"Fluorocarbons: Balanced Solutions For Society"

Residential Air Conditioning…*A Working Example*

A Worldwide Perspective

Residential Air Conditioning provides comfort to millions of homes worldwide. There are an estimated 66 million air conditioners using fluorocarbons in the US alone. People lead more productive and healthy lives due to controlled temperatures and humidity in homes. During periods of unusually hot weather, air conditioning has been credited with saving lives. Three system types are available in the global residential market: window room air conditioners, ductless split air conditioning systems and ducted central air conditioning systems.

Environmental Considerations for Residential Air Conditioning

The vast majority of residential air conditioners use hydrochlorofluorocarbon-22 (HCFC-22). This refrigerant will eventually be phased out under the Montreal Protocol.

The primary HCFC-22 replacement in the US residential air conditioning market is hydrofluorocarbon-410A (HFC-410A).

Life Cycle Climate Performance (LCCP)

Life Cycle Climate Performance is expressed as kilograms of CO_2. This includes both the greenhouse gas emissions ("direct effect") and the energy consumed ("indirect effect"). Air conditioning system operation is energy intensive and, consequently, dominates the LCCP. However, it is also important to minimize system leakage and refrigerant loss during installation, commissioning, servicing, decommissioning at the end of life, and ultimate equipment disposal. Other considerations include the system cost and the safety of users, service technicians and the public.

The environmental impacts of refrigerants over the entire life cycle of fluid and equipment for residential air conditioning systems, including power consumption for production of these materials, have been studied. The estimated LCCPs at various emission rates indicate that the LCCP of HFC-410A and HCFC-22 are comparable or better to that of hydrocarbon alternatives, such as propane, when safety (toxicity and flammability), environmental impact (climate change), cost and performance (capacity) are considered. In addition, the LCCP of HFC-410A is better than that of HCFC-22 in unitary equipment, which includes ducted residential and single package rooftop units, as long as the end of life loss of refrigerant is kept below 15% (A.D. Little, 2002). Direct refrigerant emissions represent a small fraction (less than 5%) of the LCCP and energy efficiency is key to reducing CO_2 emissions.

Industry HFCs – The Balanced Solution

HFCs offer the best solution for meeting long-term residential air conditioning requirements. Commercially available throughout the world, HFCs are energy efficient, low in toxicity, cost-effective, can be used safely and are reusable. Use in efficient systems reduces fossil fuel consumption and the corresponding CO_2 emissions.

Industry Principles

The industry actively advocates the following principles for all refrigerants worldwide:

- Contain refrigerants in tight systems and containers, minimizing atmospheric releases;
- Recover, recycle and reclaim refrigerants;
- Train all personnel in proper refrigerant handling;
- Comply with applicable standards (e.g. ISO 5149, ASHRAE 15), governing proper installation and maintenance of machinery spaces;
- Size equipment to match the specific need, thereby minimizing the refrigerant amount; and
- Design, install and operate to optimize energy efficiency.

Balanced Solutions for Society...Residential Air Conditioning. Energy Efficiency, Reduced CO_2 Emissions, Availability, Affordability. HFCs – the RIGHT Choice for Residential Air Conditioning.

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.

References:
Dieckmann, John, Magid, Hillel, 2002, "Comparison of HFC and Alternative Technologies for Refrigeration, Air-Conditioning, Foam, Solvent, Aerosol Propellant, and Fire Protection Applications," A.D. Little Inc.

The Alliance for Responsible Atmospheric Policy
2111 Wilson Blvd., 8th Floor · Arlington, VA 22201
Phone : (703) 243-0344 · Fax: (703) 243-2874
E-mail: alliance98@aol.com

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