

Environmental Choice^M Program

CERTIFICATION CRITERIA DOCUMENT

CCD-161



Product: Refrigerant Collection and Disposal Program

Preamble

Environment Canada's Environmental Choice^M Program is pleased to publish the following national guideline on *refrigerant collection and disposal programs*.

The Environmental Choice Program is designed to support a continuing effort to improve and/or maintain environmental quality by reducing energy and materials consumption and by minimizing the impacts of pollution generated by the production, use and disposal of goods and services available to Canadians.

Refrigeration fluids which contain halogenated compounds pose a significant threat to the stratosphere's "ozone layer", which protects the Earth from most of the Sun's damaging ultraviolet radiation. This environmental issue is widely recognized and considerable action has been taken, beginning with the Montreal Protocol in 1987, to phase out the production and use of compounds containing ozone-depleting substances (ODS). The conventionally used chlorofluorocarbons (CFCs) have already been phased out, replaced by hydrochlorofluorocarbons (HCFCs) and, more recently, hydrofluorocarbons (HFCs).

Though less damaging than CFCs, HCFCs still pose a threat to stratospheric ozone and are also in the process of being phased out. In addition, both HCFCs and HFCs are potent greenhouse gases (GHGs). Concern over the continuing threat of ozone-depleting substances has led to the recognition that an effective system needs to be implemented to collect, sequester and ultimately destroy the ODS that were previously in use, or currently remain so.

An effective program of ODS collection and disposal must ensure that: collection is strictly monitored (e.g., through effective chain of custody reporting), secure transportation to disposal sites is provided; no retired ODS are diverted to reuse in other markets (i.e., in developing countries) and ODS destruction is both effective and produces no harmful emissions of its own.

Based on a review of currently available life cycle information, the product category requirements will produce an environmental benefit through:

- a reduction in ozone-depleting emissions to the environment and
- a reduction in greenhouse gas emissions to the environment.

Life cycle review is an ongoing process. As information and technology change, the requirements will be reviewed and possibly amended.

Environment Canada anticipates that *refrigerant collection and disposal programs* conforming to this certification criteria document will apply to the Environmental Choice Program for verification and subsequent authority to label the qualifying services with the Environmental Choice EcoLogo^M.

Notice

Throughout this document, any reference to a standard or guideline means to its latest edition.

The Environmental Choice Program (ECP) reserves the right to accept equivalent test data for the test methods specified in this document.

Notice of Intent

Future editions of this Certification Criteria Document may require that *refrigerant collection and disposal programs* implement specific procedures for the collection and safe disposal of HFCs.

Interpretation

1. In this set of requirements, please note the following definitions:

“chlorofluorocarbons”, or **“CFCs”**, means a chemical compound containing only chlorine, fluorine, and carbon. These chemicals have properties that make them very useful as refrigerants, blowing agents, solvents and fire-retardants, but have been found to be very damaging to the stratosphere’s ozone layer;

“collection service provider” or **“CSP”** means an approved provider who accepts delivery of retired refrigerants from wholesalers and who tests, stores and prepares the retired refrigerant for shipment to the disposal service provider. A CSP may also operate a recycling/reclamation system, manufacture their own refrigerants and/or sell reclaimed refrigerants that are not forwarded to disposal service providers;

“designated end-user” means a (generally large-scale) refrigerant user who chooses to provide their retired refrigerants directly to a CSP, rather than going through a wholesaler;

“disposable container” means a container designed to be used only once for the transportation or storage of a virgin substance, such as CFC, HCFC, HFC, blends, designed in accordance with (Canadian Transport Commission (CTC) specification 39 (Department of Transport (DOT) 39 if made in the U.S.A.). This container should not be used for recovery or recycling purposes, or for any other use and should be returned to the supplier when empty. Refillable containers are preferred for replacing existing disposable containers, as they are constructed with better one-way valves and designed for multiple use; this results in minimal chances for fugitive emissions to occur;

“disposal service provider” means an approved business that, as at least part of its operations, performs the final destruction of refrigerants received from CSP;

