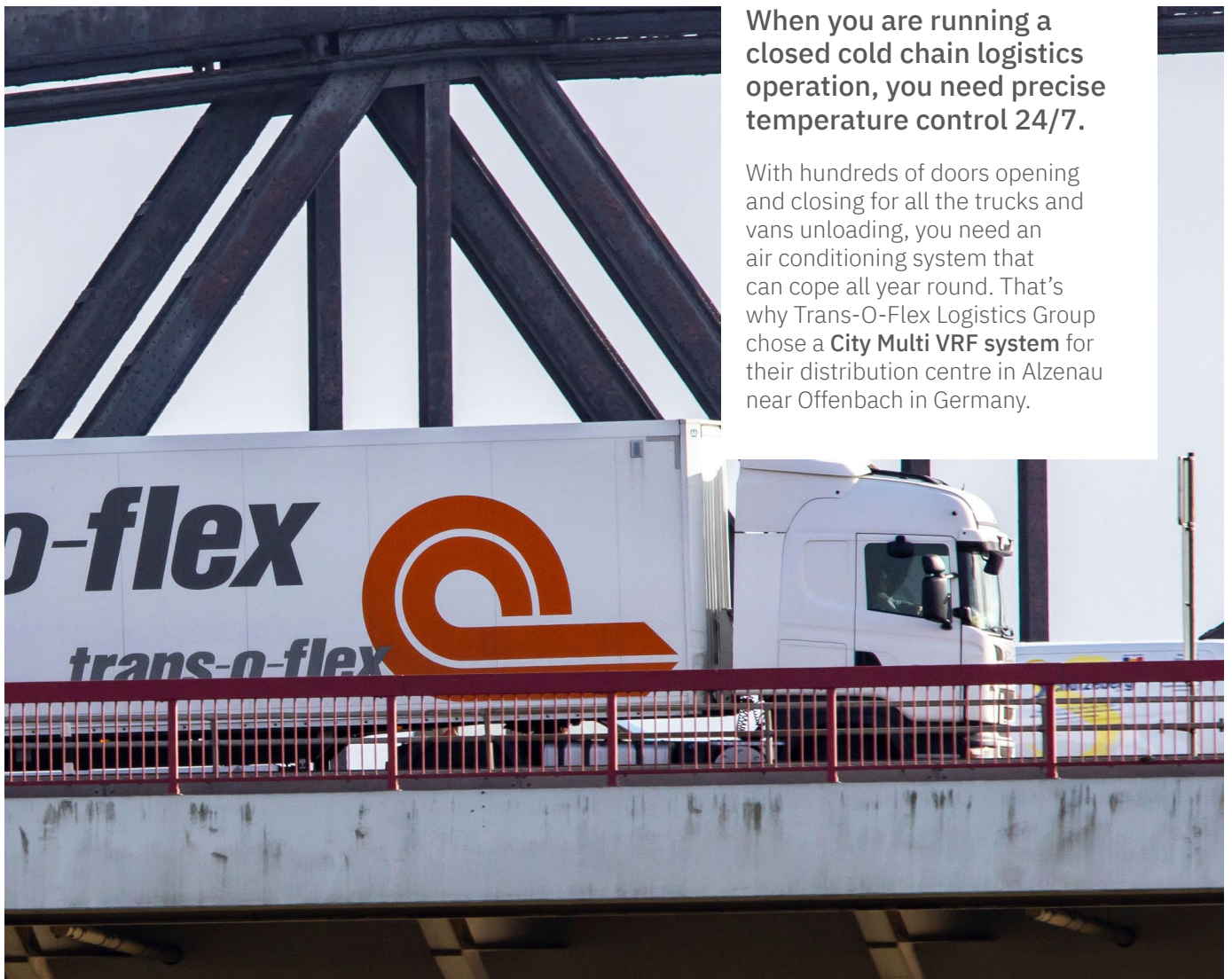


Case Study

Air conditioning delivers precise temperature control for medical logistics facility



When you are running a closed cold chain logistics operation, you need precise temperature control 24/7.

With hundreds of doors opening and closing for all the trucks and vans unloading, you need an air conditioning system that can cope all year round. That's why Trans-O-Flex Logistics Group chose a **City Multi VRF system** for their distribution centre in Alzenau near Offenbach in Germany.

Trans-O-Flex Logistics Group is a special delivery service for parcels, pallets, dangerous goods and temperature-sensitive shipments. The Austrian Post subsidiary operates six warehouse locations at major hubs in Germany.

The goods are stored, packaged and made available at these logistics locations. In addition, the correct assembly, redirection and timely delivery to any desired location is carried out professionally.

In order to secure a market advantage, the company is continuously expanding its range of refrigeration logistics with quality assurance and control that is almost unlimited in terms of time and space.

The logistics group recognised a market advantage in being able to provide its customers with a closed cold chain throughout the entire distribution process. Maintaining accurate temperature control is a unique selling point that makes Trans-O-Flex the only company of this size able to offer this guarantee in Central Europe.

