FLUORINATED GREENHOUSE GASES

Contents

INTRODUCTION

Aim

1 The aim of this leaflet is to clarify MOD policy on the use, containment and recovery of fluorinated greenhouse gases (F gases). It also outlines the latest legislative position and the substances whose use and applications are now prohibited.

Scope

2 This leaflet applies to all personnel (including RPCs, Private Partners and other such contractors) who operate and use equipment containing fluorinated greenhouse gases.

What are Fluorinated Greenhouse Gases?

3 F gases are a family of chemicals that contain fluorine. Most F gases are very powerful greenhouse gases that contribute to climate change and global warming if emitted to the atmosphere. Measures must therefore be taken both to control and ultimately stabilise, future concentrations of greenhouse gases. The three groups of substances known as the fluorinated greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

4 Each greenhouse gas has a different capacity to cause global warming – Its global warming potential (GWP) – depending on its radiative properties, its molecular weight and its lifetime in the atmosphere. The GWP is defined as the warming influence over a set time period (often 100 years) of a gas relative to that of carbon dioxide, which is set at 1. The HFCs have GWPs in the “low thousands”, the PFCs have GWPs in the “high thousands”, and SF_6 has the highest GWP of any substance, at approximately 22,000. So although the quantities of fluorinated greenhouse gases being emitted to, and existing in, the atmosphere are small relative to the others, their manufacture and use has a significant global warming impact.

Fluorinated greenhouse gases and their properties and uses

5 The fluorinated greenhouse gases are the:

Hydrofluorocarbons (HFCs)

6 HFCs are relatively inert substances with low toxicity and (mostly) low flammability. They are normally gaseous at room temperature. They are ideally suited as refrigerants in numerous applications and over a wide range of temperature applications. They were primarily developed as alternatives to the ozone depleting CFC refrigerants and halon fire extinguishants. They are also finding increased uses as solvents in both cleaning of precision components and printed circuits and metal cleaning, in the blowing of foams, and as non-flammable aerosol propellants, especially in medical applications such as metered-dose inhalers. The most common HFC refrigerant is HFC-134a. The most common HFC fire extinguishant is HFC-227ea.

Perfluorocarbons (PFCs)

7 PFCs are inert substances with very low toxicity and flammability. The most commonly used substances are gaseous at room temperature but others in the PFC family are liquid or solid. The main use of PFC gases is in electronics production, They have found use, in relatively small quantities, as components in refrigerant blends or refrigerants in specialist applications such as supercomputers; as fire extinguishants, solvents, and tracer gases; and in medical applications such as blood substitutes.

Sulphur hexafluoride (SF_6)

8 SF_6 is an inert, non-toxic gas, with exceptional dielectric and insulating properties. It is used mainly in high- and medium-voltage electrical equipment and switchgear in the electrical transmission and distribution sector and in magnesium alloy production and casting. It is also used as a tracer gas in pressure vessel leakage tests and in occupational health studies.

MOD Uses of Fluorinated Greenhouse Gases

HFCs

9 HFCs are used by MOD mainly in:

- Naval vessel refrigeration, chilled water and air-conditioning systems;
- AFV and other vehicle crew compartment cooling systems;
- Building air-conditioning systems;
- White goods, such as domestic refrigerators, cooled cabinets and water coolers;
- Cleaning and degreasing applications;
- AFV and other vehicle engine fire protection systems;
- Aircraft engine nacelle fire protection systems; and
- Building fire protection systems, such as in computer rooms and control and operations centres.

PFCs

10 No MOD uses of PFCs have been reported to the MPTF.

SF_6

11 SF_6 is used by MOD:

- In high- and medium-voltage equipment and switchgear;
- In airborne radar systems on the Sentry aircraft; and
- As a tracer gas in occupational health investigations and assessments.

International Policy – the UN Framework Convention on Climate Change (UNFCCC)

12 The international policy objective is to tackle climate change by means of international action to reduce the emissions of certain greenhouse gases responsible for global warming. The aim is to stabilise atmospheric concentrations of the greenhouse gases at levels that will prevent dangerous human-induced interference with the climate system.

13 The UNFCCC is supported by expert advisers forming the Intergovernmental Panel on Climate Change (IPCC) and, in recognising the close linkage between policies on ozone depleting substances and the fluorinated greenhouse gases, the Montreal Protocol's Technical and Economic Assessment Panel (TEAP).

14 Further information on the UNFCCC and international climate change policy, is available at:

http://unfccc.int/2860.php

European Union Policy

15 European policy on fluorinated gases was developed from a steering group, tasked to study the impact of fluorinated gases within the first of two parts to the EU Climate Change Programme (launched in 2000). Further the European Union is committed to reducing its emissions of the greenhouse gases in line with its legal obligations under the Kyoto Protocol, and to lead the international community's efforts in achieving the objectives of the UNFCCC. As part of this, policy on the fluorinated greenhouse gases is focused on improved containment, controls on unnecessary uses, improved reporting of production, usage and emissions, and encouraging the development and use of lower GWP alternatives. The second part of the Programme will review the impact of this regulation and amend it if necessary to meet the objectives of the Programme.