“global warming potential” or **“GWP”** means the time-integrated change in "radiative forcing" due to the instantaneous release of 1 kg of a trace gas expressed relative to the radiative forcing from the release of 1 kg carbon dioxide (CO₂);

“government agency” means a government agency that taken possession of refrigerants that are appropriate for acceptance into a *refrigerant collection and disposal program*; for example illegally transported CFC’s that have been intercepted by authorities;

“greenhouse gas” or **“GHG”** means an anthropogenically-generated gas suspected of enhancing the atmosphere’s natural heat-trapping abilities, thus leading to potential alteration of natural climatic patterns; relevant gases to include, *inter alia*, carbon dioxide, chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs);

“holding charge” means an amount of an inert or a refrigerant gas put into a system or equipment to ensure that there is a positive pressure to prevent leakage of air or moisture into the system or the equipment;

“**hydrochlorofluorocarbons**”, or “**HCFCs**”, means a chemical compound containing only hydrogen, chlorine, fluorine, and carbon. Hydrochlorofluorocarbons are generally less damaging to the ozone layer than chlorofluorocarbons and are thus considered as an interim replacement for CFCs;

“**hydrofluorocarbons**” or “**HFCs**”, means a chemical compound containing hydrogen, fluorine, and carbon. As they contain neither chlorine nor bromine, HFCs are not considered to be ODS but do have a global-warming potential;

“**Ozone Depleting Substance**” or “**ODS**” means a halogenated (chlorinated or brominated) hydrocarbon compound recognized by the Montreal Protocol as having the potential to adversely affect stratospheric ozone; a list of these fluids relevant to air-conditioning and refrigeration is presented in Appendix 2;

“**ozone-depletion potential**” or “**ODP**” mean a measure of the relative capability of a particular chemical to destroy ozone. The ODP is measured against CFC-11 which has an assigned ODP of 1.0. Internationally accepted ODP values have been established by UNEP.

“**perfluorocarbon**” or “**PFC**” means a chemical compound containing only carbon and fluorine;

“**reuse**”, for the purpose of this Certification Criteria Document, means the direct reuse of a previously recovered refrigerant without further processing, to remove contaminants or otherwise improve its quality;

“**reclamation**” means the re-processing and upgrading of a recovered refrigerant by filtering, drying, or distillation and chemical treatment of the refrigerant. For the purpose of this Certification Criteria Document, reclamation involves processing the recovered refrigerant "off-site" at a re-processing or a refrigerant manufacturing facility and requires the re-processed substance to be subjected to laboratory analysis to verify that it meets a specific quality standard;

“**recovery**” means the collection and storage of refrigerant from any system or equipment, containment vessels, etc., in approved external recovery storage cylinders, or in drums for low pressure refrigerants during servicing, repair, or before equipment disposal.

“**recycling**”, for the purpose of this Certification Criteria Document, means to improve the quality of recovered refrigerant before re-use. Such improvements include, *inter alia*, cleaning the refrigerant by oil separation, distillation, and single or multiple passes through replaceable core filter-driers to remove moisture, acidity, and particulate matter. Recycling may be done on- or off-site of the refrigerants’ recovery and produce renewed refrigerants that are suitable for use at a job site or service shop;

“**refrigerant**” means a fluid that absorbs heat at a low temperature and pressure, with a change of state, and rejects heat at a higher temperature and pressure.

“**retired**”, for the purpose of this Certification Criteria Document, refers to refrigerants that have been identified as potentially eligible for acceptance into a **refrigerant collection and disposal program**. Retired refrigerants may include both surplus (virgin) and used (non-reusable/recyclable) refrigerants.

“**service contractor**” means a contractor who performs servicing on refrigeration equipment;

“**servicing**” means the installation, maintenance, testing and repair, alteration, conversion, mothballing and decommissioning of refrigerant-containing systems and machinery;

“**solvent**” is a general term for a chemically diverse range of liquid substances which dissolve other materials;

“**UNEP**” means the United Nations Environmental Program;

“US EPA” means the United States Environmental Protection Agency; and

“wholesaler” means a supplier of refrigerants and refrigeration parts and supplies, who agrees to participate in a *refrigerant collection and disposal program* by receiving and storing collected (retired) refrigerants, until they are shipped to a CSP.

