

Thermal BREAK

As city and urban authorities increasingly frown on diesel engines, it's time for refrigerated transport operators to consider some alternatives. And there are plenty of them, writes Steve Banner

With the pressure on to cut carbon, and the near certainty that diesel-fuelled fridge units will be increasingly unwelcome in urban areas, refrigerated transport operators are looking for alternatives. Simon Wood, sales and operations manager for Swedish firm Hultsteins, is hoping its new entrant to the UK will attract attention.

It's certainly novel. This refrigeration system is powered by a hydraulic pump, driven by the truck's engine. Importantly, it delivers constant power to the fridge regardless of engine revs. That, says Wood, means the package cuts CO₂ emissions by at least 98%, compared with diesel-driven units. And fuel consumption falls by up to 62%.

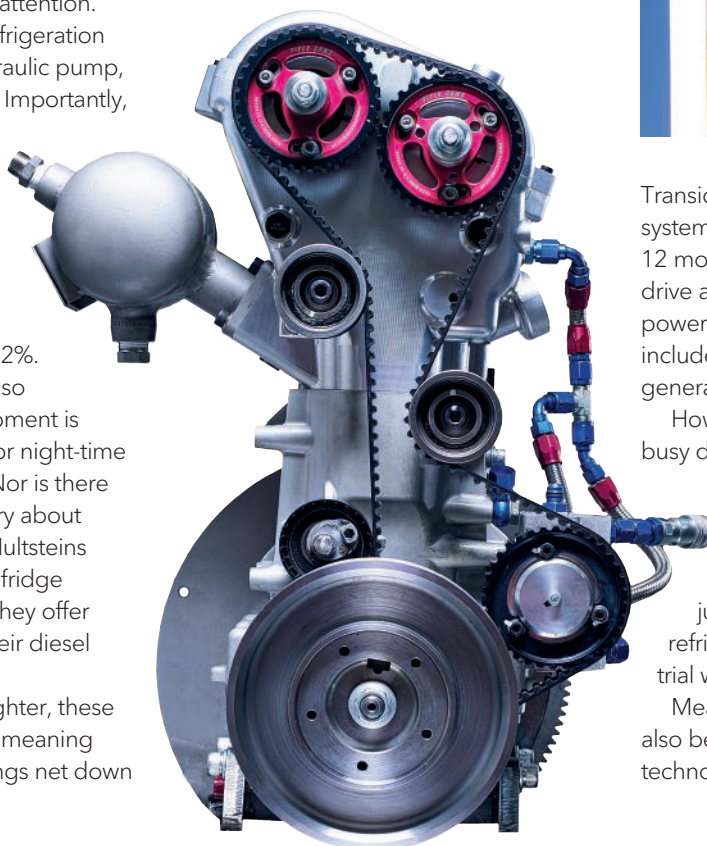
"Maintenance costs are also down by 50% and our equipment is PIEK [low-noise] approved for night-time urban deliveries," he adds. Nor is there any need for hauliers to worry about experimental technology. "Hultsteins has been building hydraulic fridge units for over 40 years, and they offer the same performance as their diesel equivalents," he insists.

But, while they are also lighter, these fridges are more expensive, meaning that annual operational savings net down

to typically £2,500–£3,000. That suggests a payback of five years.

In the UK, Hultsteins' package is most likely to be installed on rigids grossing at 7.5–26 tonnes, says Wood. "We can fit it to semi-trailers but only if they are permanently hooked up to the tractor," he explains. "And that doesn't usually happen on this side of the Channel."

But Hultsteins is not alone: Carrier



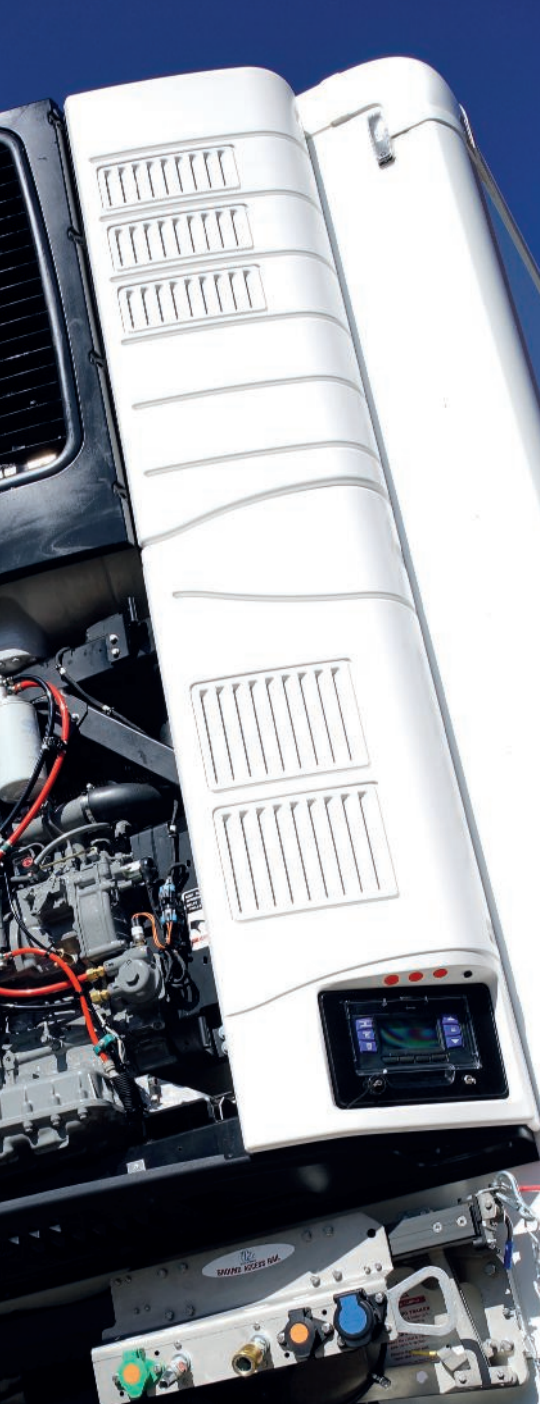
Transicold has been offering a similar system since the company acquired TRS 12 months ago. In this case, its hydraulics drive a generator that delivers electrical power to a host Carrier fridge. Again, it includes a control unit that ensures the generator runs at constant speed.