16 Further information on the EU Climate Change Programme can be viewed at:

http://ec.europa.eu/environment/climat/eccp.htm

UK Government Policy

17 The Government is committed to reducing the UK's emissions of the greenhouse gases in accordance with EU and international policy.

18 As part of this commitment, it is the government's policy that:

- HFCs should only be used where other safe, technically feasible, cost effective and more environmentally acceptable alternatives do not exist;

- HFCs are not sustainable in the long term – the Government believes that continued technological developments will mean that HFCs may eventually be able to be replaced in the applications where they are used;

- HFC emission reduction strategies should not undermine commitments to phase out ozone-depleting substances under the Montreal Protocol;

- HFC emissions will not be allowed to rise unchecked.

19 The policy takes account of the fact that HFCs are used in a wide range of applications and that they will continue to have a role in these applications where there are no acceptable alternatives. At the same time, industry and users are being given a clear signal to look closely at all the alternatives and to select those that are more acceptable where they do exist.

20 The policy also takes account of energy efficiency. The Government recognises that, over recent years, industry has made significant improvements in the energy efficiency of equipment but it believes there are opportunities for further gains. The scope for improving energy efficiency mainly depends upon the size, design, maintenance and operation of the equipment. The choice of refrigerant, for example, can have an impact but this is normally less significant over the life of the equipment. It is noted that the use of HFCs in insulation foams can in certain applications provide higher energy savings than other types of insulation.

21 Government policy on fluorinated greenhouse gases, including the implementation of EU legislation can be viewed at:

http://www.defra.gov.uk/environment/quality/air/fgas/index.htm

22 For a broader context of the role of policy on fluorinated gases within the overall UK climate change policy, see the UK Climate Change Programme, which can be viewed at:

http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/programme/programme.aspx

MOD Policy

23 It is MOD policy to minimise the Department's use and emissions to atmosphere of the fluorinated greenhouse gases, consistent with the Department's policy and the legislative constraints on its use of ozone depleting substances.

24 The policy on the fluorinated greenhouse gases forms one part of the MOD's Climate Change Strategy, which is available at: http://defenceintranet.diiweb.r.mil.uk/DefenceIntranet/Library/CivilianAndJointService/BrowseDocumentCategories/SafEnvFire/ModClimateChangeStrategy.htm

INTERNATIONAL AND UK LEGISLATION

International legislation – The Kyoto Protocol

25 The international legislative framework for the fluorinated greenhouse gases is provided by the Kyoto Protocol, which was adopted in 1997. The Protocol implements the provisions of the UNFCCC and sets legally binding emissions targets for industrialised countries.

26 The Kyoto Protocol tackles emissions of the six principle categories of greenhouse gas: carbon dioxide, methane, nitrous oxide, HFCs, PFCs and SF_6. Overall, the Parties of Annex I to the Framework Convention – the major industrial nations – are required to reduce their total greenhouse gas emissions by at least 5% below 1990 levels during the period 2008 to 2012. Annex B to the Protocol specifies the obligation of each individual Party. Parties may meet their obligations using means of their own choosing, and may utilise a number of flexible mechanisms enshrined in the Protocol that continue to be refined. The target applies to the "basket" of gases, and not to each gas category.

27 Further information on the Kyoto Protocol is available at:

http://unfccc.int/kyoto_protocol/items/2830.php

European Union Legislation

28 Member States of the European Union have ratified the Kyoto Protocol and have agreed to act collectively to ensure that their obligations are met. The EU as a whole must ensure that its emissions of the greenhouse gases are reduced to 8% below 1990 levels by 2008-2012. Furthermore, Member States have agreed to share out the commitment according to each country's circumstances and its ability to reduce emissions. Under this burden-sharing agreement, the UK is required to reduce its emissions by 12.5% over the implementation period.

29 The EU has developed a package of legislation to ensure that the Union's collective greenhouse gas emissions obligation is met. The legislative package has two elements. The first and the most relevant to defence is Regulation EC842/2006 on certain fluorinated gases, which entered into force on 4 July 2007. The objective of the regulation is to reduce emissions by regulating containment, recovery, usage and marketing prohibitions of the three groups of fluorinated gases: HFCs, PFCs, and SF_6, and preparations containing them. The second is a Directive 2006/40/EC relating to emissions from air-conditioning systems in motor vehicles, which phases-out HFCs in vehicle air-conditioning systems with a GWP of more than 150.

