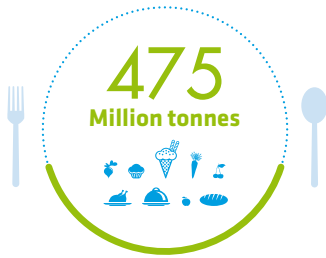


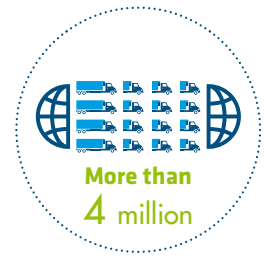
DELIVERING FOOD FRESH GLOBALLY



Where cold chains are lacking worldwide, **475 million tonnes** of food spoils before reaching market every year. 13% of all food lost due to no refrigeration



Globally, **most modern temperature controlled refrigerated transport** relies on HFC refrigerants but lower GWP HFC/HFO blends are also used



Over **4 million refrigerated road vehicles** in use around the world.

BY ROAD, RAIL & SEA



Intermodal Containers
reefer containers



Rail
refrigerated railcars



Road
refrigerated vans, trucks or trailer-mounted systems



Sea
refrigerated ships

PERFORMANCE AND SAFETY MATTERS

Technical requirements for transport refrigeration systems are very complex



Technical requirements for transport refrigeration systems are **very complex**.



They have to operate **over a wide range** of weather conditions and ambient temperatures, carry different cargos at different Temperature Set-points.



They have to be very **robust** and reliable to withstand vibrations and shocks, and must meet ship and road safety requirements.

WHY ARE HFCs & HFC/HFO BLENDS USED?



Refrigerant

HFCs & HFC/HFO blends are **very effective refrigerants** for mobile applications and used in all transport types



Efficient

As refrigerant, HFC & HFC/HFO blends has **energy-related advantages**

And **Lower GWP** with HFC/HFO blends



Safe

HFCs & HFC/HFO blends are **non-flammable** which is key when used on the road or on board a ship



Insulation

Many refrigerated trucks and containers **use HFCs or HFOs & HCFOs** as the foam blowing agent due to its good insulation performance meeting thickness requirements to maximise cargo space.

WHAT HAPPENED DUE TO F-GAS REGULATION 517/2014?

The HFCs refrigerants currently used can continue to be used in refrigerated transport systems. But **from 2020**, the **40 tonne CO₂ charge limit** for servicing and maintenance for refrigerants with a GWP >2500 **affected** all HFC 404A transport refrigeration systems with a charge size greater than 10.2 kg. Most refrigerated road and containers systems have less than 10 kg of refrigerant. Non-flammable lower GWP HFC/HFO blends have replaced R-404A in new transport equipment in the EU. **From 2023**, HFCs with a GWP >150 are banned in the foam insulation for new transport systems placed on the EU market. The ultra-low GWP HFOs & HCFOs offer superior insulation performance compared to other blowing agents