

Environmental Choice^M Program

CERTIFICATION CRITERIA DOCUMENT

CCD-148



Product: Carpet and Upholstery Care Products

Introduction

Environment Canada's Environmental Choice^M Program is pleased to publish the following national Certification Criteria Document on *Carpet and Upholstery Care Products*.

The Environmental Choice Program is designed to support a continuing effort to improve and 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.

Carpet and Upholstery care products that fall under this criteria document includes cleaners and shampoos designed to remove soil from carpet fibres and fabric. The group includes a full range of products designed for use in a variety of automatic cleaning machines (e.g., extraction, rotary brush, circular pad, dry foam). This document does not have requirements for the certification of carpet deodorizers, absorbent cleaning powders, sanitizers or stainguard products. The category group includes products sold to the household retail market and to cleaning professionals in the institutional market.

Cleaning of carpets and upholstery takes place in fixed contained indoor environments and carpet cleaning is linked to indoor air quality issues. Reduction in the amount and types of volatile compounds found in cleaners is a key environmental and human health leadership issue, as is minimising the amount of residue left on the carpet after cleaning. Most products have an ultimate disposal to aquatic ecosystems and the toxicity and biodegradability of compounds is another important opportunity for market leadership. Some carpet care products may introduce potentially undesirable chemicals into the environment (e.g, the biologically persistent pollutant alkylphenols from breakdown of surfactants). Packaging decisions can reduce transport emissions and reduce volumes to landfill.

Certification under the Environmental Choice Program will be awarded *Carpet and Upholstery Care Products* that demonstrate environmental leadership throughout their life-cycle and meet requirements for

- Performance (in particular efficacy, lack of resoiling, and effect on carpet colour);
- limited toxicity for aquatic and other organisms, including both acute/lethal toxicity and chronic/sublethal toxicity risks (e.g., endocrine disruption, carcinogens);
- biodegradability;
- limits on ingredients that are considered likely to contribute to specific environmental impacts (e.g., indoor air quality, ground-level ozone formation, depletion of stratospheric ozone);
- limited waste and resource use.

Information on the product group

Proper and regular maintenance of carpets and upholstery will increase their appearance, quality and lifespan. Carpets are a major floor covering present in schools, retail establishments, hotels, and homes and there are a variety of different cleaning methods in use.

Over 90% of all professional carpet cleaning jobs are estimated to be done with extraction machines. Most cleaning of carpets in commercial settings and a much cleaning of carpets and upholstery in residences is done through this hot water extraction method. Extraction machines inject a cleaning solution and hot water into the carpet or upholstery that is subsequently rinsed. Some products also call for a prior “pre-spraying” of the fabric with the cleaner. The soiled solution is generally returned to a waste tank and disposed of to sewage systems. Machines differ in the amount of pressure applied to carpets and the temperature of water used, with retail/rental machines being the least powerful.

Other cleaning methods include bonnet cleaning in which a rotary machine spins a mop-like “bonnet” over a carpet that has been pre sprayed with a cleaning solution. The bonnet is replaced when it becomes saturated and then rinsed clean before being used again. Other methods apply mechanical action with rotary brushes and use liquid or a foaming solution to clean. A distinct cleaning method involves spreading dry absorbent particles and solvent over the carpet and later vacuuming up the particles.

Spot cleaners for use on stains and spills on carpets are also commonly used products to be sprayed or wiped on to stains and removed with a rag. Additionally cleaning products branded as “pre-sprays” or “traffic lane cleaners” are used in heavily soiled areas prior to the extraction or shampoo process.

Many products are advertised for use in a variety of cleaning situations at different dilutions. Thus an “extraction cleaner” that is added to an hot water extraction machine at a 100:1 dilution may be used at a 10 to 1 dilution as a “bonnet cleaner” or a more concentrated version as a “spot cleaner” or a “pre-spray”. Extraction machine use will sometimes call for the use of a “defoamer” (typically this is a silicone emulsion).

