

(b) *Substantiation of confidentiality claims.* At the time of submission, EPA requires substantiation of any confidentiality claims made. Failure to provide any substantiation may result in disclosure of information without further notice by the Agency. All submissions must include adequate substantiation in order for an acceptability determination on a substitute to be published. Moreover, under 40 CFR part 2, subpart B, there are further instances in which confidentiality assertions may later be reviewed even when confidentiality claims are initially received. The submitter will also be contacted as part of such an evaluation process.

(c) *Confidentiality provisions for toxicity data.* In the event that toxicity or health and safety studies are listed as confidential, this information cannot be maintained as confidential where such data are also submitted under TSCA or FIFRA, to the extent that confidential treatment is prohibited under those statutes. However, information contained in a toxicity study that is not health and safety data and is not relevant to the effects of a substance on human health and the environment (e.g., discussion of process information, proprietary blends) can be maintained as confidential subject to 40 CFR part 2, subpart B.

(d) *Joint submissions under other statutes.* Information submitted as part of a joint submission to either SNAP/TSCA or SNAP/FIFRA must adhere to the security provisions of the program offices implementing these statutes. For such submissions, the SNAP handling of such notices will follow the security provisions under these statutes.

#### § 82.184 Petitions.

(a) *Who may petition.* Any person may petition the Agency to amend existing listing decisions under the SNAP program, or to add a new substance to any of the SNAP lists.

(b) *Types of petitions.* Five types of petitions exist:

(1) Petitions to add a substitute not previously reviewed under the SNAP program to the acceptable list. This type of petition is comparable to the 90-day notifications, except that it would generally be initiated by entities

other than the companies that manufacture, formulate, or otherwise use the substitute. Companies that manufacture, formulate, or use substitutes that want to have their substitutes added to the acceptable list should submit information on the substitute under the 90-day review program;

(2) Petitions to add a substitute not previously reviewed under the SNAP program to the unacceptable list;

(3) Petitions to delete a substitute from the acceptable list and add it to the unacceptable list or to delete a substitute from the unacceptable and add it to the acceptable list;

(4) Petitions to add or delete use restrictions on an acceptability listing.

(5) Petitions to grandfather use of a substitute listed as unacceptable or acceptable subject to use restrictions.

(c) *Content of the petition.* The Agency requires that the petitioner submit information on the type of action requested and the rationale for the petition. Petitions in paragraphs (b)(1) and (2) of this section must contain the information described in § 82.178, which lists the items to be submitted in a 90-day notification. For petitions that request the re-examination of a substitute previously reviewed under the SNAP program, the submitter must also reference the prior submittal or existing listing. Petitions to grandfather use of an unacceptable substitute must describe the applicability of the test to judge the appropriateness of Agency grandfathering as established by the United States District Court for the District of Columbia Circuit (see *Sierra Club v. EPA*, 719 F.2d 436 (D.C. Cir. 1983)). This test includes whether the new rule represents an abrupt departure from previously established practice, the extent to which a party relied on the previous rule, the degree of burden which application of the new rule would impose on the party, and the statutory interest in applying the new rule immediately.

(d) *Petition process.* (1) Notification of affected companies. If the petition concerns a substitute previously either approved or restricted under the SNAP program, the Agency will contact the original submitter of that substitute.

(2) *Review for data adequacy.* The Agency will review the petition for

adequacy of data. As with a 90-day notice, the Agency may suspend review until the petitioner submits the information necessary to evaluate the petition. To reach a timely decision on substitutes, EPA may use collection authorities such as those contained in section 114 of the Clean Air Act as amended, as well as information collection provisions of other environmental statutes.

(3) *Review procedures.* To evaluate the petition, the Agency may submit the petition for review to appropriate experts inside and outside the Agency.

(4) *Timing of determinations.* If data are adequate, as described in §82.180, the Agency will respond to the petition within 90 days of receiving a complete petition. If the petition is inadequately supported, the Agency will query the petitioner to fill any data gaps before the 90-day review period begins, or may deny the petition because data are inadequate.

