Level 3 Certificate in Mobile Air Conditioning Systems (5101)

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Unit 1 Refrigerant Handling for Mobile Air Conditioning Systems – Supplementary information

‘F Gas Regulations’.

EC Directive 2006/40/EC
EC Regulation 842/2006

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Introduction

This document explains additions and changes to EC regulations that were brought into force after September 2008. By working through this document, holders of the original City & Guilds mobile air conditioning unit 301 (those that took the unit before 30 October 2008) will have the necessary knowledge to meet the current EC and UK Government requirements. Learners that have completed unit 301 since 1 November 2008 would already have received the information contained within this document as part of the syllabus.

Summary of Key Obligations under the EC 'F Gas' Regulation.

The Information within the regulations refer to "MAC systems", these are **mobile air-conditioning systems** fitted in vehicles to cool the internal environment to a comfortable ambient temperature.

The MAC Directive specifically applies to cars and light vans (i.e. M1 and N1 class 1 vehicles as defined in Section B of Annex II of Directive 70/156/EEC).

The obligations regarding recovery of refrigerants in the EC 'F' gas Regulation apply to all types of vehicle.

The vast majority of vehicles using MAC systems use Hydrofluorocarbon (HFC) refrigerants, which are Fluorinated 'F' gases. Normally, this is HFC-134a.

When F gases are used in MAC systems, the servicing or dismantling company must ensure that it meets the requirements in EC Regulation 842/2006 and the GB Fluorinated Greenhouse Gases Regulations 307/2008 (Statutory Instrument No 41).

This is EC Directive 2006/40/EC, which aims to control the rate of leakage of HFC 134a in new MAC systems and to phase out the use of HFC 134a or any other fluorinated greenhouse gas with a Global Warming Potential (GWP) higher than 150 in new MAC systems.

EC Regulation 842/2006

The obligations under the 'F' gas regulations which will affect the motor vehicle sector for servicing and dismantling companies:

- Taking delivery of Fluorinated Greenhouse gasses.
- The efficient recovery of systems containing Fluorinated gasses during servicing, repair and dismantling (end of life).
- The handling of refrigerant cylinders (included non-refillable) and their complete recovery prior to disposal.
- The training and certification of refrigerant handlers.

The commission published the minimum requirements for refrigerant handling on the 2nd April 2008. The EC 'F Gas' Regulation requires and lays out the current qualifications and certification requirements which will apply after the 4th July 2010, with only personnel possessing one of these qualifications will be considered as qualified to take delivery, handle and recover fluorinated refrigerant gases:

Recovery	Refrigerant recovery during vehicle maintenance and at end of vehicle life.
Training	Use of personnel with prescribed minimum qualifications.

The requirements to meet (EC) No. 307/2008) has been adopted by City & Guilds of London Institute (C & G) as one of the UK recognised Awarding bodies to offer Refrigerant handling Qualifications.

The Minimum requirements as to the skills and knowledge to be covered by the training programmes are shown in the table below:

The training course referred to in Article 3(2) shall cover the following:

(a) a theoretical module as indicated in the column 'Module type' by (T);
(b) a practical module where the applicant shall perform the corresponding task with the relevant material, tools and equipment, as indicated in the column 'Module type' by (P).

Minimum knowledge and skills		**Module type**
1. **Operation of air-conditioning systems containing fluorinated greenhouse gases in motor vehicles, environmental impact of fluorinated greenhouse gas refrigerants and corresponding environmental regulations**		
1.1	Basic knowledge of the operation of air-conditioning systems in motor vehicles	**T**
1.2	Basic knowledge of the use and properties of the fluorinated greenhouse gases used as refrigerants in air-conditioning systems in motor vehicles, the impact of the emissions of these gases on the environment (order of magnitude of their Global Warming Potential in relation to climate change)	T
1.3	Basic knowledge of the relevant provisions of Regulation (EC) No 842/2006 and Directive 2006/40/EC	T
2 Environment-friendly recovery of fluorinated greenhouse gases		
2.1	Knowledge of common procedures for recovering fluorinated greenhouse gases	P
2.2	Handling a refrigerant cylinder	P
2.3	Connecting and disconnecting a recovery set to and from the service ports of a motor vehicle air-conditioning system containing fluorinated greenhouse gases	P
2.4	Operating a recovery set	P

Non-refillable Containers

EC F Gas Regulation Article 9.1.
The placing on the market of non-refillable containers filled after 4th July 2007 is banned. This is a very important obligation for the car servicing industry. Historically the use of non-refillable containers to supply HFC 134a for car servicing was very common. This is no longer permitted. There will continue to be some non-refillable containers sold whilst stocks filled before July 2007 are being used up. However, you should take steps to ensure that you are not being illegally supplied with containers filled after that date.

