

Chapter 4: Operators

Operators must ensure compliance with provisions on containment and recovery of HFCs and blends, meaning that they must make sure that contractors installing, servicing, maintaining, repairing and decommissioning their equipment are certified and records are being maintained. As the HFC phase-down progresses, the new European marketplace will reward those operators who are successful in reducing leakage rates from HFC-based equipment, and those who switch to low-GWP technologies when purchasing new equipment will be shielded from unexpected consequences.

I. Leakage Control

A. Use of Certified Personnel

Operators of HFC technologies must ensure that any installation, service, maintenance, repair or decommissioning is performed only by certified personnel.⁽⁹⁶⁾ Leakage checks and end-of-life recovery must also be performed by certified personnel.⁽⁹⁷⁾

B. Intentional and Unintentional Release

In the EU F-Gas Regulation, the legal requirements to prevent the intentional and unintentional release of HFCs have been strengthened, in particular:

- The intentional release of HFCs and blends, unless technically necessary for their intended use, is prohibited. Leak testing qualifies as an intentional release, and operators should use alternative gases, where possible, or recover the emitted HFCs and blends to the extent it is technically feasible and does not entail disproportionate costs.
- Operators are required to take all precautions that are technically and economically feasible to prevent the unintentional release of HFCs.⁽⁹⁸⁾

The prohibition on intentional releases and the requirement to take precautionary measures to prevent unintentional releases apply to both operators and the contractors performing work on their behalf.⁽⁹⁹⁾

C. Leakage Checks

Periodic leakage checks are required for certain types of equipment, namely stationary refrigeration equipment, stationary air-conditioning equipment, stationary heat pumps, stationary fire protection equipment, refrigeration units of refrigerated trucks and trailers and organic rankine cycles.⁽¹⁰⁰⁾

The frequency of the leak checks is now based on the CO₂e of the refrigerants in the equipment (see Table 9).⁽¹⁰¹⁾

Table 9:
Frequency of Leakage
Checks Based on Charge
Size in CO₂e

Charge Size	Frequency of Leakage Check	
	No Leak Detection System Installed	Leak Detection System Installed
less than 5 CO ₂ e tonnes*	N/A	N/A
5 to less than 50 CO ₂ e tonnes	at least every 12 months	at least every 24 months
50 to less than 500 CO ₂ e tonnes	at least every 6 months	at least every 12 months
500 CO ₂ e tonnes	at least every 3 months	at least every 6 months

NOTE: *For hermetically sealed equipment, leakage checks are not required unless the equipment contains 10 tonnes of CO₂e or more, provided the equipment is labelled as hermetically sealed.⁽¹⁰²⁾

The use of CO₂e instead of metric weight means that the frequency of leakage checks for some equipment increases (see Table 10). Operators should perform an audit of their installed base to identify the frequency of leakage checks for each piece of equipment under the new legislation.

Frequency of Leakage Checks**	Previous Version	EU F-Gas Regulation		
	Old Threshold	New Threshold	HFC-404A	HFC-134a
Annual	3 kg	5 CO ₂ e tonnes*	1.27 kg	3.5 kg
Every 6 Months	30 kg	50 CO ₂ e tonnes	12.7 kg	35 kg
Every 12 Months	300 kg	500 CO ₂ e tonnes	127 kg	350 kg

NOTE: *For hermetically sealed equipment, leakage checks are not required unless the equipment contains 10 tonnes of CO₂e or more, provided the equipment is labelled as hermetically sealed.⁽¹⁰³⁾

** Leakage check frequency is halved if automatic leakage detection system is installed.

Table 10:
Comparison of Old and New Requirements on Frequency of Leakage Checks

Operators must repair leaks “without undue delay” once detected and have the equipment checked by certified personnel within one month of repair.⁽¹⁰⁴⁾ “Without undue delay” should be understood to mean during the same installation, service, maintenance or repair that the leak was detected.

D. Leakage Detection Systems

Leakage detection systems are required in most types of equipment containing 500 tonnes of CO₂e or more, and must be checked periodically to ensure their proper functioning (see Table 11).⁽¹⁰⁵⁾

Equipment Containing 500 tonnes of CO ₂ e or more	Leakage Detection System	
	Required Installation	Frequency of Check
Stationary Refrigeration	1 January 2015	12 months
Stationary Air Conditioning		
Stationary Heat Pumps		
Stationary Fire Protection		
Electrical Switchgear	1 January 2017	6 years
Organic Rankine Cycle	1 January 2017	12 months

Table 11:
Obligation to Install Leakage Detection System

II. Service Ban on High-GWP HFCs in Larger Refrigeration Equipment

Under the terms of the “service ban,” from 2020 onwards the use of HFCs with a GWP of 2,500 or more to service or maintain refrigeration equipment with a charge size of 40 tonnes of CO₂e or more is prohibited.⁽¹⁰⁶⁾ The service ban does not apply to the use of recycled and reclaimed HFCs as long as certain conditions are met:

- **Recycled HFCs or Blends:** Recycled HFCs or blends must have been recovered from existing refrigeration equipment and can only be used by the undertaking that carried out their recovery or the undertaking for which the recovery was carried out.⁽¹⁰⁷⁾
- **Reclaimed HFCs or Blends:** Reclaimed HFC or blends may be used provided they have been labelled with information on the batch number and the name and address of the reclamation facility.⁽¹⁰⁸⁾

The service ban exempts refrigeration systems used in military applications or those designed to cool products to temperatures below -50° Celsius.⁽¹⁰⁹⁾ The European Commission may also issue an exemption for technical or safety reasons or due to disproportionate costs.⁽¹¹⁰⁾

