

Sector Material for Figaroo Web Site

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Prepared by Ray Gluckman, Enviros

Link on Figaroo Home Page

Information Tailored for You

Click below to access helpful information about the F-Gas Regulation that is relevant to **your** business

- What your business must do to comply
- What your customers might need
- Tools and Tips

<u>End Users</u>	<u>Contractors</u>
<u>OEMs</u>	<u>Distributors</u>

Please note, that words underlined above and on the following pages have hyperlinks to more detailed explanations or definitions. The hyperlink fields are active to help illustrate how this process may look on the web site, although we would expect that the Web designer will have more flexibility in the use of hypertext than is available in Microsoft Word.

If you display the Web Toolbar (View, Toolbars, Web) you can also use the “Back” and “Forward” arrows to navigate through this document!

As an option, the main headings (e.g. What is meant by “End User”? on the next page) could also be treated as hypertext links to the detail shown in that section. This would mean that if the reader clicked, for example, “end users”, they would only see the main headings for that section and would need to click the relevant one to see the text that is on the following pages of this document.

End User Information

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Summary of Key Actions

This section of the Figaroo website provides details of what end users of HFC refrigeration and air conditioning equipment must do in response to the EU F-Gas Regulation. Many of the obligations that affect users of refrigeration and air-conditioning equipment have been a legal requirement **since July 2007**. From that date you should have:

- a) Identified any equipment that you operate that is affected by the regulation.
- b) Established the quantity of refrigerant in each system.
- c) Begun regular leak tests on all equipment above 3 kg of HFC refrigerant and ensure that any leaks discovered are repaired.
- d) Made arrangements for proper recovery any refrigerant removed from your systems during maintenance or on decommissioning.
- e) Only used technicians with suitable qualifications.
- f) Started keeping records about each system.
- g) For larger systems with over 300 kg of HFC refrigerant, installed an automatic leak detection system.

These key actions and other obligations in the Regulation are described in detail below.

What is meant by “End User”?

The information on this web page is specifically aimed at end users of:

[“Stationary Refrigeration, Air-conditioning and Heat Pump Equipment”](#)

Many of the obligations in the F-Gas Regulation are specifically aimed at the use of these types of equipment. The usage covers a massive range of sizes and applications, ranging from domestic refrigerators to large industrial systems.

The types of end user most likely to be affected by this Regulation include:

- Industrial companies (especially in sectors using refrigeration or air-conditioning, such as food and drink manufacturing, chemicals and pharmaceuticals, cold stores, printing, semi-conductors, rubber and plastics).
- Commercial companies such as supermarkets, other food retail, hospitality (pubs, restaurants, hotels) and offices.
- Public sector organisations such as Government buildings, hospitals, leisure facilities and schools/universities.

The responsibility for compliance with the F-Gas Regulation is mainly placed on the end user (referred to in the Regulation as the “operator”) of the equipment. Click [Operator](#) for a more detailed explanation of the legal definition of who is responsible for implementing the Regulation.

Note, that the guidance for end users on this webpage only relates to stationary applications. The users of mobile equipment, especially mobile air-conditioning in cars, are not specifically targeted by the Regulation. Companies involved in car air-conditioning maintenance do have obligations – see the [Contractors](#) section of this website.

What the F-Gas Regulation is trying to get End Users to achieve

The Regulation is aimed at reducing emissions of the fluorinated greenhouse gases. These are highly “potent” gases which could contribute to global warming if they are released to the atmosphere.

The End users will need to take a number of steps to check for leaks and will need to use suitably trained technicians to avoid unnecessary venting of refrigerant.

Which refrigerants are affected by the Regulation

The Regulation affects any systems that use [HFC](#) refrigerants. It also affects [PFC](#) refrigerants, although these are relatively unusual.

The most commonly used pure HFC refrigerant is R134a. Most HFC refrigerants are blends. Common examples include R404A, R407C and R410A.

Many refrigeration and air-conditioning users have systems that use R22. This is **not** an HFC – it is an [HCFC](#). R22 is **not** affected by the F-Gas regulation, although it is subject to a phase-out schedule in the EU [Ozone Regulation](#) 2037/2000.

A number of refrigerants are referred to as HCFC blends. In most cases these are blends of **both** HCFC and HFC components. Refrigerants of this type **are** affected by the F-Gas regulation and are **also** affected by the Ozone Regulation. Example refrigerants in this category include R403B and R408A.

Click [Refrigerants](#) for a more detailed categorisation of refrigerant types.

Key Obligations and Deadlines for End Users

In most situations it is the end user of refrigeration and air-conditioning equipment that is legally responsible for compliance with many of the key rules in the F-Gas regulation.

Most of these rules came into force in July 2007. The majority of the rules only affect plants that contain a minimum of 3 kg of HFC refrigerant.

The key requirements that affect end users of refrigeration and air-conditioning equipment can be summarised under five main headings:

1. [Regular leak tests carried out by a qualified technician.](#)
2. [Repair and rechecking of leaks after they are discovered.](#)
3. [For large plants, above 300 kg of refrigerant, the installation of automatic leak detection equipment.](#)
4. [Keeping records about leak checks and the addition or removal of refrigerant.](#)
5. [Recovering refrigerant during maintenance or plant decommissioning, using a qualified technician.](#)

Click any of the above to get a detailed description of each obligation.

Are there any F-Gas bans? It is important to note that there are no bans in the F-Gas Regulation related to the use of HFCs in stationary refrigeration, air-conditioning and heat pump applications. There are three bans related to refrigeration applications, but none of these affect "mainstream" stationary refrigeration and air-conditioning applications. There are specific regulations in certain EU Member States that introduce HFC bans for some types of new stationary refrigeration and air conditioning equipment. Click [bans](#) for further information.

What your customers might need

From an end user perspective, it is important to note that many companies are becoming increasingly concerned about the environmental impact of their whole supply chain. It is possible that you will be contacted by a company upstream or downstream of yours in the supply chain who wants to be sure that you are making every effort to minimise environmental impact and, in particular, to reduce emissions of greenhouse gases.

Showing compliance with the F-Gas regulation and showing a reducing rate of F-Gas emissions is a good way of responding to such a request. The record keeping that is required under the Regulation will provide a good starting point to provide such information.

Tools and Tips for End Users

It is helpful to consider the steps that must be undertaken to ensure compliance with the F-Gas Regulation. The “set-up stages” (Steps 1 to 6) should have been completed by July 2007 when the on-going testing regime and record keeping becomes mandatory.

Step 1: Identify all equipment with HFCs. Ensure you have a list of every item of HFC equipment in your company. Refer to [Refrigerants](#) to help identify the relevant HFC refrigerants. It is a good idea to set up a database of all your equipment – this will be a very useful starting point for record keeping.

Step 2: Establish how much refrigerant is in each system. This is a crucial step as it influences the way the F-Gas Regulation will affect you. Many systems have a name plate that states the amount of refrigerant. Alternatively the plant operating manual or commissioning records should have an item specifying the amount of refrigerant in the plant. If you do not have records of this type you need to estimate the amount of refrigerant in the system. The UK Government have produced a Guide on this issue and have written a spreadsheet tool to help – this is a very useful material¹. Alternatively, ask your maintenance contractor for advice.

Step 3: For all plants > 3kg define a leak checking regime. You must establish how leak checking should be carried out and who is qualified to do it. You may need to get expert advice about this. The periodic leak checks need to be based on the use of portable test equipment (e.g. hand-held electronic HFC “sniffer”) and should check all locations where a leak is possible.

Step 4: For all plants > 300 kg fit leak detection equipment. Click [Automatic Leak Detection](#) for further details.

Step 5: For all plants > 3 kg establish a record keeping system. This is a very important aspect of the Regulation that is designed to ensure that the whole process of leakage prevention is being properly managed. Click [Records](#) for further details.

