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Regulating fluorinated refrigerants: The EU Regulation

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ABSTRACT

Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) are potent fluorinated greenhouse gases controlled by the Kyoto Protocol. Their use in industry as refrigerants and in other applications effectively started in the 1990s, when they were utilised to replace ozone-depleting substances. On 17 May 2006, the European Parliament and the Council adopted Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases. The Regulation, which entered into force on the 4 July 2006 and enters into application on the 4 July 2007 aims to reduce emissions of fluorinated greenhouse gases, helping the EU and the Member States to meet their Kyoto Protocol objectives, through better containment and recovery; training and certification of personnel involved; reporting of production, import and export data, labelling of certain products and equipment containing those gases and for some applications and uses where containment and recovery is impracticable, the prohibition of marketing and use respectively. The Commission is working with Member States after consulting stakeholders, on the implementation of the Regulation. In this context the requirements of particular concern for the cooling sector are those for labelling, standard leakage checking and training and certification of companies and personnel involved.

Keywords: fluorinated greenhouse gases, refrigerants, emissions, Kyoto Protocol

¹ The positions expressed in this paper are those of the author and do not represent the official position of the European Commission.

Background

Climate change is one of the greatest environmental, social and economic challenges facing the planet. In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) projects that, without further action to reduce greenhouse gas emissions, the global average surface temperature is likely to rise by a further 1.8-4.0°C this century. Even the lower end of this range would take the temperature increase since pre-industrial times above 2°C, the threshold beyond which irreversible and possibly catastrophic changes become far more likely.

The European Union is at the forefront of international efforts to combat climate change and has played a key role in the development of the two major treaties addressing the issue, the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, agreed in 1997. The latter requires industrialised countries to reduce their collective emissions of greenhouse gases by 5% below their 1990 levels for the period 2008 to 2012. The EU is fully committed to complying with its obligations under the UNFCCC and under the Kyoto Protocol to reduce its greenhouse gas emissions by 8% over 1990 levels by the period 2008-2012.

The major greenhouse gas is carbon dioxide (CO₂). However, the basket of greenhouse gases controlled by the Kyoto Protocol includes, *inter alia*, the so-called F-Gases: sulphur hexafluoride, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) which have high global warming potentials (GWP)² and long atmospheric lifetimes.

Complying with its Kyoto emission reduction target of 8% within the first commitment period - an overall reduction of 336 million tonnes of carbon dioxide equivalent - is crucial to the EU's credibility. Meeting this objective depends on putting in place effective policies and measures. Through the European Climate Change Programme (ECCP) launched in 2000, the European Commission identified and developed cost-effective measures to enable the European Community to meet its Kyoto Protocol target. The report of the fluorinated gases working group stated that the EU's fluorinated gas emissions in 1995 were around 65 million tonnes of CO₂ equivalent or 2% of its total greenhouse gas emissions. Assuming no additional measures were taken, emissions of these gases were forecast to increase to around 98 million tonnes of CO₂ equivalent by 2010, representing 2% to 4% of total projected EU greenhouse gas emissions. The

² "Global Warming Potential" expresses the climatic warming potential of a greenhouse gas relative to that of carbon dioxide. The standard Global Warming Potential (GWP) is calculated in terms of the 100 year warming potential of one kilogram of a gas relative to one kilogram of CO₂.

working group made a number of recommendations for action to reduce emissions of fluorinated gases, and there was a strong consensus amongst the stakeholders for a legislative framework at the Community level.

On the basis of the work of the ECCP and several studies, the European Commission made a legislative proposal in 2003 which was expected to reduce projected emissions of fluorinated gases by around 23 million tonnes of CO₂ equivalent by 2010. The legislation was finally adopted on 17th of May 2006 and comprises two elements: a Regulation covering stationary air-conditioning and refrigeration equipment as well as other applications and a Directive on air-conditioning systems in motor vehicles. The latter prohibits the use of F-Gases with higher than 150 GWP (HFC-134a has a GWP of 1300) in new vehicle model types from 1 January 2011 and in all vehicles from 1 January 2017. In addition there are provisions establishing maximum leak rates in new model types from mid-2008 and all vehicles from mid-2009.

Introduction to the F-Gas Regulation

The objective of the Regulation is to reduce emissions of fluorinated greenhouse gases covered by the Kyoto Protocol, helping the EU and the Member States to meet their objectives, through better containment and recovery; training and certification of personnel involved; reporting of production, import and export data, labelling of certain products and equipment containing those gases and for some applications and uses where containment and recovery is impracticable, the prohibition of marketing and use respectively. It entered into force on the 4 July 2006 and enters into application on the 4 July 2007, with the exception of the marketing prohibitions which apply from 4 July 2006 although prohibition dates vary between the products and equipment included in the Annex. The Regulation has a dual legal basis: Article 175 of the EU Treaty which refers to the environment, for containment, recovery, certification and reporting provisions and Article 95 which refers to the approximation of laws affecting the functioning of the common market, for labelling, control of use and placing on the market provisions.

Preventing leakages

The containment measures apply to stationary refrigeration and air conditioning systems as well as heat pumps and fire protection systems that use predominantly HFCs. The key element is a check for leakage, the frequency of which depends on the size of the installation. The frequency can be reduced if there are leakage detection systems in place, which are nevertheless compulsory for applications containing 300kg or more of F-

Gases, provided that these systems are also checked at least every 12 months. An important feature of the containment measures is the need for records on the quantity and type of F-Gas charge installed, added and recovered from equipment; the personnel or company servicing or maintaining the equipment and the dates and results of the checks of equipment and detection systems.