How to Respond to the Service Ban
<p>Operators of refrigeration equipment with charge sizes corresponding to 40 tonnes of CO₂e or more have three options:</p> <ul style="list-style-type: none"> • Continue: use existing equipment and gas until 2020, and then use reclaimed or recycled gas, if available, until 2030. • Convert: retrofit and refill the equipment to run on HFCs with a GWP lower than 2,500. • Replace: install new equipment that uses lower-GWP gases. <p>Operators should strive to ensure that all new refrigeration equipment relies on low-GWP refrigerants with immediate effect, and at the very least avoid HFCs with a GWP of 2,500 or more.</p> <p>There are many good reasons for operators to proactively convert or replace equipment before the ban is in place. First, conversion to a medium range GWP refrigerant reduces direct emissions from larger refrigeration equipment by 50% to 70%, leading to a dramatic reduction of an operator’s carbon footprint.⁽¹¹¹⁾</p> <p>Second, the replacement gases with a GWP lower than 2,500 are reported to improve energy efficiency over the standard HFC-404A by 7% to 12% for medium temperature (MT) systems and by 2% to 5% for low-temperature (LT) systems, resulting in a 1-to 3-year payback period for the refill under current HFC prices.⁽¹¹²⁾</p> <p>Third, the service ban increases HFC demand by 45 to 70 MT CO₂e in the years before and after 2020⁽¹¹³⁾ when the HFC price premium is expected to rise steeply. Early-stage conversions will therefore reduce refill costs and prevent capital abandonment.</p> <p>Fourth, there is no guarantee that a robust recycling and reclamation market will develop and, in any event, it is likely to be relatively small. Operators with large estates (e.g. large supermarket chains) are advised to explore internal recycling schemes, which provide greater predictability and the possibility of staggering their conversions over time.</p> <p>EU Member States can also reduce potential negative impacts of the service ban by taking certain initiatives. Foremost is the promotion of national producer responsibility schemes to facilitate a reclamation market for HFC-404A. To date, little reclamation has taken place in most EU Member States and, unless this changes soon, the service ban will lead to early retirement and capital abandonment.</p>

III. Recovery

A. Stationary Equipment and Refrigerated Trucks and Trailers

Operators must ensure the recovery of HFCs, i.e. their recycling, reclamation or destruction, for all stationary equipment and refrigerated trucks and trailers (see Table 12).⁽¹¹⁴⁾

Table 12:
Legal Obligation on
the Recovery of HFCs

Mandatory	“To Extent Technically Feasible and Does Not Entail Disproportionate Costs”
Stationary Refrigeration	
Stationary Air-Conditioning	
Stationary Heat Pumps	All Other Equipment
Refrigerated Trucks and Trailers	
Stationary Equipment Containing Solvents	
Stationary Fire Protection Equipment	

Operators must ensure this recovery is carried out by “natural persons that hold the relevant certificates,” meaning individuals who received training and certification via a certification programme established by an EU Member State and received a certificate following successful completion of an evaluation process.⁽¹¹⁵⁾ Existing certificates and training attestations remain valid in accordance with the conditions under which they were originally issued.⁽¹¹⁶⁾ When recovery is delegated to third parties, reasonable steps must be taken to ensure that the party to whom recovery is delegated holds the necessary certificates to perform the required task.⁽¹¹⁷⁾

B. All Other Products and Mobile Equipment

Operators must ensure the recovery of HFCs, i.e. their recycling, reclamation or destruction, for all other products and mobile equipment where it is “feasible and does not entail disproportionate costs.”⁽¹¹⁸⁾ Operators must ensure this recovery is carried out by “appropriately qualified natural persons,” as determined by the EU Member State concerned.⁽¹¹⁹⁾ The sole exception is air-conditioning equipment in motor vehicles that, because it falls within the scope of the Mobile Air Conditioning (MAC) Directive, simply requires the person undertaking the recovery to provide an attestation from a training programme established by the EU Member State concerned.⁽¹²⁰⁾

C. Residual Gases in Containers

Any person using an HFC container immediately prior to its disposal must arrange for the recovery of the residual gases therein.⁽¹²¹⁾

IV. Record Keeping

Operators must maintain records for each piece of equipment subject to leakage checks.⁽¹²²⁾ In particular, the records must specify for each piece of equipment:

- the quantities and type of HFCs installed;
- the quantities of HFCs added during installation, maintenance or servicing;
- the quantities of recycled or reclaimed HFCs used, including the name and address of the recycling or reclamation facility and, where applicable, the certificate number;
- the quantity of recovered HFCs used;
- the identity of the persons who installed, serviced, maintained, repaired or decommissioned the equipment, including, where applicable, their certificate number;
- the dates and results of the checks; and
- the measures taken to recover and dispose of the HFCs in the case of decommissioning.

Unless these records are maintained in a database set up by the national authorities of the EU Member State concerned, the records must be kept by operators for at least five years and made available on request to national authorities or the European Commission.⁽¹²³⁾

Recommendations for Operators

Installation of New Equipment

- Review refrigeration and air-conditioning procurement plans.
- Discuss refrigerant options with manufacturers of natural-refrigerant technologies and contractors.
- Install low-GWP technologies relying on natural refrigerants in new equipment whenever possible.

Operation of Existing Equipment

- Review historical leakage rates and implement leakage management programmes.
- Retrofit larger refrigeration equipment relying on HFC-404A as soon as possible while HFC quotas are still plentiful.
- Secure long-term contracts for provision of HFCs at predetermined prices.

Safe Handling and Management

- Provide technical staff with training in the use of natural refrigerants.
- Indicate to outside contractors the need for familiarity with new low-GWP refrigerants.

Important Note: Information on safe and commercially proven low-GWP alternatives in each sector can be found at <http://www.cooltechnologies.org/>. Natural refrigerants can meet nearly all human needs formerly met by HFCs.



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