CODE OF PRACTICE
ON HFCs USE IN AEROSOLS

MDIs and PU Foams are excluded from consideration in this document.

I. FEA

The FEA (*Fédération Européenne des Aérosols* or *European Aerosol Federation* – www.aerosol.org) was founded in 1959.

Today it represents 18 European countries which include more than 500 companies active in the aerosol industry. These range from small and medium-sized enterprises (SMEs) to multinationals.

FEA has also corresponding members worldwide.

II. EUROPEAN AEROSOL MARKET

Europe is the largest producer of aerosols in the world (5.2 billion units produced in 2009 which 4.9 billion in the EU). USA follows with 3.6 billion units. Total world production is estimate at more than 12 billion units.
The European consumer buys approximately 11 aerosols per annum.
During the last 5 years, the industry grew at an average of 1.4 % a year. Aerosols are very popular with consumers as they are very effective, high quality products providing:

- Long stable protection for the product
- Free from external contamination
- High precision application and dosing which frequently makes the aerosol the only or unique delivery system
- No need for additional equipment e.g. brushes
- All the product can be used up (prevents waste)
- In addition, the package is completely recyclable.

III. KYOTO PROTOCOL

The UN Framework Convention on Climate Change (UNFCCC) was adopted in Rio in 1992 and came into force in 1994.
It led to the adoption of the Kyoto Protocol in 1997, which fixes limits for greenhouse gas emissions for 38 developed countries. This means an average reduction of 5% in 2010 compared with 1990.

The European Union accepted an average reduction quota of 8%.
The gases in question are: CO_2, CH_4, N_2O and 3 fluorinated derivatives PFC, SF_6 and HFCs.

The last can be used as an aerosol propellant.
Through a number of communications and workshops, the European Commission has requested the position of the various industry sectors concerned.

IV. ENVIRONMENTAL HISTORY OF AEROSOL INDUSTRY

We would like to emphasise the tremendous decrease in CO_2-equivalent emissions from aerosols achieved under the Montreal Protocol in phasing out ozone-depleting substances such as CFCs and HCFCs.

There is, however, a conflict between the policies under the Montreal Protocol and those of Kyoto. Because of the Montreal Protocol, a number of products had to be reformulated to HFC-based propellants now falling under the scope of Kyoto.
The Kyoto Protocol did not take this into consideration when taking 1990 as basis for reduction of HFC as these products were not significantly on the market at that time.
In addition, the reformulations which had to be made under Montreal have meant that the GWP contribution from aerosols has already been reduced by more than 99% (see Table 1).

Table 1: GWP Contribution From General Aerosols

Year	Tonnage (Mt CO_2 equivalent)
1988	673.00 (1)
2009	3.74 (2)

(1) based on CFC uses
(2) based on HFC uses (except MDIs and PU foams)

V. HFC USE IN AEROSOLS

Background

The « aerosol » using a liquefied propellant to dispense a product, was developed in Norway in the 1920's. The propellant used was a hydrocarbon. Aerosols were used in the Second World War for insecticides by the US Army. These were propelled by the newly developed CFCs, which were non-flammable, low toxicity and viewed as ideal for the purpose. Their ozone depleting action had not been identified at that time.

In Europe commercial production of aerosols began in 1949 with an insecticide, followed rapidly by hairspray and other personal care and household products. CFCs were used for many applications, although most household products continued to use hydrocarbon propellants.

In 1987 the Montreal Protocol was signed agreeing the phase-out of production of ozone depleting substances (including CFCs). Subsequent revisions banned production of CFCs for use in aerosols by 1996.
Meanwhile the industry in Europe voluntarily moved away from CFCs for the majority of consumer aerosols and by the end of 1989 only a few industrial products together with metered dose inhalers, were using CFCs. Most of the European produced aerosols no longer contained CFC propellants.

Industrial aerosol products were especially affected as their choice of propellant was, and is, severely restricted. These aerosols are generally high tech, specialised products where non flammability of the product is as important as the performance – because of the circumstances of use, such as in moving machinery, areas of high static charge, poor ventilation in confined spaces, equipment in operation, etc. In the industrial sector, the precision and convenience (portability) of the aerosol are also key factors in its use.

Other non-flammable propellants exist, such as compressed gasses (compressed air, nitrogen, CO_2, N_2O). However, only relatively small amounts of compressed gas can be put into an aerosol container. There is a marked drop in pressure as the product is used and the headspace increases. Compressed gases cannot produce a consistent particle size and spray rate which makes them suitable only for undemanding applications.

HCFCs, a new generation of non-flammable liquefied gas propellants, were developed and many industrial products were reformulated to use these in the early nineties. By 1995, however, their use in aerosols was also banned because they still had some ozone depletion potential and the industrial aerosol sector was forced to turn to another new non-flammable propellant, HFC-134a, which had no ODP. This required a second complete reformulation of products – since propellants cannot simply be "lifted" in and out of a formulation – an expensive and laborious process. The USA, while a party to the Montreal Protocol, exempted most industrial aerosol uses from the ban on HCFCs. This gave a significant advantage to US suppliers in this sector since they did not have the costs of reformulation and HCFCs are significantly cheaper than HFCs, which are in short supply.

Aerosol contribution to emissions of greenhouse gases to-day

FEA estimates that current HFC usage in aerosols is around 3.74 Mt CO_2 eq. Given current trends, FEA is of the opinion that this quantity will not increase in the next 10 years.

Therefore, the European Aerosol Industry will remain a marginal contributor to the total EU greenhouse gases emissions i.e. <0.1%.

VI. MONITORING

In 2002, the FEA launched a monitoring/reporting system of HFC use in aerosol production on a national and EU level.

Table 2: GWP contribution from aerosols [3]

Year	Tonnage (Mt CO_2 eq.)
2001	5.83 [4]
2002	5.71 [5]
2003	6.25 [6]
2004	4.42 [7]
2005	4.44 [8]
2006	4.26
2007	4.04
2008	3.87
2009	3.74

[3] based on HFC consumption from production figures in EU-15 (except MDIs and PU foams) till 2004. Export outside EU-27 cannot be estimated.
[4] the figure still contains small contribution from PU foams.
[5] rectified figures based on new data (see [6]).
[6] due to the identification of new manufacturers (including some non-members).
[7] still including figures 2003 for Austria.
[8] all FEA members within EU

VII. FEA CODE

Critical Uses

As stated previously, HFCs should only be used in the aerosol industry in applications where there are no other safe, practical, economic or environmentally acceptable alternatives.

No other safe solution: where the alternatives would represent a serious health and safety risk for the users:

a) Where the presence of potential ignition sources is unavoidable;
b) Where the application has to be performed in confined spaces where sufficient ventilation cannot be guaranteed;
c) Where quantities applied could create an explosive gas mixture;

d) Where national or international regulations impose non-flammable requirements;
e) Where products have to be applied on hot surfaces;
f) Where products have to be applied in areas susceptible to static electricity;
g) Where the product has to be applied on equipment under voltage.

No other practical alternatives: where the alternative solution would present significant operational issues e.g. availability of air-compressors or high pressure cylinders on difficult to reach places.

No other economic alternatives: where the alternative product would be too expensive or only available in very limited quantities.

No other environmentally acceptable alternative: where new demands are made for products currently on the market with respect to their impact on the environment, particularly as far as their VOC content is concerned.

The only use of HFC in the aerosol industry should be intended for applications which fit within the above-mentioned conditions.

Preference would be given to substances with a lower global warming potential, where this was compatible with the desired objective and safety considerations.