A key requirement in refrigeration logistics is the quality assurance of medicinal products according to the EU guideline Good Manufacturing Practice (GMP). This demands a continuous temperature level between 15°C and 25°C must be maintained in storage rooms in which medicines are stored. Permissible deviations must not fall below a temperature of 10.5°C or exceed 29.5°C and these deviations can only occur for a maximum of 1½ hours during the entire logistics chain. Anything exceeding and falling short of these requirements means that the goods are no longer allowed to go on the market and have to be removed.

The Trans-O-Flex logistics hall in Alzenau has an area of around 8,300 square meters and has more than a hundred gates for loading and unloading trucks and vans. The operation takes place in two and, if necessary, in three shifts, right around the clock.

As with any business, the operating costs of any HVAC system represents an important consideration. The air conditioning therefore needed to be very energy-saving. **"In order to meet the given requirements and guarantee temperature maintenance, we have air-conditioned the warehouse with VRF technology,"** explains Uwe Wehland, Head of Refrigeration and Air Conditioning Technology from installers Kliwa Service GmbH from Münster.

The frequent opening and closing of the hall gates, a huge hall that cannot be fully insulated and the in-coming heat loads that inevitably flow in from the large trucks during loading and unloading increase the dangers that can lead to the goods spoiling. The rate of rejects can be noticeably reduced by intelligent air conditioning of the building.



Constant temperature control whatever the season

VRF air conditioning does not require an additional heat transfer medium when transferring energy around a building. This leads to lower energy losses than with water-bearing systems such as Chillers.



"While conventional building systems work with separate systems for heating and cooling, one of the great advantages of VRF systems is that the same system can be used alternately for heating or cooling," says Wehland. This is an enormous savings potential on the investment side. The layout of the warehouse is like a large letter Y divided into four sectors, which require different cooling capacities depending on the size. To meet this demand, there are four outdoor plant areas where the appropriate outdoor condensing units are installed.

A **City Multi Y Series system** has been used, with each outdoor unit using only 2-pipes to deliver cooling and heating operation to up to 50 different indoor units in each refrigerant circuit. It is very suitable for performing large cooling capacities with a compact system.

"It is fascinating to see how such a large building can be air-conditioned with relatively small components. In the past, this would have required relatively large conventional technologies," says Wehland.

On the south side of the building there are two City Multi Y series outdoor units, each with 124 kW cooling and 140 kW heating output. The identical systems supply two areas, in which up to 38 large trucks can be 'docked' and loaded or unloaded at the same time.

The air conditioning of the interior is mainly carried out using 4-way ceiling cassettes, each with 14 kW cooling capacity. The large square 4-way ceiling cassettes have four air outlets, which creates draft-free air conditioning with an air flow that runs along the ceiling. The cassettes are assembled in four rows, two lines of which are seven meters from the floor, while the other two rows are four meters from the floor. There are eight suspended ceiling devices in the central aisle to ensure even dissipation of the heat load.

On top of these demanding requirements, the cooling of a logistics building is influenced by additional factors which place additional demands on the air conditioning used. In the event of any accidental damage to the system's piping system for example, no water can be allowed to drip onto customer goods. This is where the refrigerant-based City Multi VRF system comes into its own.

Easy filter maintenance

In addition, the customer attaches great importance to being able to carry out particularly simple and time-saving maintenance of the numerous indoor units.



This is where the ceiling cassettes dedicated remote control filter lift is such an advantage. These allow the filter to be lowered from the ground and ensures particularly easy and time-saving maintenance of the indoor units.

This made for a highly convincing argument against competing technologies. There is a very high amount of fine dust in this warehouse, so the devices must have their filters cleaned regularly. With two people and 37 indoor units, this action only takes about one and a half to two hours.

The alternative would have been to carry out the cleaning using a mobile lifting platform. However, this would have taken about two days per interval which simply did not appear economical to the operator.

On the opposite side of the building, there are two other air conditioning systems. One corresponds in layout and performance to the system mentioned above. The second system comprises four Mr Slim Power Inverter units which deliver energy efficient heating even at low outside temperatures for a particularly highly sensitive area within the hall. Each Mr. Slim outdoor unit supplies two indoor units.

Centralised, web-based controls

The system is monitored by Kliwa Service GmbH, utilising the web functionality of the **EW50E** central control system.



This means that only a manual switchover from heating to cooling is carried out on site if required. Operation of the entire system can also be controlled from any computer with web browser functionality to provide complete remote control and monitoring of all connected air conditioner models.

Continuous monitoring and, if necessary, error reporting helps to ensure the high quality requirements according to the EU directive for good manufacturing practice.