Step 6: Identify competent personnel to carry out leak checks and refrigerant handling. The Regulation specifies that personnel carrying out leak checks and doing work that involves handling refrigerants (e.g. removing refrigerant, topping up a system etc.) must have a suitable qualification.

Step 7: Implement the leak testing regime. From July 2007 onwards, ensure that you are carrying out leak tests at the appropriate intervals (click here for [leak test frequency](#)). If leaks are found these must be noted in the plant record and repaired as soon as possible. The plant must be rechecked for leaks within a month of repair. This is actually good practice for all systems now – leaking systems cost more to run.

Step 8: Ensure plant records are maintained and used to help reduce leakage. From July 2007 onwards, ensure that you are keeping appropriate records for each HFC system. The data can be used to identify any refrigerant plants that have regular leakage problems. These should be investigated to see if any design modifications can prevent leakage.

Step 9: Ensure refrigerant recovery is carried out during plant maintenance. From July 2007 onwards, ensure that if refrigerant is removed from a system (e.g. for maintenance or at the end of plant life) that it is recovered using appropriate equipment and is then re-used or sent for recycling or destruction.

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¹ The UK Guide and spreadsheet tool can be obtained at www.defra.gov.uk/environment/climatechange/uk/fgas/

Contractor Information

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Summary of Key Actions

This section of the Figaroo website provides details of what contractors supplying services to the users of HFC refrigeration and air conditioning equipment must do in response to the new EU F-Gas Regulation. Many of the obligations in the F Gas Regulation have been a legal requirement **since July 2007**. From that date you should have:

- a) Made plans to ensure that your staff can obtain suitable qualifications to carry out any tasks involving handling of F-Gas refrigerants
- b) Stopped using non-refillable containers to transport HFC refrigerants.
- c) Fully understood the obligations being placed on end users. You will need to (i) provide advice to your customers about implementation of the regulation, (ii) be able to carry out regular leak tests on all equipment above 3 kg of HFC refrigerant and to repair any leaks discovered, (iii) be able to properly recover any refrigerant removed from HFC systems during maintenance or on decommissioning and (iv) ensure that those of your staff that carry out such activities are properly qualified.

From July 2009 contractors will only be able to take delivery of HFC refrigerants if they can prove that their relevant personnel hold the appropriate qualifications. From this date contractors will need a "Company Certificate" to prove that they employ competent staff and have the necessary recovery equipment.

The Certification requirements for personnel and companies are specified in EC Regulation 303/2008. These requirements go beyond the current minimum qualification requirements in many EU Member States. Many countries are in the process of introducing new qualifications that meet the requirements. The EC have allowed an optional transitional period, until July 2011, for personnel and companies to obtain new certificates. Interim certificates, based on existing qualifications, must be held by July 2009. Each EU Member State will have its own set of rules regarding suitable qualifications and interim arrangements.

These key actions and other obligations in the Regulation are described in detail below.

What is meant by "Contractor"?

The information on this webpage is specifically aimed at refrigeration contractors who are providing services to end users in the refrigeration, air-conditioning and heat pump markets. This includes:

- Installation contractors who are fitting new systems.
- Maintenance contractors that provide services to operators of existing equipment.

Installation and maintenance contractors need to comply with similar obligations, although the requirement to fit labels to new equipment (see details below) will only apply to installation contractors.

The majority of obligations under the F-Gas regulation refer to stationary systems such as those found in factories and buildings. However, contractors working on mobile equipment such as car air-conditioning and transport refrigeration systems also have some obligations.

What the F-Gas Regulation is trying to get Contractors to achieve

The F-Gas Regulation is aimed at reducing emissions of the fluorinated greenhouse gases such as HFCs. These are highly "potent" gases which could contribute to global warming if they are released to the atmosphere. In refrigeration and air-conditioning markets the Regulation will achieve this by improving containment, i.e. minimising leakage and ensuring that refrigerants are not vented during servicing or plant decommissioning.

For contractors the Regulation is trying to ensure that your staff have adequate qualifications to carry out any tasks that involve the handling of HFC refrigerants. The Regulation also ensures that your customers have an obligation to carry out certain tasks including regular leak checks and the repair of leaks.

The main legal obligations on contractors relate to the training of your staff and ensuring that your staff make every practical effort to minimise emissions from systems they are working on. It is important to note that the success of the Regulation will rely on contractors making sure that their customers do not try and ignore the key legal obligations that are placed on them. This means that contractors must be fully familiar with the rules being applied to end users.

Which refrigerants are affected by the Regulation

The Regulation affects any systems that use [HFC](#) refrigerants. It also affects [PFC](#) refrigerants, although these are relatively unusual.

Click [Refrigerants](#) for a more detailed categorisation of refrigerant types.

Key Obligations and Deadlines for Contractors

In most situations it is the end user of refrigeration and air-conditioning equipment that is legally responsible for compliance with many of the key rules in the F-Gas regulation. Most of these rules came into force in July 2007. The majority of the rules only affect plants that contain a minimum of 3 kg of HFC refrigerant. Details of these important obligations on end users are given in paragraph below entitled "What your customers might need".

The legal obligations on contractors can be summarised under four main headings:

1. [Ensure your staff are properly trained and certified.](#)
2. [By 2009, ensure your company is Certified so it can take delivery of refrigerant containers.](#)
3. [Do not use non-refillable containers.](#)
4. [Ensure all new equipment is properly labelled before sale.](#) (This only applies to installation contractors working on new systems that are not pre-charged with refrigerant).

It is important that contractors ensure that their staff do not carry out any activities on behalf of their customers that would be deemed to be illegal for an end user (see below for details).

Click any of the above to get a detailed description of each obligation.

Are there any F-Gas bans? It is important to note that there are no bans in the F-Gas Regulation related to the use of HFCs in stationary refrigeration, air-conditioning and heat pump applications. There are three bans related to refrigeration applications, but none of these affect "mainstream" stationary refrigeration and air-conditioning applications. There are specific regulations in certain member states that introduce HFC bans for certain types of new stationary refrigeration and air conditioning equipment. Click [bans](#) for further information.

What your customers might need

From a contractor perspective, the needs of your customers are especially important. The end users hold the main obligations under the F-Gas regulation and many will need to use the expertise and qualified staff available from contracting companies. Refrigeration contractors need to fully understand the end user obligations so that they can provide the best possible advice to their clients.

The key requirements that affect end users of refrigeration and air-conditioning equipment can be summarised under five main headings:

1. [Regular leak tests carried out by a qualified technician.](#)

2. [Repair and rechecking of leaks after they are discovered.](#)
3. [For large plants, above 300 kg of refrigerant, the installation of automatic leak detection equipment.](#)
4. [Keeping records about leak checks and the addition or removal of refrigerant.](#)
5. [Recovering refrigerant during maintenance or plant decommissioning, using a qualified technician.](#)

Click any of the above to get a detailed description of each obligation.

Tools and Tips

Contractors should consider the best way in which they can help their customers meet the end user obligations. Some of the issues that end users will find hardest are as follows:

- Identifying which plants fall under the regulation and, in particular, which of the size thresholds might apply.
- Understanding the appropriate methods to carry out the regular leak tests.
- Setting up and maintaining the correct records required under the Regulation.
- Ensuring that technicians working on their plants are properly qualified and certified.

Contractors are often the best qualified organisations to help address these issues. Contractors will find it helpful to build up a "knowledge base" of useful information related to the regulation. The Figaroo website provides much of this information. In addition some Member States have prepared useful guidance material for the refrigeration and air conditioning industry. For example the UK government have tried to provide advice about the best ways of identifying the amount of refrigerant in a system. They have prepared a comprehensive guidance note that is accompanied by a spreadsheet tool that can be used to make an estimate of refrigerant charge. This tool may prove very useful to refrigeration contractors. It can be accessed on the following website:

www.defra.gov.uk/environment/climatechange/uk/fgas/

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OEM Information

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Summary of Key Actions

This section of the Figaroo website provides details of what OEMs (Original Equipment Manufacturers) of HFC refrigeration and air conditioning equipment must do in response to the new EU F-Gas Regulation.

