

Air curtains are an increasingly popular means of creating a permeable barrier between a refrigerated vehicle's chilly cargo compartment and the outside world's ambient temperature. They also protect the cargo area from dust, smoke and exhaust gases, reports Steve Banner

COOL BREEZE

Dangling strips of PVC have traditionally been used as an alternative to air curtains, and many operators still favour them. Many drivers of temperature-controlled vans and trucks dislike them, however, says Rupert Gatty, chief executive at fridge van conversion specialist CoolKit – especially if they wear glasses.

"If you've got spectacles on, then you can guarantee that the strips will knock them off when you walk through them," he remarks. If you are on multi-drop work, than that can be umpteen times daily.

Even if you do not wear glasses, going backwards and forwards through wet, cold, and potentially dirty PVC strips all day, every day, can be a dispiriting experience. As a consequence, drivers regularly tie them together, so they are out of the way even if the transport manager tells them not to; which means there is no barrier in place at all.

Air curtains do not give rise to this sort of issue, says Gatty. "They're easy to walk through – you don't have to barge through a physical obstacle – and they are tamper proof," he comments.

However they have one or two drawbacks. "They can reduce the height of the door aperture by perhaps 100mm," he says. "Furthermore, they sometimes need a bit of maintenance," he adds. "You may need to replace an electric motor occasionally. PVC strips

have to be replaced from time to time, too, of course, although they are pretty hard wearing."

At around £200 for each van door they are fitted to, they are around twice the price of a PVC curtain. However, they do not impose any more of a weight penalty than PVC does, says Gatty, and CoolKit offers them as an option.

"They have to be aligned correctly when they are installed, though, so they don't keep running when the door is closed," he observes.

Businesses that have specified them include a major pharmaceuticals distributor, which has had them fitted to 400 vans converted by CoolKit. Air curtain supplier Brightec argues that their advantages far outweigh any disadvantages. It adds that the fans it fits rarely malfunction, and if they do, can be replaced in a matter of a few minutes. The Dutch company markets what it has to offer under the BlueSeal banner and has been instrumental in the development of air curtains (see examples, inset pics above). It pioneered their use in vehicles over a decade ago.

BlueSeal air curtain lengths vary from 800mm to 2,430mm in increments of 10mm and can be fitted to bodies with roller shutter doors as well as hinged doors. Depending on what has been installed, the curtain can either be connected directly to the door so that it starts working as it is opened, or triggered by a magnetic switch.



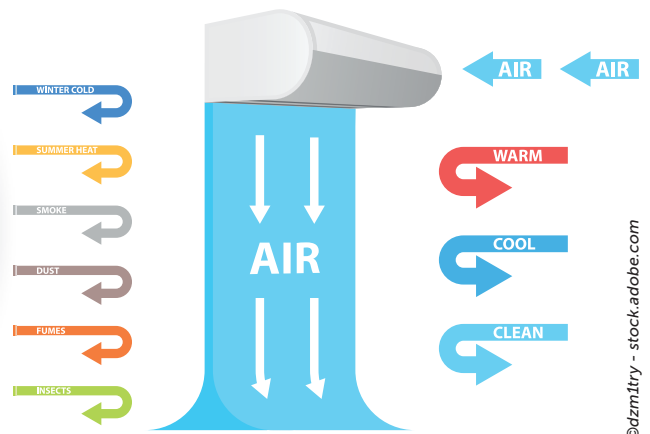
The curtains are PIEK-certified and operate at below 60dB. Vehicles equipped with them can be used on late night and early morning deliveries without the need for operators to worry that slumbering householders will be woken by whirring fans.

While the 12V or 24V fans that air curtains use drain some energy, any loss is by far outweighed, argues Brightec, by the energy consumed by a fridge unit that has to battle to maintain the temperature in an insulated load area every time the doors are flung open. It is a particular issue for operators on multi-drop work, it points out, because the doors have to be opened and closed every few miles as chilled and frozen items are delivered.

If the climate barrier that kicks in when the doors are released is effective, then less cold air will leak out. That means the

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to its set temperature,” says the spokesman. “In multi-drop distribution, the time between stops is often too short for the refrigeration unit to bring the temperature back to its set value.”

Energy consumption by a fridge unit becomes of particular concern if it is electric, fitted to an electric vehicle, and draws its power from the vehicle’s traction batteries.

The greater the power draw, the more the vehicle’s range between recharges is likely to shorten. While the reduction may not be enormous, it will nevertheless heighten any range anxieties the driver and the operator may harbour.

Tests carried out by Brunel also show that increasing the speed of an air curtain’s air stream does not make the curtain more effective, says Brightec. Instead, what happens is that more surrounding air is drawn in, turbulence is created that mixes air from inside and outside the cargo space, and cold air is lost as a result. The air stream hits the load floor and splits in two directions: some heads into the vehicle, some out of it, and warm and often humid air from the outside is drawn across the load.

Brightec has refined BlueSeal over

the past couple of years with the introduction of an LED display which tells drivers how long a door has been left open. The aim, of course, is to encourage them to close it as soon as possible to minimise temperature loss and energy consumption.

A starter battery monitor has been fitted that switches the air curtain off once the voltage drops below a level set by the vehicle’s operator. The aim is to ensure that the battery still has enough power left to fire up the engine.

Unlike PVC curtains, which need periodic cleaning, air curtains are easy to see through because they are completely invisible. That has to be counted as good news from the safety viewpoint because better visibility spells fewer accidents.

Says Brightec founder, Dr Hans Opdam: “We are often surprised by the way in which climate control is neglected in modern refrigerated vehicles at the point at which the doors are opened.” You wouldn’t casually leave the door of the refrigerator in your kitchen ajar, he points out, because if you did you would be wasting energy. Food would be spoiled, and have to be thrown out.

“Refrigerated transport is no different,” he argues. “And the only way fridge technology will be used to its full potential is if we get to grips with managing heat infiltration more effectively.” **TE**

refrigeration system does not have to work as hard as it might otherwise have to.

“Cooling energy use can increase 3- to 5.5-fold during a standard (multi-drop) distribution route compared to a route that simply involves a vehicle travelling from A to B,” says a Brightec spokesman. To support its contention the firm cites a study conducted by Brunel University and the Centre for Sustainable Energy Use in Food Chains. It concluded from simulations that air curtains could save around 45% of the cooling energy used by a refrigerated 18-tonner – the type of truck that is typically used on multi-drop rather than intercity trunking runs.

“It is also a fact that once the doors have been opened for a while, it takes a significant amount of time and energy before the cargo area returns