KEEPING YOUR COOL

Dave Whyte finds that not every fridge pan keeps up the pace when it comes to controlling temperatures

The importance of refrigerated transport in Australia is greatly underrated. Given the warm weather conditions for which our country is renowned, the fact that we can eat fresh food all year round is a testament to the power of refrigeration.

While you might think that all the dairy in your local supermarket has come from producers in your local area, it has more likely spent 10, 24, or even 48 hours on the back of a truck to get to your local Woolies or Coles. The same can be said for the fresh produce (fruits and vegetables) and meat, all of which has travelled from the farm or abattoir to the final point of sale in refrigerated conditions to maintain freshness. Suffice to say, without refrigerated transport, the world would be a very different place.

Carting refrigerated freight also means carrying a big responsibility. Maintaining the correct temperature not only ensures the freight arrives fresh (or frozen, as the case may be), but it also has a big effect on the health of the end user.

While it's easy to tell if your lettuce has been frozen (not a pretty sight), it can be a little more difficult to tell if meat, dairy or frozen products have gone outside their optimal temperature range in transit. In many cases, the receiver will check the temperature of the freight before unloading the truck, and if it's not right the load will be rejected. This is for two reasons – firstly, they don't want to pay for a product that is not in perfect condition, and, secondly, they don't want to carry the liability of anyone becoming sick through the consumption of products bought through their business.

Given the importance of temperature control, you might be surprised to learn that there is not a mandatory regulation or standard for refrigerated freight bodies in Australia.

Thermal efficiency plays a big part in looking after the freight, and in the amount of energy needed to maintain a controlled environment within a refrigerated body. There are many aspects that can affect the thermal efficiency of a refrigerated body, and, while the thickness of the walls is important, the quality of the construction, number of doors (and door seals), and standard of maintenance all play a part in controlling the conditions within a refrigerated body.

With all the obvious stuff out of the way, the question is how do we test a body for thermal efficiency, and why would we bother? To find out the answers to these questions, I travelled to Ormeau, just south of Brisbane, and caught up with Mark Mitchell and Ken Newton from Supercool Asia Pacific.

For Mark Mitchell, the interest in the efficiency of refrigerated truck bodies is not new. For over 30 years, Mark and a group of other like-minded people have been investigating, testing and spreading the word about thermal efficiency.

In 2003, the group came together and created an Australian standard for thermal efficiency in transport bodies, AS4982. This was created by referencing many similar standards across the globe, including US and European standards. While the standard is recognised, it is not mandatory, and so there is no official obligation to abide by it.

"Our standard, AS4982, is not enforced, it's a voluntary standard," Mark said. However, it does provide a standard to measure against, and so it is surprising that we don't see many manufacturers (only one at this stage) using the standard as a sales point of difference.

Measuring thermal efficiency of refrigerated bodies is not a simple process. Supercool has invested a huge amount of money in building a facility that meets all the international guidelines for performing the test, and now offers the service to any body builders, or equipment owners, looking to get an official figure on the thermal efficiency of their equipment. The test must be carried out in a stable environment, with consistent temperature (known as steady state), and with very accurate data measuring tools.

For the purpose of testing truck bodies and trailers, the sealed room (which resembles a cool room) is 23 m long and over 5 m wide. The entire room is cooled down to between 22 and 25 degrees, while the interior of the trailer body is heated to 20 degrees higher than that of the room. The test measures the amount of energy required to maintain that higher temperature within the van, without affecting the conditions outside the van, over an extended period of time.

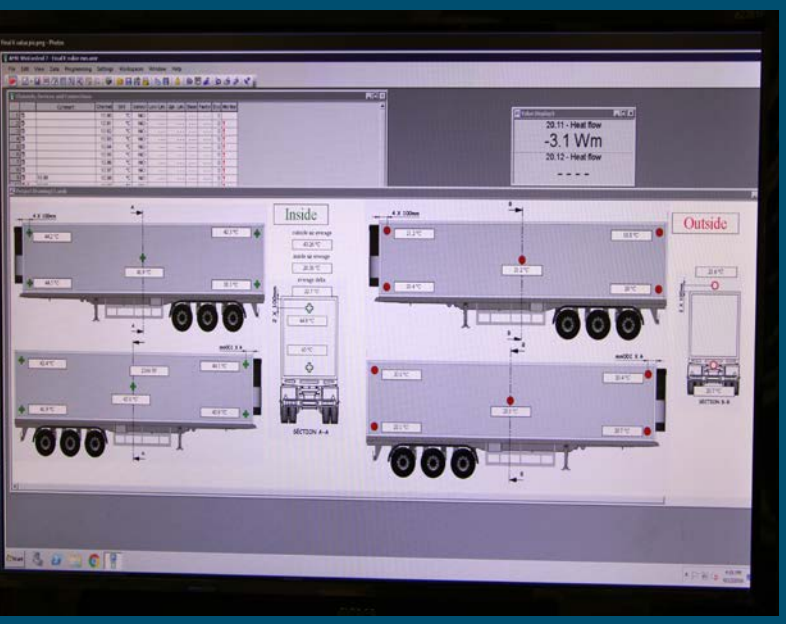
Temperatures are monitored by 32 sensors on the outside, and 32 sensors inside the van, all coupled to a data collection unit. The power draw of the heater to maintain the internal temperature is also monitored, and this is the all-important factor in obtaining the efficiency rating, or K value.

The other part of the test is validation of the van for chiller or freezer rating. Once the K value is acquired, the whole system gets turned around. The main room is now heated to 38 degrees, and the inside of the van is cooled down. To achieve a freezer rating, for example, the internal temperature needs to drop to -18 within a set timeframe, and then hold -18 at 38 degrees ambient temperature. A good K factor will mean less load on the refrigeration unit, and so reduced fuel consumption.

All of this takes time, with half a day's work involved in the setup, before the room can be closed up in order to achieve steady state conditions. That in itself can take 8-12 hours, and only then can the testing begin. Once steady state is achieved, it must be maintained for eight hours. To complete both lots of testing takes up to four days, including the temperature change in between, but the results are accurate and legitimate.

Given the amount of money invested in refrigerated trucks and trailers, it's surprising that more operators aren't looking for some sort of legitimate rating from manufacturers before they buy. It's also surprising how few manufacturers have this testing done before taking equipment to the market. In the current era of environmental responsibility, I shouldn't think it will be long before the larger fleets, whether by their own choice or that of their clients, will be looking for ways to improve the efficiency of their fridge vans, and I would guess the AS4982 standard will become the industry norm.

The upside is that Mark says the quality of Australian-built vans is actually pretty good, though there are some that are better than others. I'll be interested to see, at the upcoming Brisbane Truck Show, how many manufacturer representatives will actually know the K value of their fridge vans. I also think that if enough people ask them, they might just go to the effort of finding out. TT



Amir Jahan, project and product engineer, with Mark Mitchell, managing director of Supercool