In legal terms there are few obligations that directly affect OEMs. The majority of obligations affect end users rather than manufacturers.

From July 2007 equipment manufacturers need to ensure that any of their staff involved in operations that could affect the emissions of HFCs are properly qualified (e.g. technicians filling new equipment with refrigerant). Manufacturers also need to ensure that if any refrigerant needs to be removed from a system in the factory that it is properly recovered (venting HFCs to atmosphere is now illegal).

From April 2008 any equipment sold with HFC or PFC refrigerants must be properly labelled, showing the type and quantity of refrigerant in the system. Hermetically sealed systems must be labelled as such.

In more general terms manufacturers have a “moral obligation” to try and help their customers by providing equipment and information that will end users meet their legal obligations. End users will need to take steps to minimise leakage and to carry out leak tests. OEMs can influence this process through improvements to plant design. For example, designs can be improved to: (a) reduce the risk of leakage, (b) reduce the refrigerant charge and (c) simplify leak testing (e.g. by reducing the number of joints). End users will need to keep records about each plant they operate – OEMs can help by providing a data sheet with new plants that can form the starting point for the record keeping process. They can also provide guidance on how to carry out a leak test.

These key actions and other obligations in the Regulation are described in detail below.

What is meant by “OEM”?

The information on this webpage is specifically aimed at OEMs that are manufacturing products for end users in the refrigeration, air-conditioning and heat pump markets. This is mainly intended to refer to companies building “complete systems” that are pre-charged with refrigerant in the factory. For example:

- Manufacturers of stand alone small hermetic systems.
- Manufacturers of pre-charged split system air-conditioning units.
- Manufacturers of packaged water chillers.

If an OEM is manufacturing a component (e.g. a compressor) or an uncharged system or sub-system then they might not have any direct legal obligations, because they are not actually handling any F-Gas refrigerants.

What the F-Gas Regulation is trying to get OEMs to achieve

The F-Gas Regulation is aimed at reducing emissions of the fluorinated greenhouse gases. These are highly “potent” gases which could contribute to global warming if they are released to the atmosphere. In refrigeration and air-conditioning markets the Regulation will achieve this by improving containment, i.e. minimising leakage and ensuring that refrigerants are not vented during servicing or plant decommissioning.

OEMs can influence the success of the Regulation by selling systems that are as leak-proof as possible and that contain the lowest practical quantity of F-Gas refrigerants. There is no actual legal obligation for OEMs to do this, but it makes sense for end users to try and buy systems with the least risk of leakage. OEMs that respond positively to this “moral obligation” may find that business improves!

Which refrigerants are affected by the Regulation

The Regulation affects any systems that use [HFC](#) refrigerants. It also affects [PFC](#) refrigerants, although these are relatively unusual.

Click [Refrigerants](#) for a more detailed categorisation of refrigerant types.

Key Obligations and Deadlines for OEMs

In most situations it is the end user of refrigeration and air-conditioning equipment that is legally responsible for compliance with many of the key rules in the F-Gas regulation. Most of these rules came into force in July 2007. The majority of the rules only affect plants that contain a minimum of 3 kg of HFC refrigerant. Details of these important obligations on end users are given in paragraph below entitled "What your customers might need".

The legal obligations on OEMs can be summarised under four main headings:

1. [Ensure all new equipment is properly labelled before sale.](#)
2. [Ensure your staff are properly trained and certified.](#)
3. [By 2009, ensure your company is registered so it can take delivery of refrigerant containers.](#)
4. [Do not use non-refillable containers.](#)

Click any of the above to get a detailed description of each obligation.

Are there any F-Gas bans? It is important to note that there are no bans in the F-Gas Regulation related to the use of HFCs in stationary refrigeration, air-conditioning and heat pump applications. There are three bans related to refrigeration applications, but none of these affect "mainstream" stationary refrigeration and air-conditioning applications. There are specific regulations in certain member states that introduce HFC bans for certain types of new stationary refrigeration and air conditioning equipment. Click [bans](#) for further information.

What your customers might need

From an OEM perspective, the needs of your customers are important. The end users hold the main obligations under the F-Gas Regulation and they will be trying to buy new equipment that makes it easier to them to comply with these obligations. For this reason it is important that OEM's are fully familiar with the end user obligations and that they make every attempt to support their customers by improved design and the supply of appropriate information.

The key requirements that affect end users of refrigeration and air-conditioning equipment can be summarised under five main headings:

1. [Regular leak tests carried out by a qualified technician.](#)
2. [Repair and rechecking of leaks after they are discovered.](#)
3. [For large plants, above 300 kg of refrigerant, the installation of automatic leak detection equipment.](#)
4. [Keeping records about leak checks and the addition or removal of refrigerant.](#)
5. [Recovering refrigerant during maintenance or plant decommissioning, using a qualified technician.](#)

Click any of the above to get a detailed description of each obligation.

Tools and Tips

OEMs should review the equipment they manufacture to identify ways in which they can best help their customers by improving their design and supplying information that is tailored to the F-Gas regulation.

Design for low leakage. It is useful to try and identify the "weak spots" in your current designs from the perspective of leakage. Some of the most common causes of leakage on refrigeration and air conditioning plants are:

- Leaks from mechanical joints, especially flared joints on copper pipes. Such leaks can be avoided by minimising the number of joints, using brazed joints where possible and using high quality mechanical joints as required.
- Leaks from damaged small diameter piping that is badly supported, especially copper pipe. Such leaks can be avoided by the use of flexible piping if appropriate, by the use of stainless steel pipe and by the careful layout of the plant to avoid exposure of small diameter pipes to external damage (especially that caused by technicians clambering over a piece of plant to gain access!).
- Leaks from valve stems. Some poor quality valves have significant leakage from the valve spindle. This can be avoided by using better quality valves and ensuring that all valves are fitted with valve caps.
- Leaks from compressor seals. These can be avoided by the use of hermetic or semi-hermetic compressors but this is not always the best option in terms of energy efficiency, especially on large compressors. Where open compressors are used it is important that high-quality seals are used and that the compressor and drive motor are very carefully aligned if leaks to be minimised.
- Leaks from pressure relief valves. Some pressure relief valves do not seal properly after they have been used. This problem can be avoided by using a bursting disc in series with a pressure relief valve, which prevents any continuous slow leakage and also prevents the total loss of refrigerant during a short "high pressure excursion".

Design for low refrigerant charge. If a catastrophic leak does occur, the quantity of refrigerant that leaks is dependent on the amount of charge in the system. A number of design techniques can be used to minimise the quantity of refrigerant in a system. Modern compact heat exchangers can reduce the amount of refrigerant needed in the evaporator and condenser. For example, a plate heat exchanger evaporator might have much less refrigerant than a flooded shell and tube evaporator. Great care should be taken in the sizing and orientation of receiver vessels to avoid having excessive quantities of reserve refrigerant stored in such vessels.

Providing good information. The documentation that you supply with your plant can be designed to help the end user to (a) meet his obligations under the F-Gas regulation and (b) to reduce emissions of CO₂ by running the plant more efficiently, saving electricity. You might want to consider providing two types of information:

- **F-Gas Regulation guidance.** This would support the end users obligation for record keeping. You should provide details of the type and exact amount of refrigerant in the system and give advice about ways of minimising leakage and how leak testing should be carried out.
- **Energy efficiency guidance.** For most refrigeration plants by far the largest impact on global warming is related to the energy consumption. End users would find it very helpful if you provide some guidance on how to get the lowest energy consumption from the plant that you have supplied. For example, you could describe maintenance procedures that would ensure that the plant performance did not degrade over time through problems such as heat exchanger fouling, build up of non-condensable gases in the condenser, problems with frost on the evaporator etc.