However, this company has also been busy developing fridge units that use CO₂ as a refrigerant in a closed-loop system. Also referred to as R744, CO₂ has a GWP (global warming potential) of just 1.0, far lower than most other refrigerants. This technology is now on trial with Sainsbury's.

Meanwhile, the retail giant has also been putting another innovative technology through its paces – a

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Hubbard refrigeration unit powered by the Dearman zero-emission liquid nitrogen engine (pictured left). Participants in this trial include Mercedes-Benz, which delivered an appropriately bodied Antos rigid, and Dawsonrentals, which provided leasing facilities.

Replacing a diesel fridge unit with a Dearman system is claimed to reduce a vehicle's overall NOx emissions by more than 70% – and particulate emissions by 90%. That is because comparatively lightly regulated diesel-powered fridges typically emit six times the NOx and up to 29 times as much PM (particulate matter) as Euro 6 truck engines.

Aware of such criticisms, Carrier Transicold was busy extolling the virtues of a low-emission pack for its Supra

refrigeration system at last September's IAA Commercial Vehicle Show, in Hanover. This unit includes an engine said to emit up to 50% less PM than a standard fridge diesel.

The company has also come up with a prototype fridge engine that can run on CNG (compressed natural gas). This is expected to result in cuts of PM and NOx of 95% and 70% respectively.

Meanwhile, rival Thermo King has not been idle. In 2015, parent company Ingersoll Rand acquired Frigoblock and, ever since, the two fridge specialists have been combining technologies. One of the fruits of their labours, also unveiled at IAA, was a refrigerated hybrid drive trailer concept. If the pulling tractor is fitted with a Frigoblock Enviro Drive inverter filter, the fridge can be driven electrically via the alternator and/or by its own diesel.

SMARTER DRIVES

Thermo King's TK BlueBox telematics package then uses its geolocation feature to automatically switch power between Enviro Drive and the diesel, depending on the truck's environment. Hauliers making intensive use of such a vehicle could save 5,000 litres of fuel annually, according to the firm.

But there are yet more low-emission options. A temperature-controlled Montracon trailer fitted with a Thermo King fridge powered by a single-axle KERS (kinetic energy recovery system) went into service with Fowler Welch last year. Said to emit 50% less CO₂ than a standard unit and potentially cutting the haulier's CO₂ emissions by more than 14,000kg annually, this system was developed along with International Refrigeration Cooling.

What about good old eutectic beams? Hubbard has delivered two such systems – sourced from Botemp, of the Netherlands – to wholesale catering supplier Total Food Service. These were fitted to Solomon insulated bodies mounted on a pair of DAF rigids.

Charged overnight from off-peak mains electricity, the beams are suitable for chilled and frozen work. "They're reliable, quiet and energy efficient," comments Total distribution manager Dave Fox.

But there is little point in developing sophisticated refrigeration equipment if it is poorly managed. And increasingly, doing this adequately involves hauliers using telematics. So Thermo King's launch of SLXi – claimed as the industry's first fully telematics-enabled trailer fridge – looks interesting. Its TK BlueBox with Bluetooth are both included, and allow an operator to see exactly what is happening with the unit and the cargo – and to alter settings remotely.

Then there are body and trailer design issues to consider. "If Linde's Frostcruise cryogenic system has been specified, for example, you need a tank for the liquid nitrogen," observes Cartwright technical director Lionel Curtis. And that, in turn, means thinking about where to route the pipes. Additionally, some fridge systems may impact vehicle aerodynamics and/or weight, he adds. However, given the hostility city authorities are increasingly showing towards diesel kit, it may well be time to bite the bullet, he agrees.

Incidentally, another approach to shrinking temperature-controlled fleet CO₂, suggests Curtis, could be a switch to double-deck semi-trailers. "A double-deck artic carrying 44 pallets is likely to return 8.5–9.0 mpg, compared with 10 mpg for a single-decker with 26 pallets. But the former's per-pallet CO₂ figure will be significantly better."

Further, it's worth considering detailed fridge trailer design, not only to improve efficiency but to minimise temperature losses – particularly on multi-drop urban work. Chereau, for example, is offering SmartOpen-C electric door shutters, said to open and close in seconds. Also available is its AirShutter-C, with 12 fans that blow air across the door's threshold. The barrier thus created limits ambient air ingress into the refrigerated trailer. **TE**