

WORLD FOOTWEAR



Fluorinated gases are powerful and long-lived greenhouse gases used in a variety of industrial processes. The reduction of their emissions is a requirement under the 1997 Kyoto Protocol and will help EU Member States to meet Kyoto emission targets. A recent Council of Europe directive aims to create a 20% overall usage by 2010. One area to be affected is gas-filled soles in sports shoes.

EU emissions rulings and their effects

The gases covered are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). By volume, fluorinated gases currently account for 2% of total EU greenhouse gas emissions. However, their global warming potential is high and many of them have long atmospheric lifetimes.

For example, SF₆ has a global warming potential 23,900 times that of carbon dioxide (CO₂) which is the most common greenhouse gas. If no measures were taken, it is estimated that by 2010 emissions of fluorinated gases would increase by 50%, compared with 1995 levels. The latest measures will see them reduced by over 20% by 2012—depending on dates still to be agreed—with even greater reductions coming later on.

What is the schedule?

Final adoption following a second reading in the European Parliament is expected towards the end of this year (2005). Member States will then have 18 months to transpose the Directive, while the Regulation will come into force immediately after publication in the Official Journal. The legislation is only a first step and once in force there will be a period of monitoring and evaluation after which the need for further measures will be considered.

How will it work?

The Regulation will improve containment by setting

minimum standards for inspection and recovery of fluorinated greenhouse gases. It will also strengthen the monitoring of their emissions and introduce labelling of products and equipment so consumers can make better-informed choices. It will also set up EU-wide minimum standards for training and certification for personnel concerned. Where containment is not feasible or the use of certain fluorinated gases is inappropriate, their use will be banned.

Who is most affected?

Nike introduced air cushion sole technology using SF₆ in the early 1990s. It has proved to be an extremely successful method of ensuring an elastic attenuation of shocks while combining appropriate foot support and wear comfort. Since its peak in the mid-1990s, the system has maintained a significant share of total Nike sales. However, some of the US and international patents protecting the technology have expired making it possible in principle for other shoe manufacturers to exploit it. Nike actually managed to reduce its global SF₆ usage very substantially against a high of 277 T in 1997:

1998	– 46.4%
1999	– 62.0%
2000	– 68.7%
2001	– 81.0%
2002	– 83.6% (estimated if SF ₆ had been used for the entire year)

Usage of SF₆ in the production of pressurised cushioning units at Nike's US plant ceased in September 2002 and was replaced with PFP (perfluoropropane) so that all Nike footwear imported into Europe after June 2003 was SF₆ free.

PFP was selected for the transition to a planned elimination of all greenhouse gases by June 2006 as it had the lowest GWP of any gas that would maintain product performance during the transition period. PFP has a GWP of 7,000 compared to 23,900 for SF₆, representing a 70% reduction in GWP. However, PFP is 36% heavier than SF₆ so the effective reduction in global warming potential was in fact only 60%.

Use of new nitrogen-based technology suggests the metric tons of PFP in Nike footwear imported into the European market during the transition period is as follows:

2003	-	8.25 T
2004	-	6.70 T
2005	-	4.23 T

**These figures are potentially subject to change.*

What are the options?

Nike has apparently looked at various gases other than SF₆. The main problem has been to keep gas losses at sufficiently low levels to meet emission requirements while at the same time maintaining product performance at an

acceptable cost. Some products continue to use nitrogen while the rest switched to perfluoropropane (C₃F₈) by June 2003, reducing GWP of the filling gas by 60%.

Conclusions

Other manufacturers of sport shoes have managed to produce shoes without relying on patented gas cushions. Although their shoes have become widely accepted, Nike has remained the preferred consumer brand for this type of shoe for many consumers. Whether the changes Nike has been forced to make will impact long term sales remains to be seen.

There is nevertheless a clear implication for any manufacturer of either sports or general footwear to pay close attention to EU legislation if they intend to succeed in this important market. Several new alternative technologies are now available, so are we about to witness the end of gas-based technologies? 



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