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Distributor Information

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Summary of Key Actions

This section of the Figaroo website provides details of what distributors of refrigerants and refrigeration and air conditioning components and equipment must do in response to the new EU F-Gas Regulation.

In legal terms there are few obligations that directly affect distributors. The majority of obligations affect end users and contractors rather than distributors.

From July 2007 you should have (a) stopped selling refrigerant in non-refillable containers (unless you can clearly prove that the container was filled prior to July 4th 2007) and (b) ensured your staff members have appropriate training,

From March 2008 large refrigerant manufacturers or importers must report appropriate data to the Commission on an annual basis

From April 2008 refrigerant distributors must ensure that all refrigerant containers are correctly labelled and RAC equipment distributors must only sell relevant products if properly labelled.

From July 2009 you only be able to sell refrigerant to companies that can prove that their relevant personnel hold the appropriate qualifications.

In more general terms distributors have a “moral obligation” to try and help your customers by providing information that will help contractors and end users meet their legal obligations. End users will need to take steps to minimise leakage and to carry out leak tests. End users will also need to keep records about each plant they operate. Distributors can support this process through provision of guidance related to the Regulation.

These key actions and other obligations in the Regulation are described in detail below.

What is meant by “Distributor”?

The advice given in this section of the Figaroo website relates to three different types of distributor, as follows:

- **Refrigerant distributors.** These are companies that are dedicated to the supply of refrigerant gases. They are often involved in refrigerant recycling as well as the supply of virgin refrigerants. Such companies might also be involved in the import and export of refrigerant gases.
- **Refrigeration component wholesalers.** These are companies that supply a wide range of refrigeration plant components such as piping, valves, compressors, heat exchangers etc. Many wholesalers are also major distributors of refrigerants.
- **Refrigeration system distributors.** These are companies that distribute specific types of refrigeration system, often that are imported - for example, a company supplying a particular make of split system air-conditioning unit.

The obligations under the F-Gas regulation depend on the type of distributor in question. The different obligations clarified below.

What the F-Gas Regulation is trying to get Distributors to achieve

The F-Gas Regulation is aimed at reducing emissions of the fluorinated greenhouse gases. These are highly “potent” gases which could contribute to global warming if they are released to the atmosphere. In refrigeration and air-conditioning markets the Regulation will achieve this by improving containment, i.e. minimising leakage and ensuring that refrigerants are not vented during servicing or plant decommissioning.

Distributors can influence the success of the Regulation by selling equipment and components that help contractors minimise the refrigerant emissions from end users equipment. Distributors can also be a useful focus for the provision of related information that will help service engineers working for contracting organisations.

Which refrigerants are affected by the Regulation

The Regulation affects any systems that use [HFC](#) refrigerants. It also affects [PFC](#) refrigerants, although these are relatively unusual.

Click [Refrigerants](#) for a more detailed categorisation of refrigerant types.

Key Obligations and Deadlines for Distributors

In most situations it is the end user of refrigeration and air-conditioning equipment that is legally responsible for compliance with many of the key rules in the F-Gas regulation. Most of these rules came into force in July 2007. The majority of the rules only affect plants that contain a minimum of 3 kg of HFC refrigerant. Details of these important obligations on end users and the obligations on contractors are given in paragraph below entitled "What your customers might need".

The legal obligations on distributors can be summarised under three main headings:

1. [Do not sell or supply refrigerant in non-refillable containers.](#)
2. [Ensure that refrigerant containers correctly labelled.](#)
3. For refrigerant handling operations, [ensure your staff receive appropriate training](#)².
4. If manufacturing, importing or exporting greater than 1 tonne of F-Gas per year, [ensure you meeting the reporting requirements.](#)
5. For systems sold pre-charged with refrigerant, [ensure that the products are properly labelled.](#)
6. [After 2009, ensure that you are only selling refrigerant to companies that can prove that their staff have adequate training.](#)

Click any of the above to get a detailed description of each obligation.

Are there any F-Gas bans? It is important to note that there are no bans in the F-Gas Regulation related to the use of HFCs in stationary refrigeration, air-conditioning and heat pump applications. There are three bans related to refrigeration applications, but none of these affect "mainstream" stationary refrigeration and air-conditioning applications. There are specific regulations in certain member states that introduce HFC bans for certain types of new stationary refrigeration and air conditioning equipment. Click [bans](#) for further information.

What your customers might need

From a distributor perspective, most of your customers are refrigeration contractors although in some cases you may be supplying products and equipment directly to end-users. These two groups of customers will hold the main responsibilities for the implementation of the key clauses in the F-Gas regulation that relate to the containment and recovery of F-Gases used in refrigeration and air conditioning equipment. It is very important that distributors should become familiar with the obligations that their customers will need to meet. Apart from some of the obligations listed above, the key issues faced by your customers include:

1. [Regular leak tests carried out by a qualified technician.](#)
2. [Repair and rechecking of leaks after they are discovered.](#)
3. [For large plants, above 300 kg of refrigerant, the installation of automatic leak detection equipment.](#)
4. [Keeping records about leak checks and the addition or removal of refrigerant.](#)
5. [Recovering refrigerant during maintenance or plant decommissioning, using a qualified technician.](#)

Click any of the above to get a detailed description of each obligation.

² This refers to any refrigerant handling operations that could give rise to emissions of F-Gas refrigerants. Hence it applies to operations such as filling cylinders.

Tools and Tips

Distributors should consider the best way in which they can help their customers meet their obligations. This will probably be in the form of helpful information that they could make available to customers. The type of information will perhaps depend upon the type of distributor as follows:

- **Refrigerant distributors.** Companies distributing refrigerant should make available comprehensive information sheets that provide relevant information about the products they sell. In most cases, such information is already provided by manufacturer's data sheets. A key area that customers will find useful relates to options for reuse, reclaim and destruction of recovered refrigerants.
- **Refrigeration component wholesalers.** Component wholesalers are in a particularly strong position to provide useful information about the F-Gas regulation as they have a very strong interface with large numbers of service and installation technicians. Wholesalers will find it helpful to build up a "knowledge base" of useful information related to the regulation. The Figaroo website provides much of this information. In addition some Member States have prepared useful guidance material for the refrigeration and air conditioning industry. For example the UK government have tried to provide advice about the best ways of identifying the amount of refrigerant in a system. They have prepared a comprehensive guidance note that is accompanied by a spreadsheet tool that can be used to make an estimate of refrigerant charge. This tool may prove very useful to your customers. It can be accessed on the following website:

www.defra.gov.uk/environment/climatechange/uk/fgas/

- **Refrigeration system distributors.** The documentation that you supply with plants and systems that you sell can be designed to help the end user to (a) meet his obligations under the F-Gas Regulation and (b) reduce emissions of CO₂ by running the plant more efficiently, saving electricity. You might want to consider providing two types of information:
 1. **F-Gas Regulation guidance.** This would support the end users obligation for record keeping. You should provide details of the type and exact amount of refrigerant in the system and give advice about ways of minimising leakage and how leak testing should be carried out.
 2. **Energy efficiency guidance.** For most refrigeration plants by far the largest impact on global warming is related to the energy consumption. End users would find it very helpful if you provide some guidance on how to get the lowest energy consumption from the plant that you have supplied. For example, you could describe maintenance procedures that would ensure that the plant performance did not degrade over time through problems such as heat exchanger fouling, build up of non-condensable gases in the condenser, problems with frost on the evaporator etc.

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Hyperlink fields

Stationary refers to equipment that is normally not in transit during operation.