Category Definition

2. This category includes all *refrigerant collection and disposal programs*.

General Requirements

3. To be authorized to carry the EcoLogo^M, the *refrigerant collection and disposal program* must:
- (a) meet or exceed all applicable governmental and industrial safety and performance standards; and
 - (b) be provided in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the *Fisheries Act* and the *Canadian Environmental Protection Act (CEPA)*.

Product Specific Requirements

4. To be authorized to carry the EcoLogo^M, the *refrigerant collection and disposal program* must:
- (a) implement a series of Operating and Performance Guidelines that are in compliance with standards set by the the Montreal Protocol, Environment Canada, U.S. EPA, Transport Canada and applicable Provincial, State and municipal regulations, which encompass, as a minimum:
 - (i) initial refrigerant collection by service contractors or qualified technicians,
 - (ii) refrigerant acceptance and storage by wholesalers,
 - (iii) subsequent collection, testing and transfer of refrigerants by collection service providers (CSP) to disposal service providers,
 - (iv) final disposal of refrigerants by disposal service providers;
 - (b) implement a chain of custody (CoC) that:
 - (i) ensures all retired refrigerants accepted by the *refrigerant collection and disposal program* are:
 - (a) accepted from service contractors by wholesalers, where applicable,
 - (b) accepted from wholesalers, designated end-users and government agencies by CSPs,

- (c) fully identified and tested by CSPs, and
 - (d) transferred from CSPs to disposal service providers; and
- (ii) specifically prevent ODS from being diverted from domestic markets for reuse in foreign markets;
- (c) ensure that collection service providers (CSP):
 - (i) accept delivery of cylinders/drums containing designated refrigerants from wholesalers and transfer, as appropriate to bulk cylinders for transport;
 - (ii) upon receipt of refrigerant(s), ensure each container has a complete identification tag, which includes, at minimum, the following information:
 - (a) the service contractor name,
 - (b) the wholesalers/designated end-user/government agency name and location,
 - (c) a wholesalers/designated end-user/government agency name reference number,
 - (d) the date accepted by wholesaler, as appropriate,
 - (e) the refrigerant name, chemical formula and source (as available), and
 - (f) the cylinder/drum/other container's owner and serial number (as available),
 - (iii) prior to acceptance in the program, test collected refrigerants:
 - (a) to ensure contents meets specifications for refrigerant content (see Appendix 1-a), and
 - (b) transfer to bulk cylinders for storage;

Note: refrigerants not determined to be acceptable into the **refrigerant collection and disposal program** must be dealt with by CSPs as outlined in Appendix 1-a.

- (iv) store retired refrigerants:
 - (a) at a designated collection site that has been audited in to ensure compliance with criteria set by the refrigerant collection and disposal program,
 - (b) in accordance with the *Ontario Environmental Protection Act, R.R.O. 1990, Regulation 347, Sections 30 through 35*, "Stationary Refrigerant Waste", or equivalent, and
 - (c) for a maximum of 270 days, before collection by CSP;
- (v) prior to transport or transfer to ISO tank for transport determine, whether any of the following contaminants are present (see Appendix 1-b):
 - (i) PCBs, in excess of 25 ppm,
 - (ii) oil, in excess of 20% by volume, and
 - (iii) water, in excess of 20% by volume;
 and take action as defined in Appendix 1-b; and