Cleaning of carpets and upholstery takes place in fixed contained indoor environments and carpet cleaning is linked to indoor air quality issues. Different regulatory bodies in North America (e.g., California, New Jersey, Pennsylvania) have set limits on the volatile content of cleaners and this, together with indoor air quality concerns, is leading to the replacement and substitution of solvents and a reduction in the amount of residue left on carpets after cleaning.

Spot and stain removers are also commonly used intermittently. Other associated products include deodorisers, sanitizers and protectors/stainguards. The most common and effective soil and stainguards are fluoropolymer based and although potentially environmentally preferable alternatives exists (e.g., silicone as an active ingredient) these alternatives are not as effective against oily soils and may void carpet warranties because of interference with prior treatments.

Typical active ingredients in *Carpet and Upholstery Care Products* differ from product type to product type. Generally cleaning solutions, shampoos and spot and stain removers provide cleaning action through surfactants (ethoxylated alcohols, polyglucosides), solvents (alcohols, glycol ethers), builders (ethylene diamine tetracetic acid, imminodisuccinates), amines, acids and bases, and fragrances.

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

It is the intent of the Environmental Choice Program to re-evaluate from time to time the relevance of requirements in line with increased evidence of environmental impacts, manufacturing advances and other changes in the marketplace.

Future revisions of this Certification Criteria Document may revisit aquatic and mammalian toxicity limits as more data becomes available.

Interpretation

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

"aerosols" means a cloud or fine spray of particles of a liquid or a gas;

"asthmagens" substances known to cause asthma;

"bioaccumulate" means an ingredient tends to remain in biological systems, An ingredient is bioaccumulating if it has a bioconcentration factor > than 100 or Log BCF >2 when tested according to one of the following:

- *Code of Federal Regulation 40CFR797.1520,*
- *ASTM E-1022-84 Standard Practice for conducting bioconcentration test with fishes and salt-water bi-valve mollusk, or*
- *OECD Guidelines for Testing of Chemicals, 305C, Bioaccumulation: Degree of Bioconcentration in Fish;*

The following ingredients are considered non-bioaccumulative and do not have to be tested for BCF

- those that are readily biodegradable;
- those that have a water solubility greater than 1500 mg/L when tested using a method consistent with ASTM E1148-87, *Standard Test Method for Measurement of Aqueous Solubility,* and
- those that have an octanol-water partition coefficient of log P less than 3 when calculated, or tested using the *OECD Guidelines for Testing of Chemicals,* method 117 or 107.

"bioconcentration factor" means the ratio of chemical concentration in an organism to that in surrounding water;

"biocidal" means destructive to life. Biocides that may in carpet cleaners include quaternary ammonium compounds;

"Biosafety Level" means a classification of biological safety that may be documented on a material safety data sheet (MSDS) for a microbial culture. ATCC (American Type Culture Collection) has the following three classifications for microbial cultures:

- biosafety level 1: the culture is not known to cause disease in healthy human adults or animals,
- biosafety level 2: the culture may cause disease in humans or animals, and
- biosafety level 3: the culture is known to cause serious or potentially lethal disease in humans or animals;

"Carpet and Upholstery Cleaners" means a cleaning product designed to eliminate dirt and stains on rugs, carpeting, and the interior of motor vehicles and/or on household furniture or objects upholstered or covered with fabrics such as wool, cotton, nylon or other synthetic fabrics. "Carpet and Upholstery Cleaner" does not include dedicated stainguard products, absorbent cleaning powders, carpet deodorizers or solutions that claim an antibacterial effect

"carpet deodorizer" means a dedicated powder or liquid chemical mixture designed to be applied directly to carpet or upholstery to remove malodours;

"Chemicals that are known to the State of California to cause reproductive or developmental toxicity" means an annually updated list of chemicals said to cause developmental toxicity published by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (otherwise known as "Proposition 65");