Most of the obligations in the F-Gas Regulation that affect refrigeration and air-conditioning specifically apply to stationary equipment such as that found in factories or buildings.

Mobile equipment is mainly used either for car air-conditioning or for refrigerated transport. End users of this type of equipment are not affected by the obligations related to leak checking but will need to ensure that refrigerant is recovered from their equipment during maintenance or decommissioning.

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Refrigeration refers to cooling below ambient temperature. This includes domestic refrigerators and freezers, retail displays, industrial process cooling and cold storage warehouses.

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Air-conditioning refers to cooling of a building to achieve an acceptable ambient temperature (and sometimes humidity control as well). This includes air-conditioning of domestic, commercial and industrial buildings.

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Heat pumps refer to refrigeration devices that are used to provide heat. The “cooling” in the evaporator is usually done to a heat stream (waste heat or, in many cases, an ambient heat source) from which heat is extracted and transformed to a higher temperature level. The heat rejected from the condenser, at a higher temperature, is the “useful output” of a heat pump. This includes heating of buildings with heating only heat pumps and dual purpose heating and air-conditioning systems. It also includes industrial process heating with a heat pump using a waste heat stream.

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Operator is defined in the F-Gas Regulation as

“the natural or legal person exercising actual power over the technical functioning of the equipment and systems covered by this Regulation; a Member State may, in defined, specific situations, designate the owner as being responsible for the operator’s obligations”

In many circumstances the identity of the operator will be obvious – the phrase “exercising actual power” is an important one and it usually places responsibility with the end user, even if there is a comprehensive maintenance contract in place.

An area of potential ambiguity is in landlord-tenant relationships e.g. in an air-conditioned office building. In these circumstances you may need to refer to the legal responsibilities set down in the lease – this would normally specify the party who is responsible for the operation and upkeep of the system.

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HFC refers to hydrofluorocarbons.

HFCs are a family of chemicals that have characteristics that make them well suited to refrigeration. HFC refrigerants are used in a wide range of applications throughout the refrigeration, air-conditioning and heat pump markets.

HFCs have a very high GWP (global warming potential) which means that any HFCs emitted to the atmosphere have a strong impact on global warming. For this reason, the F-Gas regulation is aimed at minimising emissions of HFCs.

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PFC refers to perfluorocarbons.

PFCs are a family of chemicals that have a small number of specialist applications. They are never used in isolation as refrigerants but a small number of refrigerant blends include a tiny proportion of PFCs in their formulation.

PFCs have a very high GWP (global warming potential) which means that any PFCs emitted to the atmosphere have a strong impact on global warming. For this reason, the F-Gas regulation is aimed at minimising emissions of PFCs.

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HCFC refers to hydrochlorofluorocarbons.

HCFCs are a family of chemicals that have characteristics that make them well suited to refrigeration. In particular R22 is an HCFC refrigerant that is widely used in a range of refrigeration and air-conditioning applications.

HCFCs are ozone depleting chemicals and as such are being phased out under the EU Ozone Regulation 2037/2000.

HCFCs have a very high GWP (global warming potential) which means that any HCFCs emitted to the atmosphere have a strong impact on global warming. However, because HCFCs are already being phased out under the Montréal Protocol they are not included as one of the greenhouse gases targeted by the Kyoto Protocol or the F-Gas regulation.

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Regular leak tests carried out by a qualified technician.

A key obligation for end users will be to carry out regular leak tests on all plants that contain HFC refrigerants.

Basic Size Threshold. All equipment containing less than 3 kg of HFC refrigerant is exempt from the regular leak test. For hermetically sealed equipment (see below for definition) the size threshold is 6 kg.

Leak Test Interval. The regularity of leak tests is dependent on the size of the plant and whether automatic leak detection equipment has been fitted. The table below summarises the leak test intervals for different size ranges.

Frequency	Normal systems	Hermetically sealed systems
None	<3 kg	<6 kg
Annual	3 kg to 30 kg	6 kg to 30 kg
6-monthly*	30 kg to 300 kg	30 kg to 300 kg
Quarterly*	>300 kg	>300 kg

* Half this frequency if fitted with automatic leak detection

Hermetically Sealed Systems. The threshold is 3 kg for most systems, but is increased to 6 kg for a “hermetically sealed system”. This is defined in the Regulation as:

“a system in which all refrigerant containing parts are made tight by welding, brazing or a similar permanent connection which may include capped valves and capped service ports that allow proper repair or disposal and which have a tested leakage rate of less than 3 grams per year under a pressure of at least a quarter of the maximum allowable pressure”.

Examples of hermetically sealed systems include domestic refrigerators and small self-contained commercial systems such as bottle coolers, display cabinets and ice makers. Any system requiring on-site fabrication of refrigerant pipework is unlikely to fall into the hermetic category (even if it has a hermetic compressor).

What is a leak test? Commission Regulation EC 1516/2007 sets out details of leak testing requirements for F gases. The test has to be carried out by a qualified technician (see below). The following parts of the RAC system shall be systematically checked:

- Joints;
- Valves including stems;
- Seals, including seals on replaceable driers and filters;
- Parts of the system subject to vibration;
- Connections to safety or operational devices.

Direct Leak Detection. In all situations the leak test can include checks made with one or more of three “direct” measuring techniques:

- 1) Hand held electronic gas detector.
- 2) UV sensitive detection fluid or dye in the refrigerant.
- 3) Soap suds or proprietary bubble solutions.

It is often best to use a combination of techniques e.g. an electronic detector to test a wide area and soap suds to identify the exact location of the leak.

Electronic detectors need to be checked every 12 months to ensure their proper functioning. The sensitivity of portable gas detection devices shall be at least five grams per year.

Indirect Leak Detection. In some situations it is possible to use “indirect” leak measurement. This involves observation of parameters such as temperatures and pressures in the refrigeration system to ascertain whether there is a shortage of refrigerant. This can be especially useful if parts of the plant are inaccessible or located outdoors (when a hand held leak detector may not function). If a leak is suspected it will often be necessary to use direct measurement methods to identify the exact location of the leak.

Indirect measuring methods can be applied in cases where the leakage develops very slowly and where the equipment is placed in a well ventilated environment making it difficult to detect fluorinated greenhouse gases escaping from the system in the air. The decision on the measuring method to be used should be taken by certified personnel who have the necessary training and experience to determine the most appropriate measuring method on a case by case basis.

Leak Repair. If a leak is found it must be repaired by an appropriately qualified technician. The repair must be retested for leakage within a month of the repair (the retest can be done immediately after the repair is completed providing the plant is back in service).

Required Qualifications. The regulation specifies that personnel carrying out leak tests must be suitably qualified. The minimum standards for qualifications and certification of personnel and companies are set out in EC Regulation 303/2008. These requirements will need to be transposed into national legislation in each Member State of the EU. Some countries already have national qualifications that meet the new minimum requirements, but in many countries these go beyond the current training standards. Each Member State has the option of introducing a transitional period to give personnel a chance to get new qualifications that meet the minimum standards. The transitional period can run until July 2011. Member States that use the transitional period will need to define interim qualifications that are suitable during this period.

Mutual recognition of other Member State Qualifications. Any qualification that meets the new minimum standards defined in EC Regulation 303/2008 must be recognised in any country in the EU. However, interim qualifications are not recognised outside the country in which they apply.

Four Categories of Qualification. EC Regulation 303/2008 defines 4 different types of qualification for personnel handling refrigerants and carrying out leak tests. Category I covers all activities for stationary RAC equipment whereas the other 3 categories are more restrictive. These 4 categories are as follows:

Category I certificate holders may carry out all refrigerant handling activities for any size of stationary RAC systems containing HFC refrigerants. This includes leakage checking, refrigerant recovery, installation, maintenance and servicing.

