

# EU F-Gas Regulation Guidance

## Information Sheet 4: Transport Refrigeration

### Target audience for this Information Sheet

This Information Sheet is aimed at organisations that are operators (usually the owner) of transport refrigeration equipment, including vans, trucks and trailers. It is also useful for those organisations that manufacture, sell, maintain and dispose of transport refrigeration equipment.

### 1. Background

This guidance is for organisations affected by the 2014 EU F-Gas Regulation (517/2014). The F-Gas Regulation creates controls on the use and emissions of fluorinated greenhouse gases (F-Gases) including HFCs, PFCs and SF<sub>6</sub>.

In the transport refrigeration sector, the F-Gas Regulation affects the use of HFCs as refrigerants and as blowing agents for the insulation foam used for vehicle bodies. The 2014 EU F-Gas Regulation replaces the 2006 Regulation, strengthening all of the 2006 requirements and introducing a number of important new measures.

The F-Gas Regulation is an important piece of legislation that will result in significant reductions in the emissions of F-Gases. These are very powerful greenhouse gases, with global warming impacts that are several thousand times higher than CO<sub>2</sub> (per kg of gas emitted). All EU Member States agree that it is important to reduce emissions of these gases.

This Information Sheet describes the requirements that apply to transport refrigeration. Further guidance is available – see Information Sheet 30 for a full list and a glossary of terms.

### Transport Refrigeration: Compliance Checklist for EU F-Gas Regulation

#### Purchase of new equipment

- ✓ **NEW:** Take account of HFC phase down when selecting refrigerants

#### Operation of existing equipment

- ✓ **NEW:** Mandatory leak checks and repairs for refrigerated trucks and trailers
- ✓ **NEW:** Use new CO<sub>2</sub> equivalent size thresholds for mandatory leak checks
- ✓ **NEW:** Keep records about refrigeration equipment using HFC refrigerants
- ✓ **NEW:** Use qualified technicians for leak checking and refrigerant handling operations
- ✓ **NEW:** For large refrigerated transport systems, a service ban affecting maintenance of existing high GWP systems (e.g. HFC 404A)

#### End-of-life requirements

- ✓ Mandatory recovery of refrigerant by qualified technician

## 2. Sector description

The transport refrigeration sector is a significant user of HFCs. The majority of transport refrigeration is for road vehicles including vans, trucks and trailers. The refrigerated transport sector also includes shipping containers and specialised systems used for rail freight, ships and aircraft. Note, this sector does not include mobile air-conditioning (MAC) – see Information Sheet 6 for details of MAC systems.

Under the 2006 F-Gas Regulation there were few specific requirements in the transport refrigeration sector. The main requirement was for refrigerant recovery during plant maintenance and at end-of-life. Under the 2014 Regulation the transport sector is treated in a similar way to stationary refrigeration, with various new requirements including mandatory leak checks and use of trained technicians. Some of the new requirements apply to all transport systems, but some are specifically aimed at:

- a) Refrigerated trucks: motor vehicles above 3.5 tonnes and equipped with a refrigeration unit.
- b) Refrigerated trailers: vehicles designed to be towed by a tractor or truck and equipped with a refrigeration unit.

## 3. Purchase of new equipment

### HFC Bans

There are no bans on the use of HFCs in new refrigerated transport systems.

### **NEW:** Impact of the HFC Phase Down on the purchase of new equipment

When purchasing new transport refrigeration equipment you should carefully consider the impact of the HFC phase down which is a key feature of the 2014 F-Gas Regulation<sup>1</sup>. The phase down will reduce the quantity of HFCs that can be sold in the EU – by 2030 there will be an 80% cut in HFC supply. Equipment bought now will still be operating when deep cuts in HFC supply are in force. It is important to always purchase equipment using refrigerants with the lowest practical GWP to minimise the future impact of the phase down. HFC 404A is widely used in transport refrigeration systems and it has an especially high GWP<sup>2</sup>. Various alternatives are becoming available for new equipment, as a response to the new F-Gas Regulation<sup>3</sup>.

## 4. Operation of existing equipment

The 2014 F-Gas Regulation includes a number of requirements that affect the use and maintenance of existing transport refrigeration equipment containing HFC refrigerants. The exact rules depend on the type and size of transport refrigeration equipment being used. The regulations affecting existing equipment relate to (a) leak prevention, (b) record keeping and (c) the use of trained technicians. These requirements are described below.