"chlorinated plastic material" means packaging materials made of polyvinyl chloride (PVC) or other chlorinated compound;

"cleaners" means a chemical mixture designed to remove soil from carpet, upholstery and other fibres and for use in extraction machines, rotary machines and bonnet cleaning machines;

"EC50 luminescent bacteria > X mg/l" means that the product must not have a toxic effect at a concentration lower than X mg/L when tested on the bacteria *Photobacterium phosphoreum* for 30 minutes according to ***Biological Test Method: Toxicity Test Method Using Luminescent Bacteria Photobacterium phosphoreum***, Report EPS 1/RM/24, February 1992, Environment Canada;

"endocrine disruptor" means an exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub)populations. Candidate endocrine disruptors are listed in Appendix 1 of *Towards the Establishment of a Priority List of Substances for Further Evaluation of Their Role in Endocrine Disruption* prepared for the European Union;

"fluorescent brightening dyes" means dyes that fluoresce ultraviolet into visible light thereby making carpet or upholstery fibres appear brighter in sunlight or other light composed of ultraviolet wavelengths. These dyes are associated with yellowing of carpets over time;

"fluorinated surfactants" means wetting agents containing fluorine atoms. Fluorinated surfactants may be used to reduce resoiling and provide stainguard / repellency attributes to cleaners.

"IARC" means International Agency for Research on Cancer, an organization which lists known and suspected carcinogens;

"institution" means office, school, hospital, retail store, and other commercial or public workplace setting where, generally, professional cleaning companies (e.g., janitorial services), provide floor care;

"New Substances Regulations" means Canadian federal government regulations that requires that all "new" substances (ingredients), including those that are living organisms and their products, be examined for the likelihood that they will harm the environment before they are brought into (imported) or made (manufactured) in Canada.

"phosphorous based detergent builders" means phosphorous containing chemicals (e.g., sodium tripolyphosphate and trisodium phosphate) used to maintain a high solution pH, bind metal ions and emulsify soil.

"post-consumer" means material that has served its end-use at the consumer level, has been discarded by the consumer, and unless diverted, would enter the waste stream;

"propellants" means compressed gases or vapours in a container which, upon release of pressure and expansion through a valve, carry another substance from the container. Typical propellants are carbon dioxide, propane, butane, and isobutane;

"readily biodegradable" for a component, is determined using any of the six test methods described in *OECD Guidelines for Testing of Chemicals*, 301A-301F; for a whole formulation, is determined using one of the methods described in *OECD Guidelines for the Testing of Chemicals*, provided that all measurements and calculations are based on the carbon content of the mixture and its degradation, i.e. dissolved organic carbon (DOC) removal (301A or 301E), CO₂ evolution (301-B) or oxygen consumption in the presence of an inhibitor of nitrogen metabolism (301C, 301D, 301F);

"resoiling" means the appearance of soil on a recently cleaned carpet. One potential cause of quick resoiling is inadequate removal of residue from the cleaning solution;

"solvent" means a general term for a diverse range of liquid substances with dissolve other materials;

"spot and stain remover" means any product designed to clean localized areas, or remove localized spots or stains on carpets, and upholstery;

"surfactants" or "surface active agent" means an amphiphilic (dually water repelling and water attracting) substance that reduces the surface tension of water.

"toxic" means the ability to cause injury to living organisms as a result of physicochemical interaction. According to Section 64 of the Canadian Environmental Protection Act a substance is "toxic" if it is entering or may enter the environment in a quantity or concentration or under conditions that: have or may have an immediate or long-term harmful effect on the environment or its biological diversity; constitute or may constitute a danger to the environment on which life depends; or constitute or may constitute a danger in Canada to human life or health;

"volatile organic compound" or **"VOC"** means any organic compound which participates in atmospheric photochemical reactions to create smog. It excludes those organic compounds which the ECP designates as having negligible photochemical reactivity found in Appendix 2. The methods to calculate VOC content are:

- EPA Method 24-24A, 40 C.F.R., Part 60, Appendix A (1991),
- Method 18,48 Federal Register 48, no. 202, October 18, 1983,
- Method 1400 NIOSH Manual of Analytical Methods, Volume 1, February 1984,
- Environmental Protection Agency Method 8240 GC/MS Method for Volatile Organics, September 1986; or
- demonstrated through calculation from records of the amounts of constituents used to make the product where volatile means vapour pressure >0.01 KPa at 20°C.

