

**AIR CONDITIONING AND REFRIGERATION EUROPEAN ASSOCIATION
AREA**

**SUGGESTIONS to ACHIEVE REFRIGERANT EMISSION REDUCTIONS
USING THE PROPOSED EU F-GAS LEGISLATION**

1. Scope

The legislative instrument shall apply to all stationary and mobile refrigeration, air-conditioning systems and heat pumps of all sizes and secondary cooling or heating systems with nominal power input greater than 750 Watt containing controlled substances that deplete the ozone layer and/or contribute to global warming¹ to achieve the best possible leak-free systems by preventing and minimising leakage of controlled substances.

2. Competence of personnel and companies

Each Member State, in close co-operation with its National professional organisation(s), shall specify the National education degrees, certificates or other National accreditation needed to comply with the requirements of the current European harmonised standards.² The Commission shall ensure that European standards are made to specify the requirements for competence.

Each Member State shall officially appoint one (or more) National Organisation responsible for delivering mandatory certification to refrigeration companies, other specialist enterprises and personnel and for controlling the proper implementation of the certification scheme as well as the continuity of the compliance with the required competence and qualifications. The selected organisation shall be experienced within the refrigeration sector and use specialists in refrigeration and air conditioning.

Persons, who are responsible for design, construction, installation, inspection, testing, operation, maintenance, repair, disposal and assessment of refrigerating systems and their parts shall have the necessary training and knowledge for their task to achieve competence. Competence in each task shall be required for health, safety, environmental protection and energy conservation purposes. The equipment which may be required to carry out their various tasks competently is listed in appendix 1.

Personnel achieving certification as competent shall be permitted to act and work in all Member States (mutual recognition in all Member States).

The certificate shall permit the holder to transport virgin and used refrigerant within the European Community. With regard to used refrigerant, only a certificate holder shall decide if the refrigerant can be re-used or should be disposed of.

3. Design and construction

The design and construction of refrigeration systems and components and materials used including piping shall be in accordance with current European harmonised standards (norms)³. Refrigerating systems and components shall be designed and constructed with the intention to eliminate possible hazards to persons, property and the environment.

¹ EN 378-1 1 applies.

² EN 378-4 & EN 13313 shall apply

³ EN378-2, 6 Requirements for components and piping. 7 Requirements for assemblies

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Before putting refrigeration systems into service, all the components or the whole refrigerating system shall undergo the following tests: strength pressure test, leakage test, functional test of safety devices, test of the complete installation⁴. Only a competent person shall carry out welding and brazing during installation and repair.

4. Performance tests⁵

Owners/operators of systems with a total refrigerant charge of 3 kg or more shall be responsible for ensuring the system is inspected, by a competent person, at least once every 12 months for correct operation of the system and for prevention of any refrigerant leakage.

For systems with a nominal charge above 30 kg, an inspection shall take place every 6 months.

For systems with a nominal refrigerant charge above 300 kg, an inspection shall take place every 3 months.

Approved remote monitoring shall be accepted as an alternative to physical inspections.

5. Machine card and logbook⁶

The owner/operator of a system shall provide an adequately protected machine card at an easily accessible location near the system with information complying with the requirements of the current European harmonised standards⁷.

For new systems with a total refrigerant charge of 3 kg or more, the installer of a refrigerating system shall provide a logbook at an easily accessible location, near the system, complying with the requirements of the European harmonised standards⁸.

Existing systems shall have a logbook issued at the first performance test following the entry into force of this legislative instrument.

6. Maximum leakage rates

Refrigerant leaks shall be identified and repaired as soon as practicable by a competent person and the system shall only be put into service again when all leaks have been repaired and a competent person has inspected the installation.

All measures, in accordance with the best available techniques, have to be taken in order to reduce the relative loss of refrigerant below a maximum of 5%.

⁴ EN 378 7.3 Testing

⁵ Vlare II: Usage of Refrigerants para 7

⁶ EN 378-4 4 General requirements,

⁷ EN 378 -2 7.4 Marking and documentation 7.4.2.3 Machinery Card

⁸ “ “ “ “ “ 7.4.2.5 Log book

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The relative loss of refrigerant is the fraction of the nominal refrigerant charge that has been lost over a period of 1 year, in relation to the total nominal refrigerant charge. The calculation of the relative loss of refrigerant is based on the amounts of recharged refrigerant as noted in the logbook. For calculation, the average amounts lost or recharged over a period of 2 years can be taken in account.

