

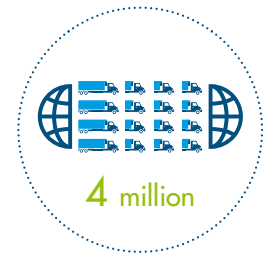
DELIVERING FOOD FRESH GLOBALLY



Where cold chains are lacking worldwide, **200 million tonnes** of **food spoil** before reaching market every year.



Globally, **most modern** temperature controlled refrigerated transport relies on HFC refrigerants.



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

BY ROAD, RAIL & SEA



Intermodal Containers
refrigerated containers



Rail
refrigerated railcars



Road
refrigerated vans, trucks or trailer-mounted systems



Sea
refrigerated ships

PERFORMANCE AND SAFETY MATTERS

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



They have to operate **over a wide range** of weather conditions, carry different cargos at different temperatures, sometimes with two different compartments at different temperatures.



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

WHY ARE HFCs USED?



Refrigerant
HFCs are **very effective** refrigerants for mobile applications and used in all transport types



Efficient
As refrigerant, HFC has **energy-related advantages** in hot climates



Safe
HFCs are **non-flammable** which is key when used on the road or on board a ship



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

WHAT HAPPENS 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 **will affect** 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. **From 2017**, pre-charged refrigerated transport equipment placed on the EU market **must have the HFCs accounted for in the quota system**. **From 2023**, HFCs with a GWP >150 are banned in the foam insulation for new transport systems placed on the EU market. **A new class of blowing agents (HFOs)** with similar properties to HFCs **is under development**.