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**ASHRAE Position Document on**

**OZONE DEPLETING SUBSTANCES**

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Note: ASHRAE position documents are approved by the Board of Directors and express the views of the Society on a specific issue. The purpose of these documents is to provide objective, authoritative background information to persons interested in issues within ASHRAE's expertise, particularly in areas where such information will be helpful in drafting sound public policy. A related purpose is also to serve as an educational tool clarifying ASHRAE's position for its members and professionals, in general, advancing the arts and sciences of HVAC&R.

## EXECUTIVE SUMMARY

Emitted CFC and HCFC refrigerants have been directly linked to the destruction of stratospheric ozone. As industries transition away from ozone-depleting substances (ODSs), ASHRAE's position is that selection and regulation of refrigerants and foaming agents, and the systems utilizing these chemicals, be based on a holistic analysis. Besides high energy efficiency and performance, analysis criteria should include consideration of community safety, personal safety, economic and social impacts, and minimization of other environmental impacts prioritizing lower global warming potential (GWP). Technical and operational efforts to prevent refrigerant emissions must continue to be developed and implemented. Public policy on ODS and their alternatives must be developed based on the latest technical and scientific information.

ASHRAE is committed to continued research, education, and information dissemination efforts to assist the transition from ODS substances to advanced HVAC&R and insulation technologies that minimize impact on the environment while enhancing performance, cost-effectiveness, and safety.

# ASHRAE OZONE DEPLETING SUBSTANCES POSITION DOCUMENT

## THE ISSUE

Emitted CFC and HCFC refrigerants have been directly linked to the destruction of stratospheric ozone. Worldwide, regulations have been implemented to phase out the production and consumption of these chemicals to protect the stratospheric ozone layer. The concerns are that:

- alternative refrigerants and systems might have poorer energy efficiency, higher GWP and more significant environmental impact than the ozone depleting substance (ODS) refrigerants and systems that they replace;
- the ozone problem is considered solved and that practices to reduce refrigerant emissions are relaxed; and
- poor system and refrigerant choices will be made because of inappropriate policy constraints and/or decision making without consideration of all of the potential impacts.

## BACKGROUND

ASHRAE has a direct interest and concern because most air-conditioning and refrigerating technologies, and some heating technologies, rely on refrigerants and foam-blowing agents. As a result, ASHRAE has direct involvement in refrigerant and foam-blowing agent issues through technical committee activities, research projects, and standards development, as well as the working practices of its members. ASHRAE has accepted the description of the ozone depletion characteristics of various refrigerants and foam-blowing agents. It also notes that ozone depletion potential (ODP) values have been obtained through complex computer models with inherent assumptions.

## RECOMMENDATIONS

A) ASHRAE holds a strong position that:

- selection of alternative refrigerants and their operating systems and of foam-blowing agents be based on a holistic analysis, including energy efficiency and performance attributes, environmental impacts, community and personal safety, economic considerations, and social impacts;
- selection of alternative systems and their refrigerants and foam-blowing agents prioritize high energy efficiency with preference given to refrigerants and foam-blowing agents with lower GWP and systems that minimize emissions;
- efforts to prevent refrigerant and foam-blowing agent emissions continue to expand through education, improved design and maintenance procedures, and enforcement;
- public policy on ODS and their alternatives be developed based on the latest technical and scientific information, including guidance documents and standards published by ASHRAE; and
- the HVAC&R industry should comply with all regulations pertaining to ODS.

B) ASHRAE recommends that further research be conducted on:

- the trade-off among safety, energy efficiency, costs, and environmental impact for the alternative refrigerants and insulating materials using a consistent and comprehensive methodology across all refrigerants and system types (deficiencies in these areas were noted in the recent UNEP/IPCC report, IPCC, 2006);
- the rates of refrigerant emissions and the effectiveness of policy and methods to reduce emissions;
- advancing development of refrigeration and air-conditioning equipment improvements that facilitate reduced refrigerant emissions during installation, operation, maintenance, and decommissioning;
- advancing development and use of zero-ODP, lower-GWP refrigerants, and foam-blowing agents with similar refrigerating or insulating properties to those currently used, without compromising safety, economic, and energy-efficiency constraints.