- (vi) transfer refrigerants, in compliance with transport and environmental laws applicable to all relevant jurisdictions, to facilities operated by disposal service providers;
- (d) ensure that disposal service providers destroy refrigerants in accordance with the following:
 - (i) the minimum acceptable destruction efficiency is 99.99%;
 - (ii) the maximum allowed combustion emissions are:
 - (e) 0.1 ng/m³ TEQ for PCDD and PCDF,
 - (f) 100 mg/m³ for HCl,
 - (g) 5 mg/m³ for HF,
 - (h) 50 mg/m³ for Particulates, and
 - (i) 100 mg/m³ for CO;
 - (iii) a destruction certificate is issued once the material has been destroyed, including, at minimum the following information:
 - (a) name of the disposal service provider and facility,
 - (b) name and chemical formula(e) of the refrigerant(s) destroyed,
 - (c) source(s) of the refrigerant(s), and
 - (d) date of final destruction;
 - (iv) refrigerants must be destroyed within 60 days of their officially documented acceptance for destruction by the disposal service provider;
- (e) maintain a list of approved Collection Service Providers (CSP), which is disseminated to all program participants;
- (f) conduct an annual audit of all collection service providers (CSP) to ensure continued compliance with Operating and Performance Guidelines of the **refrigerant collection and disposal program** (see Sections 4 (a) and 4 (c));
- (g) by October 1, 2005, implement an educational and promotion component that will communicate the benefits to all stakeholders and ensure that all key participants (i.e., ODS suppliers, service contractors, wholesalers and end-users) clearly understand their own roles and responsibilities, in regards to participating in the program; and
- (h) undertake efforts to incorporate the future collection and disposal of HFCs.

Verification

6. To verify a claim that the program meets the criteria listed in this document, the ECP will require access, as is its normal practice, to relevant purchasing records, quality control and production records and the right of access to storage and disposal facilities on an announced basis.

7. If applicable, compliance with requirement 3(b) shall be attested to by a signed statement of the Chief Executive Officer or the equivalent officer of the licensee. The ECP shall be advised in writing immediately by the licensee of any noncompliance which may occur during the term of the license. On the occurrence of any noncompliance, the license may be suspended or terminated as stipulated in the license agreement.

Conditions for EcoLogo Use

8. The EcoLogo may appear on promotional literature and official documents and stationary of the **refrigerant collection and disposal program** and designated refrigerant service contractors, provided that the program meets the requirements in this document.
9. All licensees and authorized users must comply with the ECP's *Guide to Proper Use of the EcoLogo^M* regarding the format and usage of the EcoLogo.
10. Any accompanying advertising must conform with the relevant requirements stipulated in this guideline, the license agreement and the ECP's *Guide to Proper Use of the EcoLogo^M*.
11. The EcoLogo may not appear on containers used to ship virgin refrigerants to their place of use, nor on equipment utilizing these refrigerants.
12. It is recommended that a criteria statement appear with the EcoLogo whenever the EcoLogo is used in association with the **refrigerant collection and disposal program**. The intent of this statement is to provide clarification as to why the program was certified and to indicate constraints to which the certification is limited. This is to ensure no ambiguity over, or misrepresentation of, the reason(s) for certification.

The criteria statement must be specific to the product's sub-category. The recommended criteria statement is "*Refrigerant Collection and Disposal Program*". The licensee may propose other wording for the criteria statement, but any such proposed wording must be approved by the Environmental Choice Program.

***For additional copies of this guideline or for more information about the Environmental Choice Program, please contact: TerraChoice Environmental Services Inc.,
1280 Old Innes Road, Suite 801, Ottawa, Ontario, K1B 5M7
Telephone: (613) 247-1900, Facsimile: (613) 247-2228, Email: ecoinfo@terrachoice.ca***

Appendix 1a – Testing Containers for Refrigerant Content

Cylinders and drums containing retired refrigerants, received from Service Contractors by Wholesalers, must be tested by Collection Service Providers (CSP) to ensure the contents include ODS refrigerants. This test must identify and quantify the relative percentages (by volume) of the major ODS refrigerants collected. The testing procedure must ensure that the required analytical results and precision specification can be attained and documented. If cylinders or drums do not contain ODS refrigerants, the refrigerant will not enter the *refrigerant collection and disposal program* (i.e., is designated for reclaim or otherwise disposed of).