30 A review will be undertaken four years after application. The expected EU-wide emission reductions by 2012 are 21 Mt CO_2eq and 40-50 Mt CO_2eq by 2020, compared to business-as-usual levels (~70 Mt CO_2eq).

31 Regulation EC 842/2006 can be viewed at:

http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_161/l_16120060614en00010011.pdf

32 This Regulation applies to:

- Cooling circuits of refrigeration, air conditioning and heat pump equipment;
- Equipment containing fluorinated greenhouse gas based solvents;
- Fire protection systems and fire extinguishers; and
- High voltage switch gear.

33 The main requirements of the Regulation are:

On Containment

34 All users of the substances must take all measures that are technically feasible and cost effective to prevent and minimise emissions of the fluorinated greenhouse gases, to include the inspection of equipment and the maintenance of records on the quantity and type of gas installed and the amounts added and recovered during servicing. There is also a requirement to recover fluorinated greenhouse gases from all products and equipment prior to disposal unless it is not technically feasible to do so, or if the cost of doing so is disproportionate. Both service and recovery of fluorinated gases must be carried out by a person who is appropriately qualified to do so. See paragraphs 50-75 for further information on training requirements.

35 Operators of stationary equipment applications which contain 300 kg or more of fluorinated gases must have a leakage detection system installed, which is defined under the Regulation as “a calibrated mechanical, electrical or electronic device for detecting leakage of F-Gases, which, on detection, alerts the operator”. For fire protection systems installed before 4 July 2007 that contain 300 kg or more of fluorinated gases, there is a 3 year derogation from this requirement. In the case of fire protection systems where there is an existing inspection regime in place to meet ISO 14520 standard, these checks will also fulfil the obligations of this Regulation as long as they are as frequent as those specified in the schedule below.

36 The table below indicates the frequency and reporting requirements of leakage checks required by the Regulation. Where leakage detection systems are installed the frequency of inspections required is halved.

Table 1 Overview of effect of Regulation on servicing requirements

Mass of charge gas contained (m)	*Leakage detection system required to be installed?*	*Frequency of leakage checking required*		*Records required*
		Without leakage detection system	*With leakage detection system*	
m < 3 kg		N/A	N/A	N/A
m < 6 kg (if labelled hermetically sealed)		N/A	N/A	Yes, records to be kept on quantity & type of fluorinated gas installed, any quantity added & quantity recovered during servicing/maintenance & final disposal. Records should also state any other relevant info including the identification of company or technician who performed the maintenance task & results & dates of leakage tests.
3 kg ≤ m < 30 kg		Every 12 months	Every 12 months	
30 kg ≥ m < 300 kg		Every 6 months	Every 12 months	As above plus: Information identifying the separate stationary equipment with more than 30 kg of F-Gases.
m ≥ 300kg		N/A Must have leakage detection systems	Every 12 months	As above plus: Information identifying the separate stationary equipment with more than 30 kg of F-Gases.

<u>On Reporting</u>

37 Operators of equipment referred to in Para 32 are required to maintain records for each leakage maintenance task carried out, in accordance with the reporting requirements described in Paragraph 86 and in the table above. Reporting requirements only apply to the relevant applications where the charge gas exceeds 3 kg in mass.

38 Producers, importers and exporters of more than one tonne of fluorinated greenhouse gases per year must report to the Commission the quantities of gases produced, imported, exported, recycled and destroyed. In addition they will have to provide information on the likely use of the gases and estimates of expected life-cycle emissions.

Labelling

39 Products and equipment placed on the market containing fluorinated gases in any form must be appropriately labelled, as well as containers of these gases. The label must include the chemical name of any fluorinated gases present which are covered under the Kyoto protocol, using the accepted industry nomenclature, as well as the respective quantity installed. This must be clearly labelled on the product or equipment, adjacent to the service points for charging or recovering the fluorinated greenhouse gas, or on the part of the product or equipment which contains the fluorinated greenhouse gas. Hermetically sealed systems must also be labelled as such.

Use and Marketing Restrictions

40 Regulation EC 842/2006 prohibits the use of sulphur hexafluoride, in any form or quantity, for the filling of vehicle tyres.

41 Production and placing on the market of certain fluorinated greenhouse gases in certain applications has been prohibited from specific dates, such as the use of HFCs in novelty aerosols and the use of PFCs in fire-fighting equipment. The full list of products and equipment covered by these restrictions, and their associated dates of prohibition can be found in Annex A of this leaflet.

42 Products which can be shown to be manufactured before their relevant date of prohibition are exempt from these restrictions.