Category II certificate holders may carry out refrigerant recovery, installation, maintenance and servicing, in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed). Category II certificate holders may also carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

Category III certificate holders may carry out refrigerant recovery in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed).

Category IV certificate holders may carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

.Note, a Category III technician is not qualified to carry out leak tests.

Implementation Date. The requirement for regular leak checking begins in July 2007. For a small system between 3 kg and 30 kg that require an annual leak check this implies that the first test must have been carried out before July 2008.

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Repair and rechecking of leaks after they are discovered.

After leak tests have been carried out, the Regulation wires the end user to ensure that the leak is properly prepared.

Timetable. The regulation does not specify a specific timetable between discovery of a leak and the repair. It simply states that: "the leak must be repaired as soon as possible".

After a leak has been repaired it must be rechecked for leakage within one month.

Required Qualifications. The regulation specifies that personnel carrying out leak repairs must be suitably qualified. The minimum standards for qualifications and certification of personnel and companies are set out in EC Regulation 303/2008. These requirements will need to be transposed into national legislation in each Member State of the EU. Some countries already have national qualifications that meet the new minimum requirements, but in many countries these go beyond the current training standards. Each Member State has the option of introducing a transitional period to give personnel a chance to get new qualifications that meet the minimum standards. The transitional period can run until July 2011. Member States that use the transitional period will need to define interim qualifications that are suitable during this period.

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Category II certificate holders may carry out refrigerant recovery, installation, maintenance and servicing, in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed). Category II certificate holders may also carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

Category III certificate holders may carry out refrigerant recovery in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed).

Category IV certificate holders may carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

Note: only Category I technicians can carry out leak repair work on plants with more than 3 kg of refrigerant. Category III and IV technicians are not qualified for leak repair work on any RAC plant.

Implementation Date. The requirement for repairing leaks begins in July 2007. This date will apply both to leaks identified during the mandatory regular leak checks and also to leaks discovered during other maintenance activities.

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Installation of automatic leak detection equipment.

The installation of automatic leak detection systems is mandatory for systems that contain 300 kg or more of HFC refrigerants.

What is an automatic leak detection system? The regulation defines a leakage detection system as:

“A calibrated mechanical, electrical or electronic device for detecting leakage of fluorinated greenhouse gases which, on detection alerts the operator”.

What type of leak detection system is appropriate? The regulation is not more specific about the type of leak detection that would be considered satisfactory. It is believed that two main types of system could be considered. These are:

- A sniffer type system that uses one or more sensing points to continually check for the presence of leaked refrigerant in the atmosphere near to the refrigeration system.
- An indirect type of system that measures certain system parameters and interprets these to identify the possibility of leakage. For example, this could consist of a level sensing device in the liquid receiver vessel linked to an intelligent system that is able to judge whether fluctuations in level are indicating a steady leak.

The best type of system will be very site-specific. If a plant is located in an external and windy location it is likely that the sniffer type devices will prove ineffective and indirect system is more appropriate. Conversely, if a plant is completely contained within an engine room then sniffer detection could be the most effective.

Annual testing of leak detection system. The regulation specifies that the leak detection systems installed on large systems must be checked at least once every 12 months to ensure proper functioning. The check must be made by someone with an appropriate qualification.

Change to frequency of leak tests. Where a permanent automatic leak detection system is fitted the frequency of the regular leak checks that are mandated by the regulation are halved, subject to a minimum frequency of every 12 months. This means that for systems with over 300 kg the leak check frequency is every 6 months rather than every 3 months. Similarly if a leak detection system is fitted on a small plant between 30 and 300 kg then the leak testing frequency will be every 12 months instead of every 6 months.

Required Qualifications. The regulation specifies that personnel carrying out leak detection device testing must be suitably qualified. The minimum standards for qualifications and certification of personnel and companies are set out in EC Regulation 303/2008. These requirements will need to be transposed into national legislation in each Member State of the EU. Some countries already have national qualifications that meet the new minimum requirements, but in many countries these go beyond the current training standards. Each Member State has the option of introducing a transitional period to give personnel a chance to get new qualifications that meet the minimum standards. The transitional period can run until July 2011. Member States that use the transitional period will need to define interim qualifications that are suitable during this period.

Mutual recognition of other Member State Qualifications. Any qualification that meets the new minimum standards defined in EC Regulation 303/2008 must be recognised in any country in the EU. However, interim qualifications are not recognised outside the country in which they apply.

Four Categories of Qualification. EC Regulation 303/2008 defines 4 different types of qualification for personnel handling refrigerants and carrying out leak tests. For the checking of automatic leak detection systems only a Category I technician has the necessary qualification.

Implementation Date. The requirement for fitting automatic leak detection systems on plants above 300 kg begins in July 2007.

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Keeping records about leak checks and the addition or removal of refrigerant.

A very important obligation that applies to end users is to keep records about each plant that uses HFC refrigerants.

Scope of the obligation for record keeping. Records must be kept about each system with more than 3 kg of HFC refrigerant (this applies to both normal and hermetically sealed systems). The record keeping requirements are specified in the main F Gas Regulation (EC 842/2006) with supplementary requirements given in EC Regulation 1516/2007.

Records to be kept. The records must include:

- The name, postal address and telephone number of the Operator of the equipment.
- The quantity and type of F -Gas refrigerants installed in each system
- Any quantities of refrigerant added
- Any quantities of refrigerant recovered during servicing, maintenance and final disposal.
- The dates and results of leakage checks and leakage detection system checks.
- Other relevant information including the identification of the company and technician who performed any leak tests, leak repairs, servicing or maintenance,
- Details of automatic leak detection systems, including results of annual checks for effectiveness.

These records shall be made available on request to the competent authority and to the Commission.

Example Record Logsheet. Click [example record](#) to see a template for the type of information that must be recorded.

Implementation Date. The requirement for record keeping for refrigeration and air-conditioning systems containing above 3 kg of F-Gas refrigerants begins in July 2007.

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Recovering refrigerant during maintenance or plant decommissioning, using a qualified technician.

An important obligation on end users is to ensure that refrigerant is not knowingly vented to the atmosphere.

If refrigerant needs to be removed from a system (e.g. to gain access to part of a system for maintenance or during system decommissioning at the end of life) it must be properly recovered by certified personnel. For most refrigerants this requires a special recovery machine that sucks the refrigerant out of the plant and condenses it into a storage cylinder. After recovery, refrigerant must not be vented to atmosphere.

What happens to the recovered refrigerant? After recovery the refrigerant can be reused or sent for reclamation or destruction:

- **Reuse.** In some situations refrigerant can be reused directly without any further processing. For example, some refrigerant might be removed from a plant during servicing and then directly refilled back into the same plant.
- **Recycle.** In other situations it may be preferable to carry out some simple cleaning operations on the recovered refrigerant, for example to remove traces of oil and moisture. This can be carried out with portable equipment at the end user site.
- **Reclamation.** If it is vital to thoroughly clean the old refrigerant of all contaminants before it is reused then it is necessary to carry out a reclamation process, which is usually done at a major facility owned by one of the refrigerant supply companies. They are able to fully reprocess the old refrigerant and produce a recycled fluid that is indistinguishable from virgin product.
- **Destruction.** Any waste refrigerant that cannot be reused or we claimed must be destroyed. This is done by incineration in specialised facilities. Sometimes it is more cost-effective to declare used refrigerant as waste and to send it for destruction than it is to have it reprocessed. If different types of refrigerant are mixed together in the same cylinder it is usually impossible to reprocess them.

Required Qualifications. The Regulation specifies that personnel carrying out refrigerant recovery must be suitably qualified. The minimum standards for qualifications and certification of personnel and companies are set out in EC Regulation 303/2008. These requirements will need to be transposed into national legislation in each Member State of the EU. Some countries already have national qualifications that meet the new minimum requirements, but in many countries these go beyond the current training standards. Each Member State has the option of introducing a transitional period to give personnel a chance to get new qualifications that meet the minimum standards. The transitional period can run until July 2011. Member States that use the transitional period will need to define interim qualifications that are suitable during this period.