Required Procedures

1. Cylinders and drums submitted to the program will be tested for refrigerant content within the following timeframe:
 - Less than a skid load: 10 business days after receipt
 - A skid load: 14 business days after receipt
 - Truckload: 28 business days after receipt
2. The level of precision for relative percent of specified refrigerants by volume required by the refrigerant content test will be plus-or-minus 2%.
3. Cylinders should be filled to a minimum of 40% and a maximum of 80% by volume.
4. Cylinders and drums containing any content of CFC-based refrigerants will be accepted into the *refrigerant collection and disposal program*.
5. Cylinders and drums containing a minimum of 30% HCFC refrigerant by volume will be accepted into the *refrigerant collection and disposal program*.
6. If the refrigerant contains HCFCs, the CSP will determine if the refrigerant is to be reclaimed or destroyed. It will be at the discretion of the CSP to determine if the refrigerant is commercially viable for reclamation, unless a customer states that they want the refrigerant destroyed.
7. If the refrigerant is deemed reclaimable, it is removed from the program and entered into the normal reclamation system.
8. If the refrigerant is deemed non-reclaimable, it is accepted into the program for disposal.
9. Cylinders and drums containing CFCs are to be destroyed without exception.
10. Cylinders and drums containing HCFC blends are to be destroyed without exception.
11. Cylinders and drums containing only HFCs will not initially be accepted into the program, but may be in the future. Until such future revisions, it will remain at the discretion of the CSP to determine if a pure HFC refrigerant is commercially viable for reclamation, unless a customer states that they want the refrigerant destroyed.

Appendix 1b – Bulk Collection and Testing Accepted Refrigerant for Contamination

CSPs will test bulk cylinders containing retired refrigerants for the following possible contaminants:

- PCBs;
- oil contamination; and,
- water contamination.

If PCBs are detected **with a threshold of 25PPM** or greater, the bulked refrigerant will be stored and will not be transported, transferred or otherwise permitted to continue through the ***refrigerant collection and disposal program***.

Refrigerant with significant oil and/or water contamination will be permitted to continue through the ***refrigerant collection and disposal program*** and be destroyed, however, the ***refrigerant collection and disposal program*** administrator will use the report of test results to investigate any unusual frequency of refrigerant contaminated with oil and/or water.

Contaminant test results exceeding the established thresholds for PCBs, oil and water are to be provided to the ***refrigerant collection and disposal program*** within 2 business days of testing.

Testing Specifications for Non-PCB constituents

1. Testing for all non-PCB constituents (i.e., refrigerant, oil and water) must produce results that identify 99.5% of the contents of the cylinder, following the specifications established in the ARI 700-04 Standards.
2. The threshold for water and oil content is 20% by volume.
3. Weighing equipment must be calibrated annually by an independent source.
4. Refrigerant transferred to 1000-lb bulk cylinders must have one (1) test for contamination either after the container reaches maximum capacity (i.e., 80% by volume) or prior to being transferred to an ISO tank or shipped to a destruction facility.

Testing Specifications and Subsequent Actions for PCBs

1. Retired refrigerants must be tested for PCBs before being transferred to a disposal facility.
2. Testing for PCBs will be done using gas chromatography with electron capture detection, and should follow the standard operating procedures described in *EPA Method 8082, "Polychlorinated Biphenyls (PCBs) by Gas Chromatography."*
3. Contaminant test results that detect the presence of PCBs equal to or greater than 25PPM must be reported to the ***refrigerant collection and disposal program*** within 24 hours.
4. The CSP must report the findings of their investigation to the ***refrigerant collection and disposal program*** within 30 days from the date of the test.
5. The ***refrigerant collection and disposal program*** must locate a qualified disposal facility to handle the destruction of the contaminated refrigerant within 90 days from the date of the test.
6. The ***refrigerant collection and disposal program*** must ship the contaminated refrigerant for disposal and obtain certificates of destruction from the disposal facility within 90 days from the date of the test.