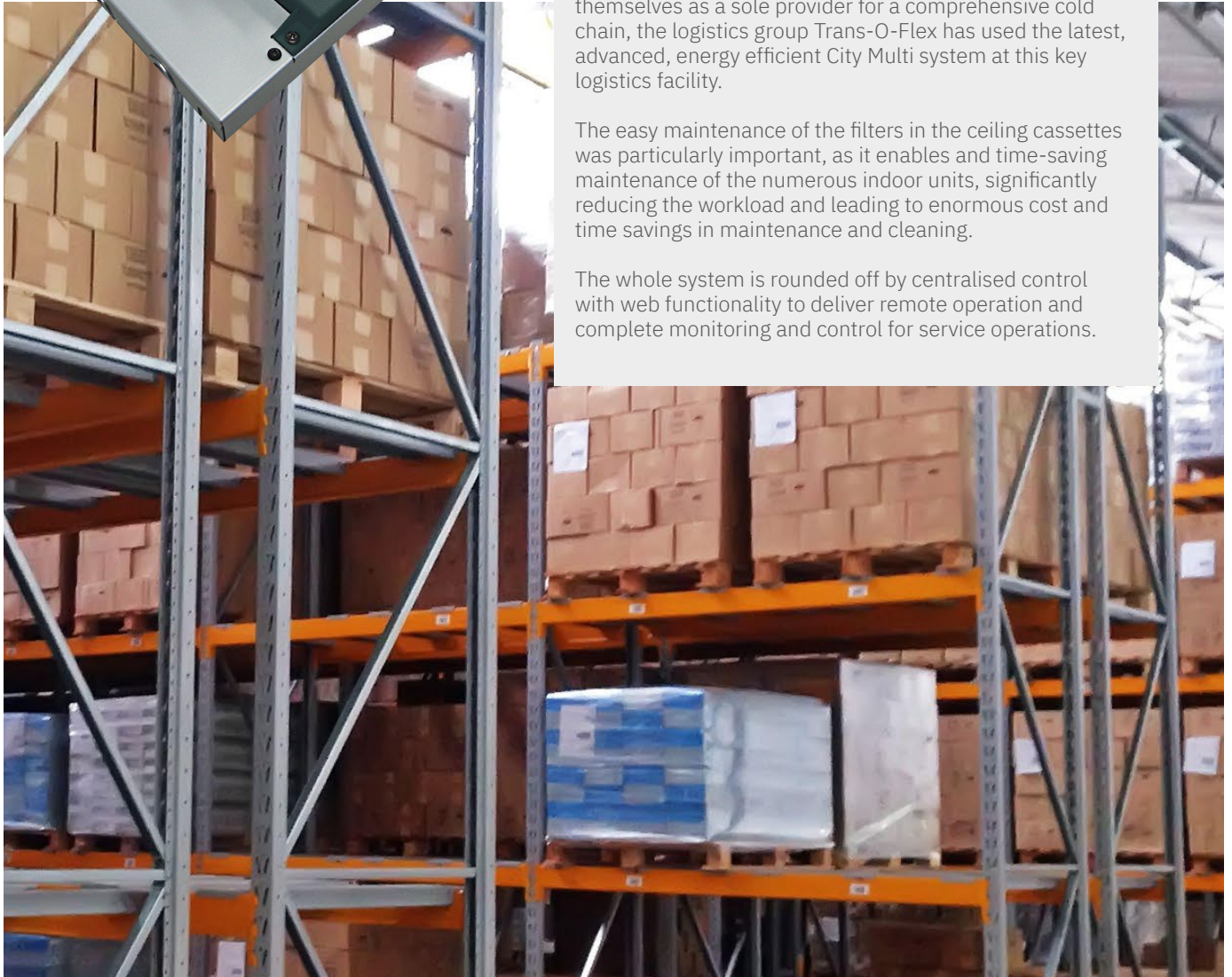
Sensors are also installed in the logistics hall at 16 key points to measure the temperature at fixed time intervals. These always sound an alarm if the specified temperature range is not adhered to.

Conclusion

In order to offer its customers added value and to position themselves as a sole provider for a comprehensive cold chain, the logistics group Trans-O-Flex has used the latest, advanced, energy efficient City Multi system at this key logistics facility.

The easy maintenance of the filters in the ceiling cassettes was particularly important, as it enables a time-saving maintenance of the numerous indoor units, significantly reducing the workload and leading to enormous cost and time savings in maintenance and cleaning.

The whole system is rounded off by centralised control with web functionality to deliver remote operation and complete monitoring and control for service operations.



Installation Summary

Outdoor Units:

- 2 x PUHY-P1000YSKB-A
- 1 x PUHY-P1100YSKB-A
- 5 x PUHZ-ZRP250YKA

CITY MULTI

Mr.SLM.



Indoor Units:

- 1 x PLFY-P125VBM-E
- 1 x PLFY-P100VBM-E
- 1 x PCFY-P63VKM
- 2 x PCFY-P100VKM
- 5 x PCFY-P125VKM
- 38 x PLP-6BAJ
- 10 x PLA-ZRP140BAR1

CITY MULTI

Mr.SLM.



Controls:

- 4 x PAR-31MAA-J
- 1 x AT-50B-J
- 1 x EW-50E
- 1 x EW-50E Maintenance Tool Advanced
- 5 x PAC-SF83MA-E



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Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of April 2021

