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# “Fluorocarbons: Balanced Solutions For Society”

## Aerosol Propellants...A Working Example

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### A Worldwide Perspective

Self-pressurized, or aerosol, packaging is used in many consumer and industrial products ranging from spray paints, hairsprays, cleaning and household products to industrial sealants and lubricants. In 2004, about 11.6 billion aerosol units were produced worldwide (excluding medical metered dose inhalers). Europe (5 billion) and the North America (4 billion) produced the vast majority of these products, according to “Spray Technology and Marketing” (December 2005).



Propellants are used in technically complex applications.

Aerosol packaging is chosen for a variety of reasons. Most significant is safety – aerosol packaging is sanitary and child resistant. Aerosol products are efficient – products are applied uniformly with little or no waste of critical ingredients. Other reasons include product quality, ability for remote application, and penetrating ability. Consequently, aerosol products should be considered in distinct product applications and not as a single group.

In the United States, the most common aerosol propellants are hydrocarbons, dimethyl ether, carbon dioxide and nitrogen; together, they account for nearly 95 percent of all aerosol units. The remainder use HFC propellants, chosen for distinct and often specialized performance properties.

### Environmental Considerations for Aerosols

In the early 1990s, many areas in the U.S. began developing regulations limiting the volatile organic compounds (VOCs) content in consumer products. VOCs result in ground level ozone, a primary smog component, which is detrimental to health. The U.S. Environmental Protection Agency has now imposed minimum national standards for VOC emissions; other governments have imposed or are other considering similar standards. Consumer product VOC emissions have been estimated to be about 2% of total VOC emissions.

VOC emissions reduction applies to all consumer product packaging forms, including aerosols. Liquids, pump sprays, aerosols, or solid consumer products may potentially emit VOCs. For most pump or aerosol products, water or extremely low volatility liquids are used to reduce VOCs. However, in some applications these ingredients are counter productive or can destroy the product functionality. For these niche applications, consumer safety and a high performance, environmentally sound product requires an HFC propellant.



HFC propellants are used to clean electronic equipment.

## HFCs - The Balanced Solution



Propellants can result in emergency response.

Commercially available throughout the world, HFCs are low in toxicity and can be used safely, qualities which are frequently unattainable with other chemicals.

HFCs-134a and -152a are used in many consumer products. Medical metered dose inhalers use HFC-134a and HFC-227ea. HFC-152a is frequently chosen where VOC reduction is required. HFC-152a has very low global warming potential and near-zero atmospheric reactivity; HFC-134a is non flammable and HFC-152a is less flammable than hydrocarbons. Alternatively, the replaced ingredients

would generate significant ground level ozone and contribute to smog formation. Total HFCs used as propellants contribute less than 0.2% of US total greenhouse gas emissions; similar contributions are expected in other parts of the world, depending on local climate conditions.

HFC-134a is used in a small percentage of aerosol units, where user safety is critical. HFC-134a is the only non-flammable liquefied propellant available today. For marine and safety alarms, the propellant is the sole chemical ingredient in the can. Since these are used predominantly in emergencies, safety is critical. In these and other niche applications, flammable propellants could result in injury from flame or explosion.



Emergency response horns are used in boating safety.

### Industry Principles for Product Stewardship

All propellants have potential environmental impact. Therefore the industry promotes the following general principles for all propellant applications:

- Handling by well-trained personnel
- Minimizing losses during filling
- Holding management accountable for potential safety, health and environmental impacts during filling
- Discouraging HFC application use where environmental impact is not offset by high societal value.

**Balanced Solutions for Society...Propellants are a perfect example of proactive, responsible chemicals management, allowing societal benefits from these applications while limiting their environmental impact.**

The Alliance for Responsible Atmospheric Policy is a leading industry voice which coordinates industry participation in the development of reasonable international and U.S. government policies regarding ozone protection and global climate change.



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