

# ENGINEERING

## S Y S T E M S O L U T I O N S

**E**dition 28 of *Engineering System Solutions* provides an overview of the new phase-out schedule for the Montreal Protocol from the 20th anniversary Meeting of the Parties in Montreal on September 21, 2007. We also describe the potential outcomes of scheduled reviews to determine if production of service quantities will be necessary beyond the phase-out of HCFCs in new equipment.

The changes to the Montreal Protocol are intended to provide significant reductions in the proliferation of HCFC refrigerants and speed the recovery of the ozone layer. They also could result in savings of several billion tons of equivalent CO<sub>2</sub> greenhouse gas emissions.

For more information on refrigerants, the Montreal Protocol and high efficiency McQuay equipment using zero ozone depleting refrigerants, contact your local McQuay representative or visit our Refrigerant Resource Center at [www.mcquay.com](http://www.mcquay.com).

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## The Accelerated Phase-out Schedule Of The Montreal Protocol

On September 21, 2007, the 191 Parties to the Montreal Protocol reached an historic agreement in Montreal on an amendment to accelerate the phase-out of ozone depleting substances (ODSs), including hydrochlorofluorocarbons (HCFCs) used in the HVAC industry. This amendment demonstrates the continued consensus and increased vigilance of the Parties in eliminating ODSs, without exception, to restore the ozone layer. Because ODSs are also potent greenhouse gases, the amendment offers a twin benefit that will result in savings of several billion tons of equivalent CO<sub>2</sub> greenhouse gas emissions.

The previous phase-out schedule had already begun to reduce production and consumption of HCFC refrigerants in developed countries, so few changes were made. However, the amendment adopted in September represents a significant acceleration in reductions for developing countries. It also foreshadows further reductions by requiring scheduled reviews in 2015 (developed countries) and 2025 (developing countries). These reviews will be used to determine if the production of service quantities will be required beyond the phase-out of

HCFCs in new equipment. This raises the possibility that HCFC-123 production could cease in 2020 in developed countries, and that HCFC production could cease in 2030 for developing countries – ten years ahead of the current phase-out schedule.

### Revised phase-out schedule

Figures 1 and 2 compare the pre- and post-amendment phase-out schedule for HCFC refrigerants for developed and developing countries.

For developed countries, HCFC consumption and production was already frozen at 1996 levels and the first stepped reduction to 65% of this level occurred in 2004. The first change in the phase-out schedule occurs in 2010 when consumption will be limited to 25% of 1996 levels versus 35%. This coincides with the phase-out of HCFC-22 in new equipment in 2010.

The second change occurs in 2015 when the Parties have agreed to a scheduled review of the need for further production and/or export of all HCFC refrigerants after 2020 for servicing. Beginning in 2020, all HCFC refrigerants will be phased out for new equipment in developed countries.