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<sup>1</sup> HFC phase down: see Information Sheet 28 for further details

<sup>2</sup> GWP: global warming potential, see Information Sheet 25 for further details

<sup>3</sup> Low GWP alternatives to HFCs: see Information Sheet 29 for further details

## Leak prevention and mandatory leak checks

**NEW:** The intentional release of F-Gases into the atmosphere is prohibited. Operators of all transport refrigeration equipment must take all measures that are technically and economically feasible to minimise leakage. Where leaks are detected operators must carry out repairs without undue delay.

**NEW:** Under the 2006 Regulation, the legal responsibility for preventing F-Gas releases was only given to the operator (usually the owner) of the equipment. In the 2014 Regulation there is a similar legal responsibility given to third party contractors carrying out installation, maintenance, leak checking or refrigerant recovery on behalf of operators.

**NEW:** Mandatory leak checks are required on refrigerated trucks and trailers above a certain size threshold. The size thresholds are defined in terms of the quantity of refrigerant in each refrigeration unit, measured in tonnes CO<sub>2</sub> equivalent<sup>4</sup>.

The use of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) size thresholds means that the kg threshold for each refrigerant is different. Refrigerants with a high GWP (e.g. HFC 404A) will have a lower size threshold than refrigerants with a lower GWP (e.g. HFC 134a). Table 1 shows leak testing requirements. Example thresholds are given for HFC 404A and HFC 134a. A comprehensive table of thresholds is given in Information Sheet 25.

The key size threshold for refrigerated trucks and trailers is 5 tonnes CO<sub>2</sub>e. Table 1 also shows the thresholds that apply to larger systems. These should not be relevant to trucks and trailers unless they have an unusually large refrigeration system.

**Table 1: Size Thresholds for Mandatory Leak Checks of Refrigerated Trucks and Trailers**

Leak Check Frequency*	2014 Regulation		
	tonnes CO <sub>2</sub> e threshold for all HFC refrigerants	kg threshold for HFC 404A	kg threshold for HFC 134a
Annual	5 tonnes CO <sub>2</sub> e *	1.3 kg	3.5 kg
Every 6 months	50 tonnes CO <sub>2</sub> e	13 kg	35 kg
Every 3 months	500 tonnes CO <sub>2</sub> e	127 kg	350 kg

\* The threshold for annual leak checks of hermetically sealed equipment is 10 tonnes CO<sub>2</sub>e

For refrigerated trucks and trailers with a refrigeration system containing more than 3 kg, the mandatory leak checks apply from 1<sup>st</sup> January 2015.

For systems with less than 3 kg but more than 5 tonnes CO<sub>2</sub>e (e.g. an HFC 404A system between 1.3 and 3 kg) the mandatory leak checks apply from 1<sup>st</sup> January 2017.

It should be noted that vehicles not defined as refrigerated trucks and trailers (e.g. a truck or van that is less than 3.5 tonnes in weight or a refrigerated container) are not subject to mandatory leak checks even if they contain a quantity of refrigerant above the 5 tonnes CO<sub>2</sub>e threshold. However, there is still the “catch all” requirement described above, to avoid intentional F-Gas release. It is recommended that all refrigerated transport systems are regularly checked for leakage to meet this obligation. This is particularly important for transport systems as they are often subject to harsh conditions such as heavy vibration.

If a leak is found during a mandatory leak check it must be repaired without undue delay and the leak test repeated within one month to ensure the repair was effective.

<sup>4</sup> Understanding CO<sub>2</sub> thresholds: see Information Sheet 25 for further details

**NEW: Record keeping**

Operators of refrigerated trucks and trailers must keep records for each piece of equipment subject to a mandatory leak check (i.e. above the 5 tonnes CO<sub>2</sub>e threshold). The records to be kept include:

- a) quantity and type of F-Gas installed
- b) quantities of F-Gas added during installation, maintenance or when repairing a leak
- c) whether the F-Gases used have been recycled or reclaimed (including the name and address of the recycling or reclamation facility and, where applicable, the certificate number).
- d) quantity of any F-Gases recovered
- e) the identity of the undertaking that installed, serviced or decommissioned the equipment, including, where applicable, their certificate number
- f) dates and results of all mandatory leak checks
- g) for equipment decommissioned, the measures taken to recover and dispose of the F-Gases.