Use and Marketing Restrictions relating to Vehicle Air-Conditioning Systems

43 Air-conditioning systems in passenger and light commercial vehicles using a fluorinated greenhouse gas with a GWP greater than 150 must initially meet certain leakage requirements before that class of vehicle can be placed on the market. Subsequently, between 2008-2017 air-conditioning systems that contain HFCs with a GWP above 150 will be phased-out.

UK Legislation

44 Regulation EC 842/2006 on certain fluorinated greenhouse gases is directly applicable in the UK. The following legislation provides further UK specific requirements for meeting the EU regulation.

45 The Fluorinated Greenhouse Gases Regulations 2009 (S.I. 2009 No. 261) put in place offences and penalties applicable in Great Britain to infringements of provisions of the EC F Gas Regulation. It is available at: http://www.opsi.gov.uk/si/si2009/uksi_20090261_en_1

46 The Fluorinated Greenhouse Gases (Northern Ireland) Regulations 2009 (SR 2009 No. 184) put in place offences and penalties applicable in Northern Ireland to infringements of the EC F Gas Regulation. It is available at: http://www.opsi.gov.uk/sr/sr2009/nisr_20090184_en_1

PROCEDURES FOR IMPLEMENTATION OF MOD POLICY

Policy Development and Implementation Management Responsibilities

47 The management focus within the MOD for fluorinated greenhouse gas issues is the Montreal Protocol Task Force (MPTF). The MPTF is responsible for supporting DBR-SSD&C in the development of the Department's fluorinated greenhouse gas policies and providing assurance that the policies are being implemented satisfactorily. It also co-ordinates all related activities. The MPTF is chaired by DBR-SSD&C which also provides a technical secretariat. Its membership comprises representatives from all areas of MOD. For more information on the MPTF Terms of Reference and its membership please contact DBR-SSDC-SD1@mod.uk or DBR-SSDC-SD1a@mod.uk.

48 The MPTF is also responsible for formulating policy on, and providing assurance on, the use and emissions of the ozone depleting substances.

Responsibilities of users

49 Project Team Leaders, Project Sponsors, Equipment, Property and Facilities Managers and others, (including RPCs, Private Partners and other such contractors), who are responsible for equipment or facilities or procedures which use, or might use, a hydrofluorocarbon (HFC), a perfluorocarbon (PFC) or sulphur hexafluoride (SF_6), in refrigeration, fire protection, solvent cleaning or other applications – the *responsible authority* – shall ensure that:

- All uses of the substances are identified, described and reported centrally on an annual basis[1];
- A strategy exists to minimise use and emissions of the fluorinated greenhouse gases and to ensure that more environmentally acceptable alternatives are evaluated and used wherever they are suitable; and

[1] This information can be supplied on the proforma given in Annex F to the Ozone Depleting Substances Lflt or could be sent as a copy of the information/data which operators of equipment containing fluorinated greenhouse gases are mandated to collect and gather and make available to the competent authority and the Commission if requested.

- A plan exists and is regularly reviewed to implement the strategy in order to comply with the Department's fluorinated greenhouse gas policies and current legislation.

Training

50 The UK transposing Statutory Instruments entitled the Environmental Protection (The Fluorinated Greenhouse Gas Regulations) 2009 S.I. 2009 No. 261 (for Great Britain) and the Fluorinated Greenhouse Gases (for Northern Ireland) Regulations 2009 SR 184 make it an offence for personnel to undertake certain activities involving fluorinated greenhouse gases unless they are suitably qualified.

51 These activities fall under the following headings:

- Stationary[2] refrigeration, air conditioning and heat pump equipment (RAC)
- Air conditioning systems in certain motor vehicles (MAC)
- Fire protection systems and fire extinguishers
- High-voltage switchgear
- Fluorinated greenhouse gas-based solvents

Training Requirements – Refrigeration and Air Conditioning (RAC)

52 A further Commission Regulation EC 303/2008 provides extra details and defines the training and certification requirements for stationary RAC systems. Both the EC Regulations (EC 303/2008 & 842/2006) provide the basis for both interim and full training and reporting requirements.

53 The GB Fluorinated Greenhouse Gases Regulations 2009 (S.I. No.261) list the minimum qualifications that are acceptable in the interim period (until Jul 2011) **and also** the certification and evaluation bodies that provide stationary equipment qualifications that meet the **full** requirements of EC 303/2008 for RAC.

54 Full qualifications are required after the 04 Jul 2011 (see Table 2 below)

55 Interim qualifications are acceptable until this date. Two interim certificates if gained before the 9 Mar 2009 for refrigerant quantities >3 kg or more are:

- City & Guilds Certificate in Handling Refrigerants Scheme 2078
- Construction Industry Training Board (CITB) Safe Handling of Refrigerants J01.

[2] 'Stationary' is defined within the legislations as, "not normally in transit during operation".

If refrigerant quantity is <3kg an acceptable interim certificate is an in-house qualification[3] (if obtained before 9 Mar 2009).