Figure 1 - Montreal Protocol Phase-out Schedule – Developed Countries

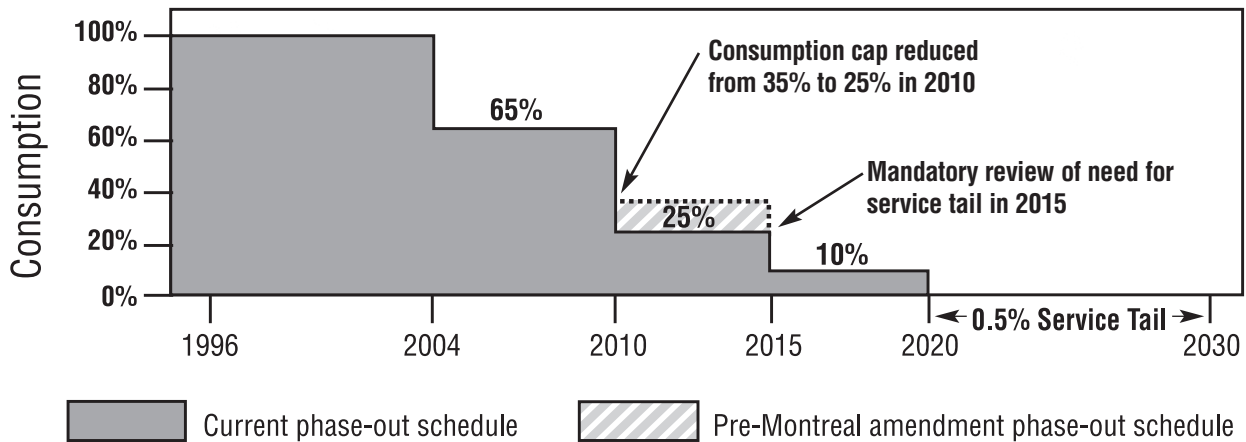
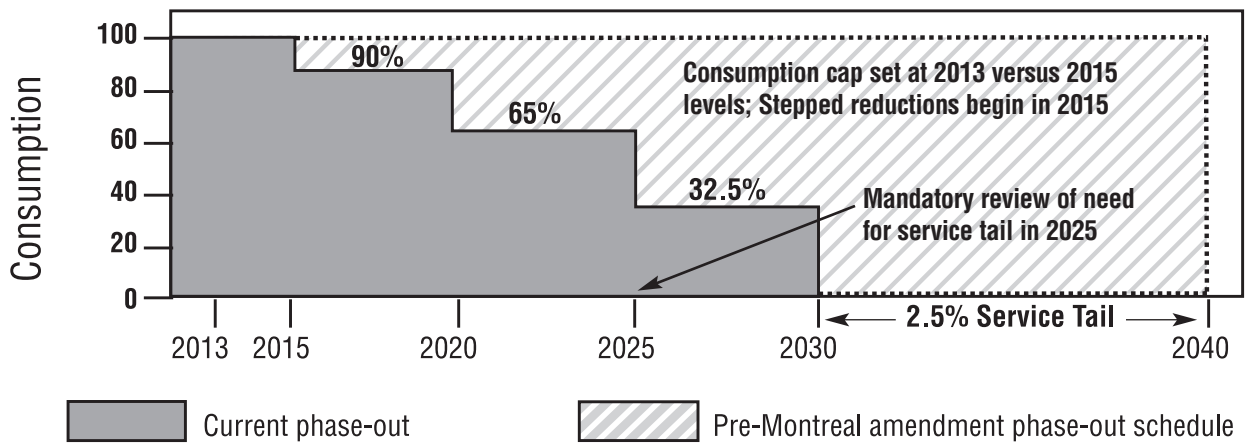


Figure 2 - Montreal Protocol Phase-out Schedule – Developing Countries



For developing countries the changes are significantly greater. Under the previous phase-out schedule, consumption and production of HCFC refrigerants would be frozen in 2016, and no stepped reductions would occur until their complete phase-out in 2040. The new phase-out schedule calls for consumption and production to be frozen at 2013 levels, with stepped reductions in 2015 (10%), 2020 (35%), 2025 (67.5%) and 2030 (97.5% – leaving 2.5% for servicing between 2030 and 2040).

Here, too, the Parties have agreed to a scheduled review in 2025 of the need for further production and/or export of all HCFC refrigerants for servicing.

Beginning in 2030, all HCFC refrigerants will be phased out for new equipment in developing countries.

### Potential outcomes of scheduled reviews

The scheduled reviews called for in the amended phase-out schedule will be used to determine if production of service quantities will be required beyond the phase-out of HCFCs in new equipment in 2020 (developed countries) and 2030 (developing countries).

There are two potential outcomes of these reviews:

- 1) No change is made and the phase-out schedules shown in Figures 1 and 2 will stand.

- 2) Production of the service tail is eliminated. In this case, all HCFCs will be phased out completely in 2020 in developed countries and 2030 in developing countries - ten years ahead of the current phase-out schedule. Thereafter, all HCFC refrigerant required for service will have to be obtained from reclaimed stock.