Category Definition

2. This category includes all ***Carpet and Upholstery Care Products*** as further defined in the subcategories below:
 - (a) ***cleaners***, and
 - (b) ***spot and stain removers***.

Note: Other sub-categories may be added at a later date. The ECP reserves the right to determine which sub-category will be assigned to a particular applicant.

General Requirements

3. To be authorized to carry the EcoLogo^M, the ***Carpet and Upholstery Care Products*** must:
 - (a) meet or exceed all applicable governmental and industrial safety and performance standards; and
 - (b) be manufactured 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

Efficient and Safe Use

4. To be authorized to carry the EcoLogo^M, the ***Carpet and Upholstery Care Products*** must:
 - (a) demonstrate cleaning efficacy, lack of resoiling, and no acceleration of colour change of carpet dyes in standardized tests performed by accredited labs as measured visually by a colour scale or with a spectrophotometer (see Appendix 1 for details);
 - (b) if the pH of the product during use is above 9 then demonstrate that the product will not adversely effect the stain resisting properties of common carpet manufacturer treatments;
 - (c) not require warning labels as corrosive under the *Consumer Chemicals and Container Regulations* or the *Controlled Product Regulations of the Hazardous Products Act*;
 - (d) be accompanied by warnings that “asthmatics” and other “chemically sensitive” individuals should avoid recently cleaned areas for a period of at least 24 hours; (*Note: it is suggested that when complying with this criterion manufacturers stress that all carpet cleaning products introduce substances to the indoor environment, and the certified product has comparatively reduced risk*);
 - (e) be accompanied with instructions advising a thorough vacuuming of the carpet after it dries to remove any potential residue remaining from the cleaner;
 - (f) be accompanied by detailed instructions on safe use and handling procedures;
 - (g) be accompanied with indications for proper waste disposal of product;
 - (h) be accompanied with instructions on the recyclability of the container and/or packaging materials;

- (i) as demonstrated by the due diligence of the manufacturer,
 - i. not be packaged in chlorinated plastic materials; and
 - ii. efforts have been made to ensure packaging with post-consumer recycled content;
- (j) not be formulated or manufactured with propellants; and
- (k) not be sold in a disposable wipe format.

Prohibited and restricted components

5. To be authorized to use the EcoLogo, all *Carpet and Upholstery Care Products* must:

- (a) not be formulated or manufactured with solvents belonging to the following groups;
 - i. halogenated solvents;
 - ii. aromatic solvents;
 - iii. ethylene glycol monomethyl ether or its acetate;
 - iv. ethylene glycol monoethyl ether or its acetate;
 - v. ethylene glycol monobutyl ether or its acetate;
 - vi. ethylene glycol monopropyl ether or its acetate; or
 - vii. diethylene glycol monomethyl ether.
- (b) not be formulated or manufactured with Ethylene Diaminetetracetic acid;
- (c) not be formulated or manufactured with phosphorous based detergents;
- (d) not be formulated or manufactured with alkylphenol ethoxylate (APEOs) surfactants;
- (e) not be formulated or manufactured with fluorinated surfactants;
- (f) not be formulated or manufactured with fluorescent brightening dyes;
- (g) be in accordance with the Volatile Organic Compounds (VOC) levels set out in the table measured as used;