56 From 04 Jul 2011 all personnel wishing to work on RAC systems containing or designed to contain fluorinated greenhouse gases need to hold a full certificate appropriate for the activities they will be undertaking, issued by one of the bodies listed below, or have a European qualification recognised under EC F gas Regulation 842/2006.

57 For personnel working in the RAC sector, there are four different levels of certification, which allow personnel to carry out different activities. Note that **Category I** covers all activities whereas the other 3 categories are more restrictive:

Category I certificate holders may carry out all of the following activities for any size of RAC systems containing HFC refrigerants – 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.

58 RAC qualifications that meet the minimum requirements have been introduced. The two certification and evaluation bodies named in the Fluorinated Greenhouse Gases Regulations 2009 (S.I. No. 261) are:

- City & Guilds (C&G)
- Construction industry Training Board (CITB)

Both have courses that meet the minimum requirements of EC 303/2008.

[3] An In-house qualification is defined in the Fluorinated Greenhouse Gases Regulations 2009 (S.I. 2009 No.261) and means a qualification verified by a certificate of competence or other written confirmation issued by an employer to such of its employees who have successfully completed a course of training provided by that employer relating to the work in question.

Table 2: Qualifications that meet the minimum Requirements **for RAC**

Level	Certification and Evaluation Bodies	
	City & Guilds	CITB
Category I	2079-11 City and Guilds Level 2 Award in F Gas and ODS Regulations: Category I	J11 Category I – leak checking, recovery, installation, service and maintenance of equipment
Category II	2079-12 City and Guilds Level 2 Award in F Gas and ODS Regulations: Category II	J12 Category II – installation, service and maintenance of equipment with a charge of less than 3kg, (6kg if hermetically sealed) and leak checking
Category III	2079-13 City and Guilds Level 2 Award in F Gas and ODS Regulations: Category III	J13 Category III – recovery of refrigerant
Category IV	2079-14 City and Guilds Level 2 Award in F Gas and ODS Regulations: Category IV	J14 Category IV – leakage checking

59 Holders of any of these stationary equipment qualifications are deemed holders of a valid certificate for the purposes of the EC F-Gas Regulation and Commission Regulation 303/208.

60 The three exemptions from Personnel Qualifications are as follows:

- Trainees are exempt for up to 2 years, but they must work under the supervision of a person with an appropriate personnel qualification (including an interim certificate) and must be enrolled on a relevant training course.

- Personnel only undertaking brazing, soldering or welding on a piece of RAC equipment would be exempt if they hold a nationally recognised qualification to undertake such activities and if they are supervised by a person holding an appropriate personnel certificate (including an interim certificate) to undertake installation of F Gas containing equipment.

- Personnel undertaking recovery of F Gases from “waste equipment” under the WEEE Regulations with an F Gas charge <3kg, in premises covered by a suitable permit and have completed a training course on the minimum skills and knowledge corresponding to Category III that is verified by an attestation of competence issued by the permit holder.

60 For further information on any of the training and qualification requirements see: http://www.defra.gov.uk/environment/quality/air/fgas/sectors/rac.htm

Training Requirements – Mobile Air Conditioning (MAC)

61 The MAC Directive is concerned with MAC systems used in cars and light vans (M1 and N1 class 1) and is therefore usually aimed at vehicle manufacturers, MAC system suppliers and those organisations carrying out retrofitting of MAC systems and those refilling or servicing the systems. The MAC Directive does therefore not apply to military class vehicles which are not N1 or M1 class.

62 However, should maintenance, servicing and recovery etc take place on larger and different types of military vehicles it is necessary for the operator to have undertaken one of the other EC minimum qualifications (as shown in Table 2) to demonstrate compliance i.e. for work on stationary RAC and MACs in other forms of transport. The MOD therefore considers that obtaining City & Guilds 5101-301 Refrigerant Handling for Mobile A/C Systems, as the best choice of qualification based on the tasks that are generally carried out by engineering tradesmen. However, should personnel already hold the City and Guilds 2079-11 Level 2 Award in F Gas and ODS Regulations, then this can also be deemed as a suitable qualification.

63 For those personnel that are required to carry out certain operations on MAC systems of class M1 and N1 vehicles (cars and light vans) the following paragraphs shall apply.

64 From 04 Jul 2010 all personnel carrying out certain operations on MAC systems containing Fluorinated greenhouse gases (including the removal of F gas refrigerants from all mobile equipment when the air-conditioning systems are under maintenance or prior to disposal of the equipment) must hold full qualifications.

65 The qualifications that meet the EC minimum requirements are available from four awarding bodies and shown below in Table 3.