### Why the accelerated phase-out?

Several factors contributed to the unanimous decision to accelerate the phase-out of HCFC refrigerants. On February 22, 2007, the United Nations Environmental Program (UNEP) released a Synthesis Report of the 2006 assessments of the Montreal Protocol by the Scientific

Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel.<sup>1</sup> According to the report, updated estimates from the 2006 assessment of the Montreal Protocol showed that, with continued compliance to the pre-amendment phase-out schedule, Antarctic ozone would return to pre-1980 levels (a commonly used benchmark for ozone recovery) in 2060-2075. This represents a 10-25 year delay versus the estimate from the 2002 assessment.

The growth in the use of HCFC refrigerants – particularly in developing countries which account for 146 of the 191 Parties to the Montreal Protocol – threatened further delays in ozone recovery. Experts estimate the use of HCFC refrigerants may have doubled by 2015 under the previous phase-out schedule.

Finally, mounting evidence has demonstrated that because ODSs are also potent greenhouse gases, their phase-out benefits both ozone recovery and global warming/climate change. On March 20, 2007, the National Academy of Sciences (NAS) released a report titled *The Importance of the Montreal Protocol in Protecting Climate*.<sup>2</sup> Authored by representatives from the Netherlands Environmental Assessment Agency, the U.S. Environmental Protection Agency (EPA), the U.S. National Oceanic and Atmospheric Administration and

Dupont Fluoroproducts, the report quantifies the impact of the phase-out of ODSs on global warming/climate change. According to the report, “The climate protection already achieved by the Montreal Protocol alone is far larger than the reduction target of the first commitment period of the Kyoto Protocol.”

Accelerating the phase-out of HCFCs was among the options recommended in the UNEP Synthesis Report as having the largest potential to bring about a return to pre-1980 ozone levels sooner. The report further notes that technically and economically feasible substitutes are available for almost all ODS applications, including those using HCFCs.

### **HCFCs phased out - no exceptions for HVAC applications**

Faced with the potential for further delays in ozone recovery and the possibility of achieving further climate change benefits, six proposals were put forth at the September 2007 Meeting of the Parties in Montreal. Included among these proposals were requests for critical use exemptions and exceptions for HCFC-123 used in the HVAC industry. The final amendment is a combination of these various proposals and represents a commitment to reduce the use of HCFC refrigerants and accelerate their phase out. None of the critical use exemptions or exceptions for HCFC-123 are included in the final amendment.

### **Conclusion**

The unanimous decision by the 191 Parties to the Montreal Protocol to accelerate the phase-out of HCFC refrigerants sends a strong message that ozone recovery and climate change are recognized globally as environmental concerns that require immediate action. It also recognizes that technically equivalent and economically feasible alternatives are available for all HVAC equipment using HCFC refrigerants.

While the majority of the changes were designed to significantly accelerate reductions of HCFC use in developing countries, the new phase-out schedule foreshadows further reductions by requiring scheduled reviews of the need for service quantities in 2015 (developed countries) and 2025 (developing countries). If production of service quantities ceases as a result of these scheduled reviews, all HCFC refrigerant required for service will have to be obtained from reclaimed stock.

For more information on refrigerants, the Montreal Protocol and high efficiency McQuay equipment using HFC refrigerants with zero ozone depletion potential, contact your local representative or visit [www.mcquay.com](http://www.mcquay.com).

<sup>1</sup>Presentation of the synthesis report of the 2006 assessments of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel. United Nations Environment Programme, UNEP/OzL.Pro.WG.1/27/1, February 22, 2007.

<sup>2</sup>The importance of the Montreal Protocol in protecting climate, Guus J. M. Velders, Stephen O. Andersen, John S. Daniel, David W. Fahey, and Mack McFarland, Proceedings of the National Academy of Sciences, March 20, 2007.

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