Table 1 – Frequency of leak checks

Quantity of F-Gases	Frequency of inspections per 12 months
3 kg or more and 6 kg if hermetically sealed	One
30 kg or more	Two
300 kg or more	Four
30 kg and 300 kg with leakage detection systems	Halving of inspections

Collecting and storing F-Gases from equipment

The recovery provisions apply to stationary refrigeration and air-conditioning equipment and also to fire protection systems and extinguishers, high-voltage switchgear and equipment containing F-Gas based solvents. There is an obligation on operators of such equipment to ensure that proper recovery of fluorinated greenhouse gases is undertaken by certified personnel before the final disposal and when appropriate during its servicing and maintenance, for their recycling, reclamation or destruction. There is also an obligation on operators to recover fluorinated greenhouse gases from other applications, including mobile equipment, such as motor vehicles air-conditioning systems, provided it is technically feasible and does not entail disproportionate cost.

Trained and certified personnel

Technical personnel undertaking leakage checking and the recovery of fluorinated greenhouse gases from the applications mentioned above as well as the personnel and companies involved in the installation and maintenance or servicing of refrigeration and air conditioning, as well as heat pump and fire protection equipment, will need to have the skills which are necessary to contain, prevent and thus reduce emissions of F-Gases. The operator is responsible for ensuring that only certified technicians are used. Furthermore, by 4 July 2009, the Member States will have to ensure that the companies involved in leakage checks and recovery can only take delivery of F-Gases if their relevant personnel is certified.

Labelling the equipment

The labelling provisions require that refrigeration and air conditioning equipment, as well as heat pumps, fire protection systems and extinguishers, switchgear and all containers containing fluorinated greenhouse gases cannot be placed on the EU market unless the chemical name and the quantity of the contained F-Gas as well as the message that this is a fluorinated greenhouse gas covered by the Kyoto Protocol are clearly and indelibly indicated. Hermetically sealed systems will have to be labelled as such.

Prohibition of marketing and use

For some products containing fluorinated greenhouse gases where containment is difficult there is a placing on the market prohibition. The prohibition does not affect air-conditioning and refrigeration equipment, apart from non-confined direct evaporation systems containing refrigerants, for example can cooling drinks in which the refrigerant is released, the marketing of which is banned from 4 July 2007.

In regards to use prohibitions there are two main use restrictions on the use of SF₆ as a cover gas in magnesium die-casting as well as for filling vehicle tyres.

Implementation

The Commission is currently working with Member States after consulting stakeholders, on the implementation of the Regulation. In this context, the requirements for labelling of equipment, including refrigeration and air conditioning containing F-Gases, the procedure of standard leakage checking – a key measure in enhancing containment of fluorinated gases– and the requirements for training and certification are issues of particular concern for the cooling sector. In particular, the minimum requirements for certification of personnel and companies and the conditions for mutual recognition on the basis of which, Member States will either need to adjust their existing systems or introduce new certification schemes is a particularly challenging task, considering the large number of technical personnel across the European Union affected. Thus, the Commission is working closely with Member States in finding cost-effective and practical solutions without compromising the aims of the provision in the context of the Regulation objectives. The main idea discussed is the need to have different categories of certification, so that technicians are trained and certified only for the activities they carry out in their work. Furthermore, since mutual recognition of the certificates will apply across MS and considering that some MS already have already training and certification schemes in place, whereas others do not, it is important that the minimum set of skills that personnel of each category will be trained for, is satisfactory for all Member States.

The effective implementation of the Regulation is only a first step. A number of issues require further research before a fully comprehensive framework for the containment of fluorinated gases can be established. The Regulation provides for a review by 31 December 2007, accompanied, if appropriate, by legislative proposals in the following year, with a view to applying containment provisions in air conditioning systems (apart from those fitted to motor vehicles) and refrigeration systems contained in modes of transport. Furthermore, an extensive review is foreseen by 2011 when the Commission has to publish a report based on the experience of the application of this Regulation accompanied by proposals for revision of the Regulation.

Combating climate change is an urgent global task, which requires commitment and continuous action. In January 2007 the European Commission set out proposals and options for limiting global climate change to 2°C. The key targets were endorsed by EU leaders at their summit in Brussels in March 2007. The targets are ambitious, however, through hard work and action in all possible fronts, including the reduction of emissions of F-Gases, can be achieved.

References

Commission of the European Communities (2001), European Climate Change Programme, Working Group Industry, Work Item Fluorinated Gases

Commission of the European Communities (2003), Proposal for a Regulation of the European Parliament and of the Council on certain fluorinated greenhouse gases, COM (2003) 492 final

Commission of the European Communities (2007), Limiting global climate change to 2 degrees Celsius - The way ahead for 2020 and beyond, COM(2007) 0002 final

European Parliament and Council (2006) Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases, OJ L 161, 14/6/2008

European Parliament and Council (2006) Directive 2006/40/EC relating to emissions from air conditioning systems in motor vehicles and amending Council Directive 70/156/EEC, OJ L 161, 14/6/2008

Intergovernmental Panel for Climate Change (IPCC) (2001) IPCC Third Assessment Report: Climate Change 2001. (<http://www.ipcc.ch/pub/reports.html>)

Intergovernmental Panel for Climate Change (IPCC) (2007) IPCC, Working Group I, Fourth Assessment Report: The Physical Science basis. (<http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>)