The Member States shall ensure that any system installed before or after the coming into force of this legislative instrument found to have a relative loss rate of greater than two times the maximum rate in force at the time shall have all leaks repaired before returning to service. If the relevant loss rate cannot be improved, within twelve months, to below the maximum rate in force at the time, then the system shall be taken permanently out of service or replaced within the following twelve months. If technical reasons only prevent replacement within this twelve months, then time for replacement shall be reduced as much as possible and must be notified to the environmental enforcement body responsible for implementing enforcement of this instrument appointed in each Member State.

7. End of life (disposal)

Used refrigerant, which is not intended for re-use, shall be dealt with as waste for safe disposal. Competent personnel only shall carry out disassembly of any refrigeration system.

8. Review

This instrument shall be reviewed in five years from coming into force, with a view to reducing the annual maximum leakage rates defined in clause 6.

Definitions

Refrigeration system [heat pump]: Combination of interconnected refrigerant-containing parts constituting one closed refrigerant circuit in which the refrigerant is circulated for the purpose of extracting and rejecting heat (i.e. cooling, heating).

Mobile system: Refrigerating system which is normally in transit during operation.

NOTE: Mobile systems include the following:

- refrigeration systems in vessels, e.g. refrigerated cargo systems in ships, refrigeration systems in fishing boats, air conditioning on board, refrigeration systems for provisions;
- transport refrigeration systems, e.g. transport of refrigerated cargo by road, train and containers;
- refrigeration systems for air conditioning in vehicles, e.g. cars, lorries, buses, trains, excavators and cranes.

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Refrigerant: Fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure and rejects heat at a higher temperature and a higher pressure usually involving changes of the state of the fluid.

Competence: Ability to perform satisfactorily the activities within an occupation⁹.

Recover: Removing refrigerant in any condition from a system and store it in an external container.

Disposal: Conveying a product to another party, usually for destruction.

Qualification: Evidence of a certain level of training, professional knowledge, skill and experience.

Certification: Procedure used to demonstrate the qualification of personnel at a level and leading to the issue of a certificate.

Certificate: Document issued under the rules of assessment system indicating that the named person is competent to deal with applicable health, safety, environmental protection and energy conservation requirements for refrigerating systems and heat pumps.

Specialist Enterprise: Company, firm, partnership or individual trader certificated as competent to operate in the refrigeration, air conditioning and heat pump market within the scope of this legislative instrument

⁹ EN 13313 applies.

APPENDIX 1

Minimum Operative Technical Instrumentation of Competent Companies and other Specialist Enterprises.

An organisation working in any field of refrigeration shall have competent personnel.

NOTE *The organisation should have adequate equipment to enable the competent person to do the work.*

The technical equipment required in addition to the normal standard implements must comply with the current state of the art of technology, with regard to metrological equipment, specialist tools and necessary facilities and appliances, and observe the current standards, guidelines and laws.

The appliances and means of measurement used in the execution of the leak tightness inspection must be checked, cleaned, serviced and calibrated at regular intervals, in line with the standard job instruction. Logs of this activity must be kept. If requested, access by governmental authorities to these records must be granted. The necessary documents must be kept up-to-date and must be known to the competent and qualified personnel.

List of Appliances and Equipment, these shall conform to the applicable EN Standards

Documentation:

Production test/completion certificates;
Operator's log of the facility;
EN 378 parts 1 to 4 current;

Refrigerant fluid certification;
Refrigerant fluid flow direction labels.

Specialist Tools:

Gas-welding facilities;
Personnel protective equipment;
Soldering appliance, braze welding up to 800°C;
Sealing tongs with lead seal;
Ratchet key;
Torque wrench.

Specialist Appliances:

Extraction appliance / Filling facility;
Leak detection equipment;
(Capable of detecting down to leaks of 5 ppm);
charging lines;
Refrigerant bottles(virgin and recycled)
High and low pressure gauge manifold and lines;
Vacuum pump (minimum 270 Pa).

Fuels and Accessory Agents:

Welding gas;
Refrigerant oil;
Refrigerant,
Nitrogen, dry nitrogen;
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Measuring and testing devices:

Calibrated measuring equipment (electric current, voltage, resistance)
Acid tester;
Calibrated temperature measuring device (appropriate for verification, including the necessary measuring filler);
Vacuum Gauge with current certificate of calibration
Vacuum measuring device (minimum 270 Pa);
Weighing scales (appropriate for verification).