of up to 3,000 litres of fuel per year, worth more than \$4,000. The engine runs for fewer hours and emissions drop accordingly. Service intervals can be extended, prolonging reefer life.

The guiding HACCP principles of handling frozen and chilled food on refrigerated trucks and trailers make it clear: for chilled foods – never warmer than +5°C rule; for frozen foods – never warmer than -18°C rule.

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