C) ASHRAE is committed to:

- continuing research, education, and information dissemination efforts to transition to refrigerants and foam-blowing agents that reduce the impact on ozone depletion while minimizing impacts on global warming;
- supporting research to develop and advance HVAC&R technologies that minimize impact on the environment while enhancing performance, cost-effectiveness, and safety criteria;
- supporting development of guidelines and standards to reduce direct emissions of refrigerants from systems and to improve energy efficiency of refrigeration, air-conditioning, and heat pump systems; and
- encouraging responsible refrigerant use and proper technician training.

## ATTACHMENT—FOR SUPPORTIVE INFORMATION (NOT CITED IN THE PD)

### Related ASHRAE Publications

#### Handbook Chapters

- 2008 ASHRAE Handbook—HVAC Systems and Equipment.* Chapter 34, Compressors.
- 2008 ASHRAE Handbook—HVAC Systems and Equipment.* Chapter 38, Liquid-Chilling Systems.
- 2006 ASHRAE Handbook—Refrigeration.* Chapter 5, Refrigerant System Chemistry.
- 2006 ASHRAE Handbook—Refrigeration.* Chapter 8, Refrigerant Containment, Recovery, Recycling and Reclamation.
- 2005 ASHRAE Handbook—Fundamentals.* Chapter 19, Refrigerants.

2005 *ASHRAE Handbook—Fundamentals*. Chapter 20, Thermophysical Properties of Refrigerants.

## Standards

*ANSI/ASHRAE Standard 34, Designation and Safety Classification of Refrigerants.*

*ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems.*

*ANSI/ASHRAE Standard 147, Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment.*

## Position Documents

*Climate Change Position Document*, July 1, 2004.

## Recent Publications of General Interest

Achievements in Stratospheric Ozone Protection—Progress Report. US EPA, Office of Air and Radiation, 1200 Pennsylvania Avenue, NW 6205J, Washington, DC 20460 - April 2007. EPA-430-R-07-001.

*Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer*, Seventh Edition, 2006, United Nations Environment Programme, Ozone Secretariat, ISBN 978-92-807-2770-8.

Safeguarding the Ozone Layer and the Global Climate System: Issues related to Hydrofluorocarbons and Perfluorocarbons. Summary for Policy Makers, IPCC Secretariat, c/o WMO, 7bis, Avenue de la Paix, 1211 Geneva 2, Switzerland, 2005 ISBN 92-9169-118-6.

Production and Consumption of Ozone Depleting Substances under the Montreal Protocol, 1986–2004, United Nations Environment Programme, Ozone Secretariat, November 2005, Third Edition.

Report of the Technology and Economic Assessment Panel, April 2007 Progress Report, United Nations Environ-

ment Programme, Ozone Secretariat ISBN 978-92-807-2829-3.

IPCC Special Report on Safeguarding the Ozone Layer and the Global Climate System, 2005, ISBN 92-9169-118-6.

## Update on Regulations

The Montreal Protocol controls international ozone depleting chemicals agreements. The MP Parties meet annually and may make adjustments to the phase-out schedules listed below, which are current through 2007. Individual countries may accelerate phase-outs faster than the MP. Use of existing ODSs is not prohibited under the MP, but specific countries have imposed additional restrictions. Current updated schedules and schedules for other ozone depleting compounds besides CFCs/HCFs can be found at: <http://ozone.unep.org/publications>.

Montreal Protocol—CFCs—Production/Consumption

1. Developed Countries—Phased Out
2. Developing Countries—(a) 1/1/2007 reduce production/consumption by 85% of 1995–1997 average levels; (b) 1/1/2010 reduce production/consumption to zero

Montreal Protocol 2007—HCFC Adjustments Developed Countries (base level of 1989 plus 2.8% of 1989 CFC consumption)

1. Old Schedule: 2010 65% reduction; 2015 90% reduction; 2020–2030 0.5% service; 2030 phase-out
2. New Schedule: 2010 75% reduction; 2015 90% reduction; 2020–2039 0.5% service; 2040 phase-out

Montreal Protocol 2007—HCFC Adjustments Developing Countries

1. Old Schedule: 2016 freeze @ 2015 levels; 2040 phase-out
2. New Schedule: 2013 freeze @ 2009, 2010 average levels; 2015 10% reduction; 2020 35% reduction; 2025 67.5% reduction; 2030–2040 2.5% service; 2040 phase-out