Cleaners	Spot and Stain removers
0.1%	8%

- (h) not be formulated or manufactured with ingredients with a sole purpose of adding to the scent of the product;
- (i) if sold or advertised as containing specific odour destroying or odour neutralizing ingredients then demonstrate that these ingredients remove malodours through a physio-chemical process that is not simply masking and overpowering odours;
- (j) not be formulated or manufactured with ingredients with a sole purpose of adding to the biocidal or antimicrobial effect of the product on carpets or upholstery;

- (k) if formulated or manufactured with bacteria and/or enzymes, then the bacteria/enzyme mixture must;
 - i. be in compliance with the New Substances Notification Regulations as per the Canadian Environmental Protection Act, 1999;
 - ii. use (or be derived from) only those bacterial cultures that are derived from a Biosafety Level 1 ATCC microbial culture (or equivalent).
- (l) not be formulated or manufactured with any ingredients that are included in the International Agency for Research on Cancer (IARC) lists for proven (Group 1), probable (Group 2A) or possible (Group 2B) carcinogens;
- (m) not be formulated or manufactured with any ingredients that are known to the State of California to cause reproductive or developmental toxicity;
- (n) not be formulated or manufactured with any ingredients identified for priority for research as endocrine disruptors by the European Union; and
- (o) not be formulated or manufactured with any ingredients identified as asthmagens by the Association of Occupational & Environmental Clinics.

Toxicity and Biodegradation

6. To be authorized to use the Ecologo, all *Carpet and Upholstery Care Products* must:

- (a) demonstrate low toxicity to aquatic and terrestrial life as described in the table below;

Cleaners: Extraction	Cleaners: Shampoo, Bonnet Cleaner, Pre-Spray	Spot & Stain removers
at use dilution EC50 luminescent bacteria > 10,000 mg/l	at use dilution EC50 luminescent bacteria > 15 mg/l	at use dilution EC50 luminescent bacteria > 3,500 µg/l
And	And	And
Calculated LD50 (oral rat) of >5,000 mg/kg	Calculated LD50 (oral rat) of >5,000 mg/kg	Calculated LD50 (oral rat) of >5,000 mg/kg

- (b) be formulated or manufactured with ingredients that are readily biodegradable or demonstrate that the entire product is readily biodegradable;
- (c) not be formulated or manufactured with ingredients that bioaccumulate.

Verification

6. To verify a claim that a product 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 production facilities on an announced basis.
7. 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 wholesale or retail packaging, or on the product itself, provided that the product 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. A criteria statement appear with the EcoLogo whenever the EcoLogo is used in association with the ***Carpet and Upholstery Care Product***. The intent of this statement is to provide clarification as to why the product 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.

Regardless of the applicable sub-category, the ECP suggested criteria statement wording for this product type is “***Carpet and Upholstery Care Products***”. The licensee may propose other wording for the criteria statement, but any such proposed wording must be approved by the Environmental Choice Program.

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Appendix 1: Procedure to demonstrate product efficacy when recognized standard not available

At the time of publication, the ECP is awaiting the publication of a North American wide accepted test method available to evaluate the efficacy of carpet cleaners and spot and stain removers. However it has been confirmed that at least one testing laboratory is recognised by the industry for its work in testing the performance of cleaners, and an industry association is planning to publish a recognized standard.

The ECP will accept efficacy test data that indicate the product is able to clean the intended surface, (e.g., achieve at least a “3” rating on a American Association of Textile Chemists and Colorists (AATCC) Gray Scale), not promote resoiling and not significantly adversely impact colour fastness.

The tests may be done as a comparison to a nationally available brand product in which the tested product performs as well or better than the reference product. Or, if sufficient test method exist the tests may be done against other standardised controls (e.g., resoiling of a recently cleaned versus a non-cleaned carpet sample).