Appendix 2 – Ozone Depleting Potential and Global Warming Potential of Refrigerants

Chemical Name	Lifetime, (yrs)	ODP	GWP
CFCs			
CFC-11 (CCl ₃ F) Trichlorofluoromethane	45	1.0	3800 - 4680
CFC-12 (CCl ₂ F ₂) Dichlorodifluoromethane	100	1.0	8100 - 10720
CFC-113 (C ₂ F ₃ Cl ₃) 1,1,2-Trichlorotrifluoroethane	85	0.8 - 1.0	4800 - 6030
CFC-114 (C ₂ F ₄ Cl ₂) Dichlorotetrafluoroethane	300	0.94 - 1.0	9300 - 9880
CFC-115 (C ₂ F ₅ Cl) Monochloropentafluoroethane	1700	0.44 - 0.6	7200 - 9300
CFC-13 (CF ₃ Cl) Chlorotrifluoromethane	640	1.0	11700 - 14190
CFC-111 (C ₂ FCl ₅) Pentachlorofluoroethane		1.0	
CFC-112 (C ₂ F ₂ Cl ₄) Tetrachlorodifluoroethane		1.0	
CFC-211 (C ₃ FCl ₇) Heptachlorofluoropropane		1.0	
CFC-212 (C ₃ F ₂ Cl ₆) Hexachlorodifluoropropane		1.0	
CFC-213 (C ₃ F ₃ Cl ₅) Pentachlorotrifluoropropane		1.0	
CFC-214 (C ₃ F ₄ Cl ₄) Tetrachlorotetrafluoropropane		1.0	
CFC-215 (C ₃ F ₅ Cl ₃) Trichloropentafluoropropane		1.0	
CFC-216 (C ₃ F ₆ Cl ₂) Dichlorohexafluoropropane		1.0	
CFC-217 (C ₃ F ₇ Cl) Chloroheptafluoropropane		1.0	
HCFCs			
HCFC-21 (CHFCl ₂) Dichlorofluoromethane	1.7	0.04	148 - 210
HCFC-22 (CHF ₂ Cl) Monochlorodifluoromethane	12.0	0.05 - 0.055	1500 - 1780
HCFC-31 (CH ₂ FCl) Monochlorofluoromethane		0.02	
HCFC-121 (C ₂ HFCl ₄) Tetrachlorofluoroethane		0.01 - 0.04	
HCFC-122 (C ₂ HF ₂ Cl ₃) Trichlorodifluoroethane		0.02 - 0.08	
HCFC-123 (C ₂ HF ₃ Cl ₂) Dichlorotrifluoroethane	1.3	0.02 - 0.06	76 - 120
HCFC-124 (C ₂ HF ₄ Cl) Monochlorotetrafluoroethane	5.8	0.02 - 0.04	470 - 620
HCFC-131 (C ₂ H ₂ FCl ₃) Trichlorofluoroethane		0.007 - 0.05	
HCFC-132b (C ₂ H ₂ F ₂ Cl ₂) Dichlorodifluoroethane		0.008 - 0.05	
HCFC-133a (C ₂ H ₂ F ₃ Cl) Monochlorotrifluoroethane		0.02 - 0.06	
HCFC-141b (C ₂ H ₃ FCl ₂) Dichlorofluoroethane	9.3	0.1 - 0.12	630 - 713
HCFC-142b (C ₂ H ₃ F ₂ Cl) Monochlorodifluoroethane	17.9	0.06 - 0.07	1800 - 2400
HCFC-221 (C ₃ HFCl ₆) Hexachlorofluoropropane		0.015 - 0.07	
HCFC-222 (C ₃ HF ₂ Cl ₅) Pentachlorodifluoropropane		0.01 - 0.09	
HCFC-223 (C ₃ HF ₃ Cl ₄) Tetrachlorotrifluoropropane		0.01 - 0.08	
HCFC-224 (C ₃ HF ₄ Cl ₃) Trichlorotetrafluoropropane		0.01 - 0.09	
HCFC-225ca (C ₃ HF ₅ Cl ₂) Dichloropentafluoropropane	1.9	0.02 - 0.025	120 - 180
HCFC-225cb (C ₃ HF ₅ Cl ₂) Dichloropentafluoropropane	5.8	0.03 - 0.033	530 - 620
HCFC-226 (C ₃ HF ₆ Cl) Monochlorohexafluoropropane		0.02 - 0.1	
HCFC-231 (C ₃ H ₂ FCl ₅) Pentachlorofluoropropane		0.05 - 0.09	
HCFC-232 (C ₃ H ₂ F ₂ Cl ₄) Tetrachlorodifluoropropane		0.008 - 0.1	
HCFC-233 (C ₃ H ₂ F ₃ Cl ₃) Trichlorotrifluoropropane		0.007 - 0.23	