EC F Gas Regulation Article 4.2.
Under Article 4.2 there is a requirement for the recovery and recycling of any residual gases contained in any containers at the end of life of that container. Note that this applies to both non-refillable and non-returnable containers. Where containers are returned to fluid suppliers they become the responsibility of the fluid supplier. Any refrigerant not recycled will need to be sent for destruction. This refrigerant waste is classified as hazardous waste and is subject to the GB Hazardous Waste Regulations, and waste producers have a duty of care to dispose of this safely.

Directive 2006/40/EC

This is EC Directive 2006/40/EC, which aims to control the rate of leakage of HFC 134a in new MAC systems and to phase out the use of HFC 134a or any other fluorinated greenhouse gas with a Global Warming Potential (GWP) higher than 150 in new MAC systems.

MAC Directive Article 5

Phase-out of HFC 134a in new vehicles

There will be a ban on the manufacture of new vehicles using any refrigerant with a Global Warming Potential (GWP) higher than 150. Effectively this is a ban on the current refrigerant, HFC 134a, which has a GWP of 1300.

Global Warming Potential (GWP) is a measurement of how much a greenhouse gas is estimated to contribute to global warming. It is a relative scale which compares the gas in question to that of the same mass of carbon dioxide (whose GWP is by definition 1). A GWP is calculated over a specific time interval and the value of this must be stated whenever a GWP is quoted.

Greenhouse Gases – Global Warming Potential (GWP)*			
	Time Horizon		
	20 years	100 years	500 years
Carbon Dioxide	1	1	1
Methane	62	23	7
Nitrous Oxide	275	296	156
Hydrofluorocarbon R134a	3,300	1,300	420
Chloroflurocarbon R12	10,200	10,600	5,200

*Intergovernmental Panel on Climate Change (IPCC) – Third Assessment Report

The ban is brought in gradually between 1 January 2011 and 1 January 2017. Between these two dates it only applies to **new vehicle types**. After the latter date it applies to all new cars and light vans.

Reduced leakage rates in new HFC 134a MAC systems

Article 5 of the MAC Directive also sets limits on leakage rates from new cars and light vans. These are design requirements at Type Approval and each vehicle does not need to be tested in practice. The key dates are as follows:

- From 5 January 2009 no new cars or light vans will be type approved unless they meet the leakage rates shown below.
- From 5 January 2010 no new cars or light vans can be sold unless they meet the leakage rates shown overleaf.

- The maximum allowable leakage rates, for any system using a refrigerant with a GWP higher than 150 are:
- 40 grams per year for a single evaporator system.
- 60 grams per year for a dual evaporator system.

To Summarise, the MAC Directive requires that new vehicles containing MAC systems with a refrigerant with a global warming potential of 150 or greater cannot be type-approved or marketed unless they meet the limits on F gas leakage.

Retrofitting and refilling

MAC Directive Article 6.1. Applicable from 1st January 2011
With effect from 1 January 2011, air-conditioning systems designed to contain refrigerant with a GWP higher than 150 (including HFC 134a) shall not be retrofitted to vehicles type-approved from that date.

With effect from 1 January 2017, air-conditioning systems designed to contain refrigerant with a GWP higher than 150 (including HFC 134a) shall not be retrofitted to any vehicles.

Air-conditioning systems fitted to vehicles type-approved on or after 1st January 2011 shall not be filled with refrigerant with a GWP higher than 150 (including HFC 134a).

With effect from 1 January 2017 air-conditioning systems in vehicles can only be filled with refrigerant with a GWP higher than 150 (including HFC 134a) if the system was fitted (not retrofitted) to the vehicle before 1 January 2017.

Additional information

Further information regarding centre/scheme approval or any aspect of assessment of our qualifications should be referred to the relevant City & Guilds regional/national office:

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