Whatever method is employed, efficacy testing must comply with the following general conditions:

1. Testing must be performed by a third party accredited laboratory;
2. Testing must be carried out under controlled, replicable conditions; in situ or anecdotal data is not acceptable for ECP certification;
3. Preference is given to objective results quantified in recognized metric units;
4. All control conditions must be specified;
5. The product must be tested at its maximum recommended dilution (i.e., minimum concentration); and
6. Complete copy of the testing protocol and final report must be made available to the ECP

Appendix 2: Volatile Organic Compounds with Negligible Photochemical Reactivity

1. The list of volatile organic compounds (VOCs) designated by the Environmental Choice Program as having negligible photochemical reactivity has been taken from Guidelines for Volatile Organic Compounds in Consumer Products, *Canadian Environmental Protection Act 1999*

This ECP designated list includes the following compounds:

- | | |
|---|---|
| (a) methane; | (z.2) difluoromethane (HFC-32); |
| (b) ethane; | (z.3) ethylfluoride (HFC-161); |
| (c) methylene chloride (dichloromethane); | (z.4) 1,1,1,3,3,3-hexafluoropropane (HFC-236fa); |
| (d) 1,1,1-trichloroethane (methyl chloroform); | (z.5) 1,1,2,2,3-pentafluoropropane (HFC-245ca); |
| (e) 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); | (z.6) 1,1,2,3,3-pentafluoropropane (HFC-245ea); |
| (f) trichlorofluoromethane (CFC-11); | (z.7) 1,1,1,2,3-pentafluoropropane (HFC-245eb); |
| (g) dichlorodifluoromethane (CFC-12); | (z.8) 1,1,1,3,3-pentafluoropropane (HFC-245fa); |
| (h) chlorodifluoromethane (HCFC-22); | (z.9) 1,1,1,2,3,3-hexafluoropropane (HFC-236ea); |
| (i) trifluoromethane (HFC-23); | (z.10) 1,1,1,3,3-pentafluorobutane (HFC-365mfc); |
| (j) 1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114); | (z.11) chlorofluoromethane (HCFC-31); |
| (k) chloropentafluoroethane (CFC-115); | (z.12) 1-chloro-1-fluoroethane (HCFC-151a); |
| (l) 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); | (z.13) 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a); |
| (m) 1,1,1,2-tetrafluoroethane (HFC-134a); | (z.14) 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxybutane (C ₄ F ₉ OCH ₃); |
| (n) 1,1-dichloro 1-fluoroethane (HCFC-141b); | (z.15) 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF ₃) ₂ CF ₂ OC ₂ H ₅); |
| (o) 1-chloro 1,1-difluoroethane (HCFC-142b); | (z.16) 1-ethoxy-1,1,2,2,3,3,3,4,4,4-nonafluorobutane (C ₄ F ₉ OC ₂ H ₅); |
| (p) 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); | (z.17) 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF ₃) ₂ CF ₂ OC ₂ H ₅); and |
| (q) pentafluoroethane (HFC-125); | (z.18) methyl acetate and perfluorocarbon compounds that fall into the following classes, namely, |
| (r) 1,1,2,2-tetrafluoroethane (HFC-134); | (i) cyclic, branched or linear completely fluorinated alkanes, |
| (s) 1,1,1-trifluoroethane (HFC-143a); | (ii) cyclic, branched, or linear completely fluorinated ethers with no unsaturation, |
| (t) 1,1-difluoroethane (HFC-152a); | (iii) cyclic, branched or linear completely fluorinated tertiary amines with no unsaturation, and |
| (u) parachlorobenzotrifluoride (PCBTF); | (iv) sulfur containing perfluorocarbons with no unsaturation and with sulfur bonds only to carbon and fluorine. (composés organiques volatils (ou COV)) |
| (v) cyclic, branched or linear completely methylated siloxanes; | |
| (w) acetone; | |
| (x) perchloroethylene (tetrachloroethylene); | |
| (y) 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); | |
| (z) 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); | |
| (z.1) 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC-43-10mee); | |