Mutual recognition of other Member State Qualifications. Any qualification that meets the new minimum standards defined in EC Regulation 303/2008 must be recognised in any country in the EU. However, interim qualifications are not recognised outside the country in which they apply.

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Category I certificate holders may carry out all refrigerant handling activities for any size of stationary RAC systems containing HFC refrigerants. This includes leakage checking, refrigerant recovery, installation, maintenance and servicing.

Category II certificate holders may carry out refrigerant recovery, installation, maintenance and servicing, in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed). Category II certificate holders may also carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

Category III certificate holders may carry out refrigerant recovery in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed).

Category IV certificate holders may carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

.Note, a Category IV technician is not qualified to carry out refrigerant recovery. Only a Category I technician can do refrigerant recovery on a plant with 3 kg or more refrigerant.

Implementation Date. The requirement for refrigerant recovery from all stationary refrigeration and air-conditioning systems containing F-Gas refrigerants begins in July 2007.

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Ozone Regulation 2037/2000

The EU Ozone Regulation is European legislation that is implementing the Montréal Protocol, which affects ozone depleting substances.

The very powerful ozone depleting substances such as CFCs (chlorofluorocarbons) and Halons have already been completely phased out under the Ozone Regulation. HCFCs, which also deplete the ozone layer although to a lesser extent, are currently in the process of being phased out under the Ozone Regulation.

For refrigeration applications the use of HCFC refrigerants in new systems is already banned and the use of HCFCs for the maintenance of existing systems will be phased out between 2010 (for virgin HCFCs) and 2015 (for recycled HCFCs).

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Refrigerants

Table 1 Refrigerant Types and Regulatory Impact

Type	Refrigerant Examples*	EU Regulation		Comments
		Ozone	F-Gas	
CFC	R11, R12, R502	✓	✗	These are already completely phased out - it is very unlikely you have any of these on site, except in very old domestic sized refrigerators.
HCFC	Pure fluids: R22 , R123, R124, R141b, R142b	✓	✗	R22 is very common in industrial refrigeration and air-conditioning.
HCFC Blends with HFCs	Blends: R401A, R401B, R401C, R402A, R402B, R403A, R403B, R408A , R411B	✓	✓	HCFC blends were introduced in mid-1990s to help with CFC phase out. Most HCFC blends <u>also contain HFCs</u> , so these refrigerants are affected by <u>both</u> Regulations.
HCFC Blends with no HFCs	R406A, R409A, R409B	✓	✗	These uncommon HCFC blends do not contain any HFC components, so are only subject to the Ozone Regulation
HFC	Pure fluids: R134a , R32, R125	✗	✓	HFCs have been used since 1995 as alternatives for CFCs and HCFCs
HFC Blends	Blends: R404A, R407C, R410A , R413A, R416A, R417A, R422D, R423A, R508, R424A, R426A, R427A, R428A, R434A, R507	✗	✓	HFC blends are used because the properties of pure HFCs do not suit all refrigeration applications.
Other	Ammonia (R717) , CO ₂ (R744), Hydrocarbons (e.g. Propane)	✗	✗	Ammonia is quite common in industrial refrigeration and is not affected by these Regulations.
Trade Names	<p>Trade names are sometimes used instead of an "R-number". The trade name is often used with the relevant R number (e.g. Harp 408A), but in some cases the trade name incorporates a completely different number (e.g. R 401A is also Suva MP39)</p> <p>Common trade names:</p> <p>Suva MP39 (R401A), MP66 (R401B), HP80 (R402A), HP81 (R402B)</p> <p>Isceon 69S (R403A), 69L (R403B)</p> <p>Dupont Isceon MO29 (R422D), 39TC (R423A), MO49 (R413A), MO59 (R417A), MO79 (R422A), MO89</p> <p>Forane FX10 (R408A), FX56 (R409A), FX57 (R409B), FX100 (R427A)</p> <p>RS RS24 (R426A), RS44 (R424A), RS45 (R434A), RS52 (R428A)</p> <p>Greencool, Harp, Klea, Solkane</p>			

* The more commonly used refrigerants are shown in bold

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Product bans on related to refrigeration and air conditioning

There are no bans in the F-Gas Regulation related to the "mainstream" use of HFCs in stationary refrigeration, air-conditioning and heat pump applications.

There are three bans related to refrigeration applications as follows:

- There will be a ban on HFC 134a used in mobile air-conditioning (i.e. air-conditioning in cars). This comes into force in 2011, and will apply to new models of car placed on the market after that date. By 2017 all new cars placed on the market will need to be using an alternative refrigerant. This ban is not part of the F-Gas Regulation but is contained in an EU Directive that was issued at the same time as the Regulation.
- There is a ban on the use of non-refillable containers for transporting HFC refrigerants. This ban came into force in July 2007. This might affect your maintenance processes but will have no direct impact on the usability of stationary systems. It is worth noting that non-refillable containers are usually only used for the maintenance of very small systems, in particular for car air-conditioning. It is unusual for companies maintaining larger refrigeration and air-conditioning systems to be using non-refillable containers.
- There is a ban on the use of HFCs and PFCs for "non-confined direct evaporation systems containing refrigerants". This ban came into force in July 2007. It applies to the very unusual situation where a product is directly cooled by an evaporating refrigerant that is then emitted to the atmosphere. For example, a food product is frozen by immersion in a bath of evaporating refrigerant liquid. Many years ago CFC refrigerants were used in this way for high-value food products. An example of a legal system of this type is the use of liquid nitrogen for direct cooling food products.

It should be noted that the comments above apply to the EU F-Gas Regulation and not to regulations in individual EU member states. Some Member States have their own Regulations that go beyond the requirements of the F-Gas Regulation. In Denmark, for example, there is a much stricter regime that bans the use of HFC refrigerants in many types of new refrigeration system, with the possibility of granting exemptions. In Austria a number of proposed HFC restrictions have been abolished due to a recent comprehensive technical review. Applications and uses of HFCs, PFCs and SF₆ which are relevant and essential for the Austrian industry are now exempted.

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Example Record Sheet

The table below shows an example record sheet for compliance with the F-Gas Regulation. Records must be kept for each plant that contains more than 3 kg of HFC refrigerant.

General Information			
Plant Name		Reference No.	
Location of plant			
Plant Operator ³			
Operator Contact ⁴			
Cooling loads served			
Refrigerant Type		Refrigerant Quantity installed (kg)	
Plant manufacturer		Year of installation	
Refrigerant Additions			
Date	Engineer ⁵	Amount Added, kg	Reason for addition
Refrigerant Removals			
Date	Engineer	Amount Removed, kg	Reason for removal. What was done with recovered refrigerant
Leak Tests			
Date	Engineer	Test Result	Follow up actions required
Follow-up Actions			
Date	Engineer	Related to test on	Actions Taken
Testing of Automatic Leak Detection System (if fitted)			
Date	Engineer	Test Result	Comments

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³ Name and address of company operating the plant

⁴ Contact details for Operator's nominated person responsible for F-Gas compliance

⁵ Identify both the Company and the actual Technician carrying out the work, with contact details – to provide evidence of competence.

Technician training and certification

A crucial aspect of the F-Gas regulation is that those personnel involved in operations that could affect the emissions of HFC refrigerants into the atmosphere are properly qualified.

The types of technician task that affect the emissions of gases include:

- Carrying out leak tests.
- Repairing leaks.
- Recovering refrigerant from a system.
- Adding refrigerant to a system.
- Building or installing a new system.
- General system maintenance involving the refrigeration circuit of an existing system.
- Decommissioning of an old system.