Table 3: Details of Certification and Evaluation Bodies and Qualifications offered

Certification and Evaluation Body	Qualification
City & Guilds of London Institute	C&G 5101 This course has 3 units; completion of all units gives you a VRQ Level 3. • 301 Refrigerant Handling for Mobile A/C Systems* • 302 Testing and Servicing Mobile A/C Systems • 303 Advanced diagnostics for Mobile A/C Systems It is possible to take the 301 unit only (*) as it is sufficient to meet the minimum requirements.
The Institute of the Motor Industry (IMI)	There are 3 levels of qualification offered by the ATA route. Each meets the minimum requirements. • Automotive Technician Accreditation (ATA) Air conditioning Refrigerant Handler (Qual Ref: IMIA/AC08/1). • ATA Air Conditioning – Service Technician (Qual Ref: IMIA/AC08/2) • ATA Air Conditioning – diagnostic Technician (Qual Ref: IMIA/AC08/3)
IMI Awards Ltd	• IMIAL Level 3 Award in Automotive Refrigerant Handling (EC 842/200) (QCF) Qual No. 500/6771/0* • IMIAL Level 3 Certificate in Automotive Air Conditioning and Climate Control (EC 842/2006) QCA I.D No. 500/4229/4 *The Award is sufficient to meet the minimum requirements.
The Institute of Road Transport engineers (Irtec)	• Certificate of competence in refrigerant handling for light commercial vehicles. This qualification is not currently available.

66 During the Interim period (until 4th Jul 2010), one of the qualifications listed in Schedule 1 (Parts 1 & 2) of the Fluorinated Greenhouse Gases Regulations 2009 (S.I. 2009 No. 261) must be held by all MAC personnel involved in refrigerant recovery and refrigerant handling. The web link to the qualifications listed in Schedule 2 is: http://www.opsi.gov.uk/si/si2009/uksi_20090261_en_6

Training Requirements – Fire Protection Systems and Fire Extinguishers

67 Personnel carrying out certain operations on fire protection equipment and systems containing F gases must ensure that they have the appropriate qualifications. End user companies & organisations (such as MOD – "operators") have an obligation to ensure that they only use contractors and/or in-house personnel with these qualifications to work on their fire protection systems. Personnel need to hold a valid certificate to prove this.

68 By 4 July 2010, all personnel whether they be in-house staff or fire protection contractors wishing to work on fire protections systems containing F gases need to hold a full certificate that meets the minimum requirements for certification of personnel handling F gases as set out in Commission Regulation 304/2008. Personnel wishing to undertake installation, servicing and maintenance on fire protection systems containing 3 kg of more of F gas need to hold either:

- Fire Industry Association (FIA) F-Gas Competency Certificate Course Class I; or
- European qualification recognised under mutual recognition provisions.

69 All companies undertaking work with fire protection systems need to hold Company Certification from the FIA if they employ personnel to carry out installation, maintenance or servicing on systems. This provides a means for the operator to verify the scope and certification of the company and personnel it employs to install maintain and service its fire protection systems.

70 More information is available from the FIA on www.fia.uk.com or email info@fia.uk.com or Tel: 020 8549 5855.

Training Requirements – High Voltage Switchgear containing SF_6

71 Personnel carrying out activities resulting in the recycling, reclamation or destruction of SF_6 from switchgear must have appropriate qualifications. End user companies are obliged to ensure they only use personnel, be they contractors or in-house staff that have the appropriate qualifications to undertake activities which require the recovery of SF_6 from switchgear.

72 The qualification requirements apply to all personnel undertaking activities that require the recovery of SF_6 from switchgear.

73 The minimum requirements for certification of personnel recovering SF_6 from switchgear are set out in Commission Regulation 305/2008. These requirements probably go beyond the content of previous qualifications or in-house training. From 3rd Jul 2009 all personnel wishing to recover SF_6 from switchgear need to hold a full personnel certificate that meets these minimum requirements.

74 Personnel wishing to undertake recovery of SF_6 from switchgear need to hold either:

- One of the GB qualifications that meet the minimum requirements (listed on page 2 of the following web link) http://www.defra.gov.uk/environment/quality/air/fgas/documents/fgassupport-scs5.pdf

- A European qualification recognised under mutual recognition provisions. This will only apply to "full qualification" that meets the minimum requirements specified in EC 305/2008.

Restrictions on new uses

75 New designs of equipment and new installations shall not use, require the use of, or incorporate, any PFC.

76 New equipment and facilities shall not use or require the use of HFCs and SF_6 where technically feasible, safe, and environmentally preferable alternatives are available. Contracts for new equipment and facilities shall not specify the use of HFCs or SF_6 and offers by contractors of equipment that utilises or requires these substances should be challenged and a justification for an HFC or SF_6 solution obtained and evaluated.

