

APPENDIX E TO SUBPART G OF PART 82—UNACCEPTABLE SUBSTITUTES LISTED IN THE JANUARY 26, 1999 FINAL RULE, EFFECTIVE JANUARY 26, 1999

REFRIGERATION AND AIR-CONDITIONING SECTOR UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
All refrigeration and air-conditioning end uses	MT-31	Unacceptable	Chemical contained in this blend presents unacceptable toxicity risk.

[64 FR 3865, Jan. 26, 1999]

APPENDIX F TO SUBPART G OF PART 82—UNACCEPTABLE SUBSTITUTES LISTED IN THE JANUARY 26, 1999 FINAL RULE, EFFECTIVE JANUARY 26, 1999

REFRIGERATION AND AIR-CONDITIONING SECTOR UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
All refrigeration and air-conditioning end uses.	Hexafluoropropylene (HFP) and all HFP-containing blends.	Unacceptable	Presents unacceptable toxicity risk.

[64 FR 3868, Jan. 26, 1999]

APPENDIX G TO SUBPART G OF PART 82—SUBSTITUTES SUBJECT TO USE RESTRICTIONS AND UNACCEPTABLE SUBSTITUTES LISTED IN THE MARCH 3, 1999, FINAL RULE, EFFECTIVE APRIL 2, 1999.

REFRIGERANTS UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
CFC-12, R-502, and HCFC-22 Household Refrigeration, Transport Refrigeration, Vending Machines, Cold Storage Warehouses, and Retail Food Refrigeration, Retrofit and New.	Self-Chilling Cans-Using HFC-134a or HFC-152a.	Unacceptable	Unacceptably high greenhouse gas emissions from direct release of refrigerant to the atmosphere.

[64 FR 10378, Mar. 3, 1999]

APPENDIX H TO SUBPART G OF PART 82—SUBSTITUTES SUBJECT TO USE RESTRICTIONS AND UNACCEPTABLE SUBSTITUTES, EFFECTIVE MAY 28, 1999

CFC-12 Automobile and Non-automobile Motor Vehicle Air Conditioners, Retrofit and New

Criteria for Uniqueness of Fittings

(a) All fittings for alternative motor vehicle refrigerants must meet the following requirements:

(1) High-side screw-on fittings for each refrigerant must differ from high-side screw-on fittings for all other refrigerants, including CFC-12, and from low-side screw-on fittings for CFC-12;

(2) Low-side screw-on fittings for each refrigerant must differ from low-side screw-on fittings for all other refrigerants, including CFC-12;

(3) High-side screw-on fittings for a given refrigerant must differ from low-side screw-on fittings for that refrigerant, to protect

against connecting a low-pressure system to a high-pressure one;

(4) High-side quick-connect fittings for each refrigerant must differ from high-side quick-connect fittings for all other refrigerants, including CFC-12 (if they exist);

(5) Low-side quick-connect fittings for each refrigerant must differ from low-side quick-connect fittings for all other refrigerants, including CFC-12 (if they exist);

(6) High-side quick-connect fittings for a given refrigerant must differ from low-side quick-connect fittings for that refrigerant, to protect against connecting a low-pressure system to a high-pressure one;

(7) For each type of container, the fitting for each refrigerant must differ from the fitting for that type of container for all other refrigerants, including CFC-12.

(b) For screw-on fittings, “differ” means that either the diameter must differ by at least 1/16 inch or the thread direction must be reversed (i.e. right-handed vs. left-handed). Simply changing the thread pitch is not sufficient. For quick-connect fittings, “differ”

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means that a person using normal force and normal tools (including wrenches) must not be able to cross-connect fittings.

(c) The sole exception to the $\frac{1}{16}$ inch difference requirement is the difference between the small can fittings for GHG-X4 and

R-406A. The GHG-X4 small can fitting uses a metric measurement, and is slightly less than $\frac{1}{16}$ inch larger than the small can fitting for R-406A. EPA has concluded that these fittings will not cross-connect, and therefore they may be used.

REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
All HCFC-22 end-uses, retrofit and new	NARM-22	Unacceptable	This blend contains HCFC-22, and it is inappropriate to use such a blend as a substitute for HCFC-22. In addition, this blend contains HFC-23, which has an extremely high GWP and lifetime. Other substitutes for HCFC-22 exist that do not contain either HCFC-22 or HFC-23.