Records must be kept by the vehicle operator for at least 5 years. Records collected by a contractor on behalf of an operator must be kept by the contractor for at least 5 years

The records shall be made available on request to the UK Government's competent authority (i.e. the Environment Agency) or to the Commission.

**NEW: Service Ban**

A new feature of the 2014 F-Gas Regulation is the Service Ban, affecting existing equipment:

- From 1<sup>st</sup> January 2020 the use of F-Gases with a GWP above 2,500 to maintain transport refrigeration systems with a charge size of 40 tonnes CO<sub>2</sub>e or more shall be prohibited.

In the transport refrigeration sector this could affect systems that use HFC 404A. However, the size threshold of 40 tonnes CO<sub>2</sub> is equivalent to 10.2 kg of HFC 404A. Most refrigerated trucks and trailers, vans and containers will be unaffected by the Service Ban as long as they are below this size threshold.

Large transport refrigeration systems (Including all transport types such as rail and ships) that are above the 40 tonnes CO<sub>2</sub>e threshold (10.2 kg for HFC 404A) must comply with the Service Ban. It will be legal to continue operating such systems, but you will not be allowed to top up any leaks with virgin refrigerant. Owners of equipment affected by the Service Ban have 3 main options:

- a) You can replace the plant with new equipment using a refrigerant with a lower GWP. This is a good option for plants close to end-of-life.
- b) You can "retrofill" the plant, replacing the HFC 404A with a lower GWP alternative such as HFC 407A, HFC 407F or HFC 452A. In the refrigerated transport sector the retrofill option may be problematic because of Regulations related to the transport of refrigerated food products (ATP Regulations - the Agreement on the international carriage of perishable foodstuffs).
- c) You can use reclaimed or recycled HFC 404A for plant maintenance until 1<sup>st</sup> January 2030.

**NEW: Use of trained technicians**

All refrigerant handling operations on refrigerated trucks and trailers using refrigeration equipment containing HFC refrigerants must be carried out by suitably trained technicians holding an F-Gas handling certificate and working for an F-Gas Certificated company. This includes plant installation,

leak testing, maintenance and end-of-life decommissioning. See Information Sheet 21 for details of all training and certification requirements.

## 5. End-of-life requirements

Any transport refrigeration equipment containing HFCs in either the refrigeration circuit or the insulation foam that is being disposed of at end-of-life must undergo an HFC recovery process.

For **refrigerated trucks and trailers** there is an explicit mandatory requirement for recovery.

For **other transport refrigeration** there is a “catch-all” requirement for the recovery of F-Gases “*to the extent that it is technically feasible and does not entail disproportionate costs*”. Under the 2006 Regulation the same catch-all requirement applied to all refrigerated transport. It is considered technically feasible and cost-effective to recover refrigerant from transport systems, so all operators of transport refrigeration equipment should ensure that F-Gases are recovered.

F-Gas refrigerant must be recovered by a certificated technician before the refrigeration system is dismantled. Modern refrigerant recovery machines should be able to remove well over 95% of the refrigerant in an old system. Any insulating foam associated with these refrigeration systems (e.g. PU foam in truck bodies) should be sent to a specialist recovery facility, where the foam can be crushed and the HFCs recovered.

All recovered F-Gases can either be:

- a) sent for destruction by incineration at a licenced waste facility
- b) sent to a specialist plant that can re-process the old refrigerant into a gas with properties identical to virgin refrigerant, to create “reclaimed refrigerant”
- c) given a basic cleaning process, to create “recycled refrigerant”.

Given the HFC supply shortage that will be created by the phase down process, it is worth trying to send the old refrigerant for reclamation as it may have a good residual value. If the old refrigerant is too contaminated it cannot be reclaimed and must be sent for destruction. It is important not to mix different gases in the same recovery cylinder – as this would render them unsuitable for reclamation.

Reclaimed refrigerant can be used in any refrigeration equipment. Recycled refrigerant must always be used with care as it may be contaminated or of unknown composition. The use of recycled refrigerant with a GWP above 2,500 is restricted to either (a) the organisation owning the plant from which the gas was recovered or (b) the organisation that carried out the recovery.

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**This Information Sheet has been prepared by Gluckman Consulting**

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