



HCFC PHASE-OUT: It's Time

A Briefer on Ozone Layer Protection, the Montreal Protocol and the HCFC Phase-Out for Participating Broadcasters in the 2012 World TV Awards Science/Environment Category

What are hydrochlorofluorocarbons (HCFCs)?

HCFCs are a group of ozone-depleting substances (ODS) controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer. HCFCs were found to have a negative effect on the earth's stratospheric ozone layer which protects humans, animals and plants against the harmful ultraviolet-B (UV-B) rays of the sun.

How do HCFCs harm the ozone layer and the earth?

The ozone layer is a thin, fragile shield that envelops the earth and acts like an umbrella that protects us from the sun's harmful ultraviolet-B radiation (UV-B). It is made up of ozone (O₃) molecules and located in the upper atmosphere, 10 to 50 kilometers above the earth's surface.

Ozone-depleting substances (ODS) destroy ozone molecules in the stratosphere, which causes ozone depletion – the thinning of the ozone layer. Because of this, more UV-B penetrates the earth.

In addition, like most ODS, HCFCs were also found to be powerful greenhouse gases (GHGs) which significantly contribute to the warming of the earth's atmosphere. Hence, the phase out of HCFCs will not only have a positive impact on ozone layer recovery but also on climate change mitigation.

What are the types of HCFCs, and where are they used?

There are several HCFCs that are commonly used in the world. Each type of HCFC has a different ozone-depleting potential (ODP), or ability to destroy ozone molecules in the stratosphere.

Chemical Name	ODP	Use
HCFC-22	0.055	used as a refrigerant in several applications such as unitary air conditioners, cold storage, retail food refrigeration equipment, chillers, and industrial process refrigeration. Also used (in smaller quantities) as a blowing agent for certain foam applications and as a propellant in aerosols.
HCFC-141b	0.11	historically used as a blowing agent in rigid polyurethane foams and integral skim foams and in aerosol solvent cleaning applications. Phased out in 2003.
HCFC-142b	0.065	used as a blowing agent in extruded polystyrene boardstock. Also used in small quantities in refrigerant blends as a retrofit refrigerant for applications such as motor vehicle air conditioners that previously used CFC-12.
HCFC-123	0.02	used in centrifugal chillers and portable fire extinguishers.
HCFC-124	0.018	used in some sterilant mixtures and as a mixture component in some CFC-12 drop-in replacements. Replaces CFC-114 in some heat pumps and special air conditioning equipment
HCFC blends: HCFC-225ca and HCFC-225cb	0.025- 0.033	used as a solvent, an aerosol solvent, and in small quantities in the adhesives, coatings, and inks sector. HCFC-225 ca/cb is a mixture of the two isomers HCFC-225ca and HCFC-225cb typically in a 45/55% by weight ratio.
HCFC-21	0.04	used as a refrigerant in highly specialized cooling loops.

From <http://www.epa.gov/ozone/title6/phaseout/hcfcuses.html>; <http://www.epa.gov/ozone/science/ods/classtwo.html>

What is being done in response to this issue?

The Montreal Protocol is an international agreement where all member countries (197 Parties) agreed to gradually reduce and eventually eliminate their production and consumption of ODS following an agreed schedule. Please note that this is only international environmental agreement with universal ratification.

Each country that ratified the Montreal Protocol committed to gradually reduce and eventually eliminate its CONSUMPTION of ODS, including HCFCs. The Montreal Protocol defines CONSUMPTION as:

CONSUMPTION = PRODUCTION + IMPORT – EXPORT

HCFC Phase-out Schedule

During the 19th Meeting of the Parties in 2007 in Montreal, Canada, Parties to the Montreal Protocol agreed to adjust the HCFC phase-out schedules for both developed and developing countries. Below is the new phase-out schedule of HCFCs in developing countries (also known as Article 5 countries):

Base Level	Average importation from 2009-2010
1 January 2013	Freeze of base level
1 January 2015	10% reduction in HCFC consumption
1 January 2020	35% reduction in HCFC consumption
1 January 2025	67.5% reduction in HCFC consumption
1 January 2030	97.5% reduction in HCFC consumption
1 January 2030 to 31 December 2039	Annual average of 2.5% of HCFC base level allowed for servicing
1 January 2040	HCFCs no longer allowed for consumption

What should be done?

The industry plays a vital role in meeting the 2013 and 2015 targets. Currently, the companies that produce HCFCs, use HCFCs in the production of their products and/or equipment and/or commercial and industrial owners with huge refrigeration and air-conditioning systems are the largest consumers of these substances. Hence, the phase-out of HCFCs in this sector will have a huge positive impact to the protection of the ozone layer and reduction of GHG emissions. In addition, the industry can benefit from the savings from the shift to energy efficient alternative technologies.

Specifically:

- All HCFC stakeholders must be aware of the phase-out schedule and available alternatives;
- Equipment owners must begin to assess the potential impact of the HCFC phase-out when considering new equipment and retrofits of existing equipment;
- Owners of HCFC equipment or potential buyers of new refrigeration and air conditioning (RAC) equipment must be knowledgeable of HCFC issues;
- Commercial and industrial owners are urged to review their present stock of RAC equipment and together with a contractor or equipment specifier, prepare short and long term plans for their equipment needs and the effects the HCFC phase-out will have on these needs.
- Contractors should provide correct and timely information on HCFCs to technicians and marketing staff, and complete information on available ozone-friendly and climate-friendly equipment and refrigerant solutions to customers.

Notes

United Nations Environment Programme (UNEP) is the United Nations system's designated entity for addressing environmental issues at the global and regional level. Its mandate is to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and the international community for action.

Montreal Protocol on Substances That Deplete the Ozone Layer is an international treaty designed to protect the ozone layer by phasing out the production and consumption of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature on September 16, 1987 and entered into force on January 1, 1989. Since then, it has undergone five revisions, in 1990 (London), 1992 (Copenhagen), 1995 (Vienna), 1997 (Montreal), and 1999 (Beijing). Due to its widespread adoption and implementation it has been hailed as an example of exceptional international cooperation "Perhaps the single most successful international agreement to date..."

The Multilateral Fund for the Implementation of the Montreal Protocol is managed by an Executive Committee which is responsible for overseeing the operation of the Fund. The Committee comprises seven members from developed and seven members from developing countries.

Activities are implemented by four international agencies (UNDP, UNEP, UNIDO, World Bank) and a number of bilateral government agencies. Since 1991, the Multilateral Fund has approved activities including industrial conversion, technical assistance, training and capacity building worth over US \$2.6 billion that will result in the phase out of almost 460,000 ODP tonnes of consumption and production of ozone-depleting substances in developing countries.

In September 2007 the Parties to the Montreal Protocol decided to accelerate the freeze and phase-out of hydrochlorofluorocarbons (HCFCs).

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