

## Case story

# A better tomorrow in livestock transportation – **improved ventilation** for a cool ride

Pigs, and especially piglets, need fresh air. High-quality ventilation in livestock transportation is therefore vital for their welfare.

For this reason, Cuppers Carrosserieën in the Netherlands, manufacturer of coaches and trailers, incorporates VLT® HVAC Drive FC 102 in its latest trailer models. This AC drive provides infinitely variable speed control and ensures trouble-free operation of ventilation fans.

## Continuous innovation

Transportation of live animals has seen considerable changes in recent years. Many innovations have been triggered by stricter legal requirements concerning animal welfare and hygiene. In addition, the growing demand for optimum transportation conditions from the agricultural sector itself played a major role.

Johnny Cuppers, managing director of Cuppers Carrosserieën: “Fifty years ago, pigs were transported in open trailers

and exposed to all types of weather. Nowadays closed trailers are used nearly everywhere. This development was accelerated by market demand and legal requirements. Eight years ago we started using so-called cross-ventilation, and three years ago we moved to fully-conditioned transportation. Fully-conditioned means that the trucks and trailers are equipped with UV air filters and cross-ventilation. To date, we have been the leading company in Europe in applying these technologies.”

## Infinitely

variable fan speed  
using VLT® HVAC  
Drives





New trailer equipped with cross-ventilation from Cuppers Carrosserieën, on the road.

## Safe and sound

What is the importance of air filtering and ventilation in a trailer for livestock transportation?

Johnny Cuppers: "What ultimately matters is that the pigs arrive at their destination safe and sound. They are not only a vulnerable, but also a valuable cargo. The trucks and trailers that we build nowadays can transport about 800 piglets or 180 full grown pigs simultaneously.

For special animals the value rises quickly to about 50,000 EUR. Any accident or contamination during transport has a drastic effect on animal welfare. The transportation company is also badly affected by such an incident. It is held responsible or even liable and its reputation in the industry suffers. In the specialized world of international livestock transportation, news travels fast.

Leading transportation companies therefore have great interest in delivering the animals in excellent health. For this reason improved technical systems that prevent contamination and keep temperatures under control are essential."

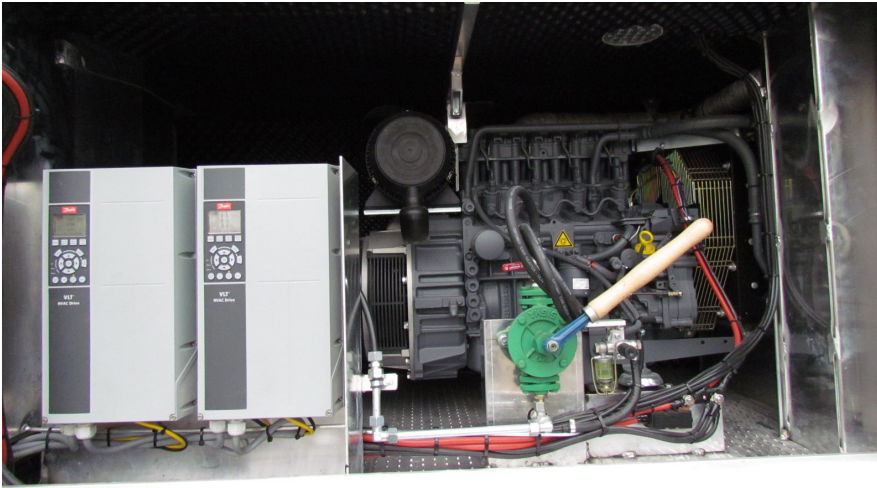
*Johnny Cuppers, managing director Cuppers Carrosserieën:  
"What ultimately matters is that the pigs arrive at their destination safe and sound."*

## Application-optimized products

An important contribution to the development to this new type of trailer was made by Kleventa, a Dutch company specialized in automation and control in the agricultural sector.

Kleventa, like Cuppers Carrosserieën, is based in Lichtenvoorde, where both companies have cooperated for many years. Mark Klein Tank, managing director of Kleventa: "Because of our experience in the agro business we know the risks of working around animals. We have delivered many climate control systems for stables and we know

what damage ammonia can do to electronics. For this reason we treat our control systems and internet routers with a durable coating. The Danfoss AC drives we install in the trucks and trailers have been coated effectively by the manufacturer during production. Another challenge in trucks and trailers is the presence of vibration. Equipment such as UV lights, printed circuit boards and connectors are seriously affected. It is not possible to just mount standard parts and hope for the best. Specific provisions have been designed and installed for these parts so no unexpected failures will occur after installation in a truck or trailer."



Two VLT® HVAC Drive FC 102 units provide infinitely variable fan speed control.