HCFC-234 (C3H2F4Cl2) Dichlorotetrafluoropropane		0.01 - 0.28	
HCFC-235 (C3H2F5Cl) Monochloropentafluoropropane		0.03 - 0.52	
HCFC-241 (C3H3FCl4) Tetrachlorofluoropropane		0.004 - 0.09	
HCFC-242 (C3H3F2Cl3) Trichlorodifluoropropane		0.005 - 0.13	
HCFC-243 (C3H3F3Cl2) Dichlorotrifluoropropane		0.007 - 0.12	
HCFC-244 (C3H3F4Cl) Monochlorotetrafluoropropane		0.009 - 0.14	
HCFC-251 (C3H4FCl3) Trichlorofluoropropane		0.001 - 0.01	
HCFC-252 (C3H4F2Cl2) Dichlorodifluoropropane		0.005 - 0.04	
HCFC-253 (C3H4F3Cl) Monochlorotrifluoropropane		0.003 - 0.03	
HCFC-261 (C3H5FCl2) Dichlorofluoropropane		0.002 - 0.02	
HCFC-262 (C3H5F2Cl) Monochlorodifluoropropane		0.002 - 0.02	
HCFC-271 (C3H6FCl) Monochlorofluoropropane		0.001 - 0.03	
HFCs			
HFC-23 (CHF3)	260 - 270		11700 - 12240
HFC-32 (CH2F2)	4.9 - 5.6		543 - 650
HFC-41 (CH3F)	2.4 - 3.7		90 - 150
HFC-125 (C2HF5)	29 - 32.6		2800 - 3450
HFC-134 (C2H2F4)	9.6 - 10.6		1000 - 1100
HFC-134a (CH2FCF3)	13.8 - 14.6		1300 - 1320
HFC-143 (C2H3F3)	3.4 - 3.8		300 - 347
HFC-143a (C2H3F3)	48.3 - 52		3800 - 4400
HFC-152a (C2H4F2)	1.4 - 1.5		120 - 140
HFC-227ea (C3HF7)	33.0 - 36.5		2900 - 3660
HFC-236fa (C3H2F6)	209 - 240		6300 - 9650
HFC-236ea (C3H2F6)	10.0 - 10.7		1200 - 1350
HFC-245ca (C3H3F5)	5.9 - 6.2		560 - 682
HFC-245fa (C3H3F5)	7.2 - 7.6		950 - 1020
HFC-365mfc (C4H5F5)	8.6 - 9.9		782 - 950
Perfluoropropane (C3F8)	2600		7000 - 8690
Perfluorobutane (C4F10)	2600		7000 - 8710
Perfluorocyclobutane (c-C4F8)	3200		8700 - 10000
Perfluoropentane (C5F12)	4100		7500 - 9010
Perfluorohexane (C6F14)	3200		7400 - 9140

Source: US EPA: Class I Ozone-Depleting Substances (<http://www.epa.gov/ozone/ods.html>), Class II Ozone-Depleting Substances (<http://www.epa.gov/ozone/ods2.html>) and Global Warming Potentials of ODS Substitutes (<http://www.epa.gov/ozone/geninfo/gwps.html>).

Note - the Scientific Assessment of Ozone Depletion, 2002 updated a limited number of GWPs and ODPs (semiempirical values for all updated ODPs except CFC-114 and CFC-115, which are model-derived). All GWPs and ODPs that were not updated in 2002 are 1998 values that have not changed.