SOLVENTS CLEANING—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Metals, Electronic, and Precision cleaning with CFC-113, methyl chloroform, and HCFC-141b.	Chlorobromo-methane	Unacceptable	Other alternatives exist with zero or much lower ODP.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS: TOTAL FLOODING AGENTS

End-use	Substitute	Decision	Conditions	Further information
Total flooding	HFC-236fa	Acceptable subject to narrowed use limits.	Acceptable when manufactured using any process that does not convert perfluorobutylene (PFIB) directly to HFC-236fa in a single step: for use in explosion suppression and explosion inertion applications, and for use in fire suppression applications where other non-PFC agents or alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems.	Use of this agent should be in accordance with the safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Systems. Users should observe the limitations on HFC-236fa acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties, or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems. Documentation of such measures should be available for review upon request. The principal environmental characteristic of concern for HFC-236fa is its high GWP of 9400 and long atmospheric lifetime of 226 years. Actual contributions to global warming depend upon the quantities emitted. See additional comments 1, 2, 3, 4, 5.

<p>Total flooding C₁F₈</p>	<p>Acceptable subject to narrowed use limits.</p>	<p>Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems.</p>	<p>Use of this agent should be in accordance with the safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems. Users should observe the limitations on PFC acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems. Documentation of such measures should be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. Actual contributions to global warming depend upon the quantities of PFCs emitted. See additional comments 1, 2, 3, 4, 5.</p>
<p>Total flooding C₁F₁₀</p>	<p>Acceptable subject to narrowed use limits</p>	<p>Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems.</p>	<p>Use of this agent should be in accordance with the safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems. Users should observe the limitations on PFC acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet safety guidelines in the latest edition of the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems. Documentation of such measures should be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. Actual contributions to global warming depend upon the quantities of PFCs emitted. See additional comments 1, 2, 3, 4, 5.</p>

Additional comments:

- 1—Should conform with relevant OSHA requirements, including 29 CFR 1910, Subpart L, Sections 1910.160 and 1910.162.
- 2—Per OSHA requirements, protective gear (SCBA) should be available in the event personnel should reenter the area.
- 3—Discharge testing should be strictly limited to that which is essential to meet safety or performance requirements.
- 4—The agent should be recovered from the fire protection system in conjunction with testing or servicing, and recycled for later use or destroyed.
- 5—EPA has no intention of duplicating or displacing OSHA coverage related to the use of personal protective equipment (e.g., respiratory protection), fire protection, hazard communication, worker training or any other occupational safety and health standard with respect to halon substitutes.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—STREAMING AGENTS—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Conditions	Comments
Halon 1211 replacement	C6F14	Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements: (a) because of their physical or chemical properties, or (b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions.		Users should observe the limitations on PFC acceptability by taking the following measures: (i) conduct an evaluation of foreseeable conditions of end-use; (ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and (iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions Documentation of such measures should be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. Actual contributions to global warming depend upon the quantities of PFCs emitted. For additional guidance regarding applications in which PFCs may be appropriate, users should consult the description of potential uses which is included in the March 18, 1994 Final Rule (59 FR 13044.) See comments 1, 2. See comments 1, 2, 3.
Halon 1211 replacement.	HFC-236fa	Acceptable in nonresidential uses when manufactured using any process that does not convert perfluorobutylene (PFIB) directly to HFC-236fa in a single step		See comments 1, 2.
Halon 1211 replacement. Additional comments:	HFC-227ea	Acceptable in nonresidential uses only		See comments 1, 2.

- 1—Discharge testing and training should be strictly limited only to that which is essential to meet safety or performance requirements.
- 2—The agent should be recovered from the fire protection system in conjunction with testing or servicing, and recycled for later use or destroyed.
- 3—Acceptable for local application systems inside textile process machinery.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—TOTAL FLOODING AGENTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Halon 1301 replacement	Chlorobromo-methane	Unacceptable	Other alternatives exist with zero or lower ODP. OSHA regulations prohibit its use as extinguishing agent in fixed extinguishing systems where employees may be exposed. See 29 CFR 1910.160(b)(11).

AEROSOLS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Solvent in aerosols with CFC-113, MCF, or HCFC-141b.	Chlorobromo-methane	Unacceptable	Other alternatives exist with zero or much lower ODP.

ADHESIVES, COATINGS, AND INKS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Solvent in adhesives, coatings, and inks with CFC-113.	Chlorobromo-methane	Unacceptable	Other alternatives exist with zero or much lower ODP.
Solvent in adhesives, coatings, and inks with MCF.	Chlorobromo-methane	Unacceptable	Other alternatives exist with zero or much lower ODP.
Solvent in adhesives, coatings and inks with HCFC-141b.	Chlorobromo-methane	Unacceptable	Other alternatives exist with zero or much lower ODP.

[64 FR 22996, Apr. 28, 1999, as amended at 67 FR 4201, Jan. 29, 2002]