77 The decision to procure equipment for which a fluorinated greenhouse gas is but one option should take into account, amongst other things:

- Cost and performance over the full equipment life cycle;

- The total equivalent warming impact (TEWI) of feasible solutions, taking into account the warming impact of CO_2 from energy used by the equipment as well as the likely emissions of the fluorinated greenhouse gases themselves from the equipment concerned; and

- Specific uses which are prohibited by Regulation 842/2006 (Annex I).

Restrictions on existing uses

78 Users may continue to procure supplies of the fluorinated greenhouse gases as required to support existing applications.

79 The responsible authority shall ensure that the existing uses are within the remit of the current legislation and that requirements for reporting and responsible management outlined in this Leaflet are complied with.

Alternative substances and methods

80 Commercially available alternatives to the HFCs exist for many applications. For example, domestic refrigerators and small air-conditioning units utilising hydrocarbon refrigerants are readily available. Contractors and suppliers should be consulted.

Responsible management

81 In order to comply with Regulation EC 842/2006 and Section 33 of the Environmental Protection Act 1990, all users of the fluorinated greenhouse gases are required to follow certain codes of practice.

82 The responsible authority shall ensure that:

- All practicable measures are taken to recover the substances during servicing, maintenance and decommissioning of equipment, or prior to disposal of the equipment (the only exemption to this rule is if the products or equipments containing F gases are serving on military operations);

- All precautionary measures practicable are taken to minimise leakages and prevent avoidable emissions of the substances during equipment operation;

- All stationary refrigeration systems containing a refrigerant charge of greater than 3 Kg are monitored for leakage and appropriate records are actively maintained. The frequency of monitoring shall be linked to the installed charge of the equipment. Thus:

  - Equipment containing 300kg or more of refrigerant shall be inspected at least monthly,

  - Equipment containing 30kg or more of refrigerant shall be inspected at least quarterly,

  - Equipment containing 3kg or more of refrigerant shall be inspected at least annually;

- Maintenance engineers and other personnel who handle the substances are suitably trained and qualified to an appropriate standard and are competent to undertake their tasks. Minimum qualification standards are defined in the UK transposing S.I. (see paragraphs 50-75).

- Any events that result in a significant accidental or avoidable loss of any of the substances are investigated and appropriate measures taken to prevent a recurrence. A record should be retained of the investigation and actions taken.

83 The deliberate or negligent venting or discharge to atmosphere of any of the substances, as a means of disposal or in other avoidable circumstances, is a criminal offence.

Servicing requirements

84 In order to comply with the reporting requirements for the UK government, the MOD will require all technicians who work with equipment listed in paragraph 32 to record the following information each time any servicing or maintenance is carried out. This includes:

- Quantities installed and used during the year, by application category;
- An estimate of the quantities emitted to atmosphere;
- Quantities added and recovered during each period of servicing, maintenance, and disposal; and
- Identification of the company or technician who performed the servicing or maintenance, as well as the dates and results of the checks carried out.

Reporting requirements

85 Regulation EC 842/2006 requires the UK government to submit information to the European Commission on the usage and emissions of the fluorinated greenhouse gases. It is Government and MOD policy (endorsed by the SDEB) that MOD must contribute to this reporting and also collect information as part of its Climate Change Strategy. TLBs must therefore collect and submit data annually on <u>all</u> applications of HFCs, PFCs and SF_6, to include:

- Quantities installed at the year-end and used during the year, by application category;
- Quantities added and recovered during each period of servicing and maintenance, and disposed of;
- An estimate of the quantities emitted to atmosphere during the year;
- A narrative on measures taken or being taken to minimise emissions to atmosphere;
- A narrative on progress being made in any replacement or conversion programmes; and
- Information identifying separate stationary equipment (within each system) with more than 30 kg of fluorinated gases.

86 The information that is required is detailed in Annex F to Leaflet 7, Ozone Depleting Substances, which may serve as a suitable proforma. The information shall be submitted by the responsible authority, wherever possible in an electronic format, to the appropriate TLB representative at each significant procurement or usage event, or collated for each *calendar year* by 31 March of the following year.

87 Annex B lists a number of material designations and common or trade names of products that may contain these substances.

88 The responsible authority shall also notify the appropriate TLB member of all events that result in a significant accidental or avoidable loss of any fluorinated greenhouse gas. All such single-event discharges of greater than 25kg of any gas shall then be notified by the appropriate TLB member to DBR-SSD&C. The notification of the event should include a concise description of the circumstances, the outcome of the investigation and a description of measures taken to prevent a recurrence.