Specification of Minimum Training Standards for Personnel and Companies

The minimum standards for qualifications and certification of personnel and companies are set out in EC Regulation 303/2008. These requirements will need to be transposed into national legislation in each Member State of the EU. Some countries already have national qualifications that meet the new minimum requirements, but in many countries these go beyond the current training standards.

Transitional Arrangements. Each Member State has the option of introducing a transitional period to give personnel a chance to get new qualifications that meet the minimum standards. The transitional period can run until July 2011. Member States that use the transitional period will need to define interim qualifications that are suitable during this period.

Mutual recognition of other Member State Qualifications. Any qualification that meets the new minimum standards defined in EC Regulation 303/2008 must be recognised in any country in the EU. However, interim qualifications are not recognised outside the country in which they apply.

Four Categories of Qualification. EC Regulation 303/2008 defines 4 different types of qualification for personnel handling refrigerants and carrying out leak tests. Category I covers all activities for stationary RAC equipment whereas the other 3 categories are more restrictive. These 4 categories are as follows:

Category I certificate holders may carry out all refrigerant handling activities for any size of stationary RAC systems containing HFC refrigerants. This includes leakage checking, refrigerant recovery, installation, maintenance and servicing.

Category II certificate holders may carry out refrigerant recovery, installation, maintenance and servicing, in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed). Category II certificate holders may also carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

Category III certificate holders may carry out refrigerant recovery in relation to RAC systems containing less than 3 kg of fluorinated greenhouse gases (or less than 6 kg for systems that are hermetically sealed).

Category IV certificate holders may carry out leak checks on any plant provided that it does not entail breaking into the refrigeration circuit containing fluorinated greenhouse gases.

Company Certification. Any company that carries out installation, maintenance or servicing of RAC equipment containing F Gas refrigerants will require a certificate from Certification Body in their Member State. To obtain a full certificate a company will need to show:

- a) That they employ sufficient staff that hold the full F Gas personnel qualifications, as described above (in relation to the expected volume of business).
- b) That they have the necessary tools and procedures available to ensure that their staff can meet the requirements of the F Gas Regulation.

If there is no transitional period, companies must hold a Company Certificate by July 2009.

If a Member State has introduced transitional arrangements then companies must hold a full Company Certificate by July 2011. In addition, they must hold an interim Company Certificate by July 2009. The requirements for interim certificates might vary between different countries. In most cases it will be based on proof that the company employs sufficient staff that hold the interim personnel qualification.

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Company Registration

The F-Gas regulation specifies that after July 2009 contracting companies will only be able to take delivery of refrigerant if they can show that their relevant personnel hold the appropriate training and certification.

This is an important requirement that will require the set up of some form of company registration scheme in each Member State. These registration schemes will require each company to show that they have sufficient personnel holding the appropriate type of certification to prove that they have the skills necessary to handle refrigerants.

The exact format of these company registration schemes has not yet been agreed. The Figaroo website will provide updates on this issue as they become available.

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Ban on Non-refillable containers

Most major refrigeration contractors use returnable and refillable containers to transport refrigerant to their customers' sites. However, some refrigerant suppliers sell refrigerant in non-refillable containers, especially for small quantities of refrigerant. Historically, these have been popular because they avoid the complications related to keeping track of returnable cylinders. Non-refillable containers were widely used for the maintenance of car air-conditioning systems.

From the perspective of the F-Gas Regulation the use of non-refillable containers is damaging to the environment. All used refrigerant cylinders contain a small quantity of refrigerant that would be vented to the atmosphere if the cylinder is simply thrown away.

Because of this the F-Gas Regulation includes a ban on the use of non-refillable containers for the transport of refrigerants.

Implementation Date. This ban came into force on July 4th 2007.

Strictly speaking the ban applies to the filling of containers (not to the sale of them). This means that non-refillable containers filled before the ban came into force could be legally sold, but the refrigerant distributor would need to prove that the non-refillable containers he sells after 4th July 2007 have been filled before this date

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Product and Container Labels

The Regulation requires that any new refrigeration or air-conditioning product or equipment that is sold containing F-Gas refrigerants must be properly labelled. This obligation is the responsibility of the OEM for a factory charged system or the installation contractor for a site charged system.

There is also a requirement to label any containers of F-Gas Refrigerants (e.g. refrigerant cylinders).

The label must be attached on the product containing the F-Gas, if possible being placed adjacent to the service points for the addition or removal of refrigerant. Details of the label are defined in EC Regulation 1494/2007.

The label must clearly and indelibly show:

- The following text: "Contains fluorinated greenhouse gases covered by the Kyoto Protocol";
- The type of F-Gas being used, using the accepted industry nomenclature, standard to the equipment or substance.
- The quantity of F-Gas in the product.
- Hermetically sealed systems shall be labelled as such.

In addition to the labelling requirements referred to above, refrigeration and air conditioning products and equipment as well as heat pumps, which are insulated with foam blown with fluorinated greenhouse gases, before being placed on the market, shall be marked with a label containing the following text: 'Foam blown with fluorinated greenhouse gases'.

Where fluorinated greenhouse gases may be added outside the manufacturing site and the resulting total quantity is not defined by the manufacturer, the label shall contain the quantity charged in the manufacturing plant and shall provide space on the label for the quantity to be added outside the manufacturing plant as well as for the resulting total quantity of fluorinated greenhouse gases.

Information about the F-Gas used, including data on the GWP (global warming potential) should be included in the instruction manuals provided with the product or equipment.

Implementation Date. This requirement came into force in April 2008.

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Reporting Refrigerant Production and Sales

Companies affected by this requirement. Reporting requirements apply to producers, importers and exporters of F-Gases. You will need to report data if you produce, import or export **more than 1 tonne** of F-Gases per year.

The 1 tonne threshold applies separately for production, imports and exports.

Note that this definition applies to either the initial manufacture of a product in an EU country or the initial import of an F Gas product from outside the EU. For example, if your company is a wholesaler that is selling more than 1 tonne of refrigerant per year that was supplied by another company located in the EU, then the reporting rules do **not** apply.

The reporting rules only apply to bulk supplies of F Gases. If you are importing a product that contains F Gases (e.g. a piece of pre-charged refrigeration equipment) you do not need to report this import.

What information must be reported? The information requirements are as follows:

- **For producers**, you must report (a) the total production of each F-Gas that your company produces in the Community, (b) identifying the main categories of applications in which the substance is expected to be used, (c) the quantity of each F-Gas placed on the market in the Community and (d) any quantities of each F-Gas recycled, reclaimed or destroyed.
- **For importers**, you must report (a) the quantity of each F-Gas imported or placed on the market in the Community, (b) separately identifying the main categories of applications in which the substance is expected to be used and (c) any quantities of each used F-Gas it has imported for recycling, for reclamation or for destruction.
- **For exporters**, you must report (a) the quantities of each F-Gas exported from the Community and (b) any quantities of each used F-Gas exported for recycling, reclamation or for destruction.

What is meant by "main categories of applications"? Producers and importers are expected to identify the main categories of applications for which the substance that they are producing or importing is expected to be used. This is intended to be a "high level definition" as, in many cases, the producer or importer cannot know in great detail where their product will be used. The type of categorisation that is defined in the Regulation includes end uses such as mobile air-conditioning, refrigeration, air-conditioning, foams, aerosols, electrical equipment, semiconductor manufacture, solvents and fire protection.

Reporting periods. You must report data for each calendar year. The data must be communicated to the Commission by the 31st March after the end of the relevant calendar year.

Who receives the reports? You must send your reports to a representative at the European Commission and also the same information must be sent to the competent authority of the Member State concerned. The Figaroo website will provide more details about the relevant contacts in the Commission and Member States as these become available.

Implementation Date. This requirement comes into force on March 31st 2008.

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