Control panel

*“Two VLT® HVAC Drive FC 102 units are installed, which power two substantial 380 V electric motors. This comprises the automatic climate control for the livestock trailer ”*

## Clean, fresh air

Johnny Cuppers: “Air filtering is installed to prevent moulds, bacteria and viruses from contaminating the pigs. Contamination is a major concern. It may even occur when you pass too closely by a location with infectious diseases. For this reason our new trailers are equipped with UV filters that sterilize the incoming ventilation air. UV filters kill nearly all airborne microbes, thus preventing contamination from external sources.

The ventilation prevents temperatures rising too high, for instance when the truck is stuck in a traffic jam in summer. In a trailer without effective ventilation the temperature would increase very quickly, something that the pigs don’t handle very well. Trucks that are used in colder climates may be equipped with a heater to pre-heat the ventilation air.

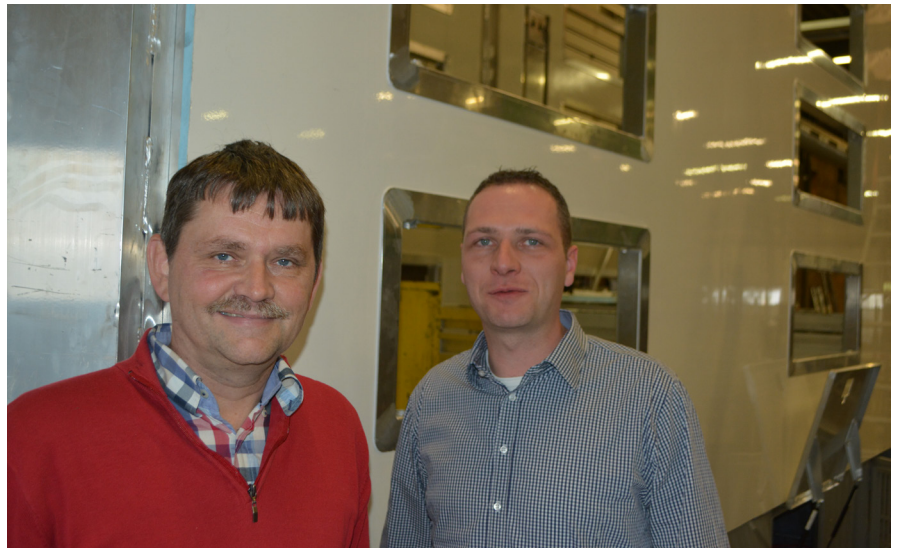


Installation front trailer

## Why Danfoss?

Mark Klein Tank, Managing Director of Kleventa Lichtenvoorde explains:

- Service focus is important to us
- Much knowledge in-house at Danfoss
- We have much knowledge and experience with Danfoss
- The quality of Danfoss products matches our market position.



*Johnny Cuppers, managing director of Cuppers Carrosserieën (l); Mark Klein Tank, managing director of Kleventa (r), cooperate in the development and construction of new trailers for livestock transportation.*

## Cross-ventilation

"In the 1980s we were one of the first to install ventilation in livestock trailers. We have always been leaders in this technology. Our latest development is the solution using cross-ventilation. It is a solution which combines state-of-the-art technology, such as drinking installations and cooling. These new trailers aim at the "high-end" segment in our market. The cross-ventilation means that air is blown into the trailer on one side and exits at the other side. The trailer has a hollow sidewall on the right side with a 12 centimeter depth. First, ventilation air is cleaned in the UV filter. Then it is then blown into the hollow sidewall. The air is supplied to the accommodation area of the trailer through apertures in the separating wall.

The accommodation area is divided into segments which are monitored

separately and are equipped with separate temperature controls. The used air is extracted by the exhaust fans. These fans are installed in the opposite wall."

## In the construction hall

In the construction hall at Cuppers it is striking how big today's livestock trailers are in real life. And the amount of space required by the ventilation system: 10% of the trailer. The majority of the technical systems are installed in a protected area at the front of the trailer. This area houses the main components and systems, such as a diesel powered generator which supplies the electricity for the trailer. In addition, two VLT® HVAC Drive FC 102 units are installed, powering two substantial 380 V electric motors. These electric motors drive two fans which blow the ventilation air into the hollow sidewall.

Since the AC drives are able to drive the electric motors with continuously variable speed, the fan speed can be adjusted in infinite steps in accordance with the temperature in the trailer.

So what we have here is a livestock trailer with automatic climate control. The capacity of the ventilation system is impressive; if necessary the entire internal air volume of the trailer can be refreshed roughly eight times in a single minute. And when the trailer is used in colder climates, it will be equipped with a heater to pre-heat the ventilation air. Currently 10 trailers are in operation all across Europe. Considering the price, which is roughly twice that of an average trailer, the market interest is 'very promising', according to Johnny Cuppers.



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