Disposal of recovered and unwanted fluorinated greenhouse gases

89 Fluorinated greenhouse gases that are recovered during maintenance procedures or from decommissioned systems shall be recovered for recycling, reuse or safe disposal. If not needed by the user concerned, the substances may be offered, in the first instance, to the DFG point of contact (DFG OPS-INDGASEO) for recycling and possible use in support of other MOD applications. If recycling is not feasible or cost-effective, the substances will require environmentally-safe disposal, using an approved process and by an authorised contractor, with due regard for the Duty of Care. The costs of disposal shall be borne by the user area.

Further guidance

90 Further advice and guidance on any of the policy matters or management duties described in this section can be obtained from the appropriate MPTF member or the Sustainable Development Team via DBR-SSDC-SD1@mod.uk or DBR-SSDC-SD1a@mod.uk .

ANNEX A

PLACING ON THE MARKET PROHIBITIONS IN ACCORDANCE WITH ARTICLE 9 OF REGULATION EC 842/2006

Fluorinated greenhouse gases	Products and equipment	Date of prohibition
Fluorinated greenhouse gases	Non-refillable containers	4 July 2007
Hydrofluorocarbons and perfluorocarbons	Non-confined direct-evaporation systems containing refrigerants	4 July 2007
Perfluorocarbons	Fire protection systems and fire extinguishers	4 July 2007
Fluorinated greenhouse gases	Windows for domestic use	4 July 2007
Fluorinated greenhouse gases	Other windows	4 July 2008
Fluorinated greenhouse gases	Footwear	4 July 2006
Fluorinated greenhouse gases	Tyres	4 July 2007
Fluorinated greenhouse gases	One component foams, except when required to meet national safety standards	4 July 2008
Hydrofluorocarbons	Novelty aerosols	4 July 2009

Products placed on the market which can be shown to have been manufactured before their respective date of prohibition are exempt.

ANNEX B

COMMON AND TRADE NAMES OF PRODUCTS THAT MAY CONTAIN FLUORINATED GREENHOUSE GASES

Controlled Chemicals	Possible Trade- and Alternative Names
HFCs	AZ-20, AZ-50 R23, R32, R125, R134a, R143a, R152a, R236fa FE-13, FE-25, FE-36, FM200 Asahiklin, Dymel, Forane, Formacel, Frigc, Genesolv, Vertrel, Genetron, Isceon, Klea, Solkane, Suva,
HFC-containing blends	R401A, R401B, R401C, R402A, R402B R404A, R407A, R407B, R407C, R408A, R410A, R410B, R411B, R413A, R415A Isceon 59, Isceon 89 RX3
PFCs	PFC or R-14, -116, -218, -318 CEA 308, CEA 410, CEA 614
PFC-containing blends	R403A, R403B, R412A R413A R508A, R508B, R509A Isceon 89 RX3
SF_6	

- Some of these trade names may be associated with products that do not contain any of the fluorinated greenhouse gases. In most cases, the name will often be accompanied by a code or number that can be used to identify the product's composition.

- The table is for guidance only and is not intended to be a complete list of products that might contain HFCs, PFCs or SF_6.

ANNEX C

ASSURANCE QUESTIONS

The purpose of these question sets is not for delivery bodies to provide answers to each question. However, they should be useful for the delivery body in stating their assurance level. If full assurance cannot be given, a short explanation of the problem area/s and the actions which are being taken to improve the assurance level is required.

Questions

1. How are legislative requirements met and updated?

2. How is the usage, containment, recovery and marketing of the HFCs, PFCs and SF_6 fluorinated gases regulated?

3. How is the TLB/TFA managing the phase-out of HFCs in vehicle air conditioning systems with a GWP of above 150?

4. How do sites manage the containment and leaking reporting requirements of fluorinated gases?

5. How is the training of personnel managed for each of the different activities involving fluorinated gases?

6. How are accidental emissions of fluorinated gases investigated?

7. How are the responsible authorities ensuring that:
   - use and emissions of the fluorinated gases is minimised;
   - that environmentally acceptable alternatives to fluorinated gases are used where technically and economically feasible;
   - that new designs and installations do not incorporate or use PFCs, HFCs or SF_6?

8. How many sites during the last annual reporting audit period received either no assurance or limited assurance? How is this being remediated?

9. On the basis of your responses to the questions, and the guidance that is provided in JSP 418, what level of assurance do you believe applies for your compliance with this policy area?

DIA Assurance Classifications

- **Full assurance** - The frameworks of governance, risk management and control should ensure effective, efficient and economic achievement of the business objective. Risks that threaten the achievement of that objective are adequately managed.

- **Substantial Assurance** - Weaknesses identified in governance, risk management or control frameworks. Achievement of the business objective is threatened by inadequate management of medium or low category risks.

- **Limited Assurance** - Weaknesses identified in governance, risk management or control frameworks. Achievement of the business objective is threatened by inadequate management of high category risks.

- **No Assurance** - The frameworks of governance, risk management and control do not support effective, efficient and economic achievement of the business objective