(5) *Rulemaking procedures.* EPA will initiate rulemaking whenever EPA

grants a petition to add a substance to the list of unacceptable substitutes, remove a substance from any list, or change or create an acceptable listing by imposing or deleting use conditions or use limits.

(6) *Communication of decision.* The Agency will inform petitioners within 90 days of receiving a complete petition whether their request has been granted or denied. If a petition is denied, the Agency will publish in the FEDERAL REGISTER an explanation of the determination. If a petition is granted, the Agency will publish the revised SNAP list incorporating the final petition decision within 6 months of reaching a determination or in the next scheduled update, if sooner, provided any required rulemaking has been completed within the shorter period.

APPENDIX A TO SUBPART G OF PART 82—  
SUBSTITUTES SUBJECT TO USE RESTRICTIONS AND UNACCEPTABLE SUBSTITUTES

REFRIGERANTS  
Unacceptable Substitutes

End-use	Substitute	Decision	Comments
CFC-11 centrifugal chillers (retrofit).	HCFC-141b .....	Unacceptable .....	Has a high ODP relative to other alternatives.
CFC-12 centrifugal chillers (retrofit).	HCFC-22/HFC-142b/ CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-11, CFC-12, CFC-113, CFC-114, R-500 centrifugal chillers (new equipment/NIKs).	HCFC-22/HFC-142b/ CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 reciprocating chillers (retrofit).	HCFC-141b .....	Unacceptable .....	Has a high ODP relative to other alternatives.
	HCFC-22/HFC-142b/ CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 reciprocating chillers (new equipment/NIKs).	HCFC-22/HFC-142b/ CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-11, CFC-12, R-502 industrial process refrigeration (retrofit).	HCFC-22/HFC-142b/ CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFC-11, CFC-12, R-502 industrial process refrigeration (new equipment/NIKs).	HCFC-22/HFC-142b/ CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.

REFRIGERANTS—Continued  
Unacceptable Substitutes

End-use	Substitute	Decision	Comments
CFC-12, R-502 ice skating rinks (retrofit).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 ice skating rinks (new equipment/NIKs).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 cold storage warehouses (retrofit).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 cold storage warehouses (new equipment/NIKs).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500, R-502 refrigerated transport (retrofit).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500, R-502 refrigerated transport (new equipment/NIKs).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 retail food refrigeration (retrofit).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 retail food refrigeration (new equipment/NIKs).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 commercial ice machines (retrofit).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 commercial ice machines (new equipment/NIKs).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 vending machines (retrofit).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 vending machines (new equipment/NIKs).	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.

REFRIGERANTS—Continued  
Unacceptable Substitutes

End-use	Substitute	Decision	Comments
CFR-12, water coolers (retrofit).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, water coolers (New equipment/NIKs).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, household refrigerators (retrofit).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, household refrigerators (new equipment/NIKs).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, R-502 household freezers (retrofit).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, 502 household freezers (new equipment/NIKs).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, R-500 residential dehumidifiers (retrofit).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, R-500 residential dehumidifiers (new equipment/NIKs).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, motor vehicle air conditioners (retrofit).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
CFR-12, motor vehicle air conditioners (new equipment/NIKs).	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	HCFC-22/HFC-142b/CFC-12.	Unacceptable .....	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon blend A .....	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.

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FOAMS  
Unacceptable Substitutes

End-use	Substitute	Decision	Comments
CFC-11 Polyolefin .....	HCFC-141b (or blends thereof).	Unacceptable .....	HCFC-141b has an ODP of 0.11, almost equivalent to that of methyl chloroform, a Class I substance. The Agency believes that non-ODP alternatives are sufficiently available to render the use of HCFC-141b unnecessary in polyolefin foams.

SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Comments
Electronics cleaning w/ CFC-113, MCF.	Perfluoro-carbons (C5F12, C6F12, C6F14, C7F16, C8F18, C5F11NO, C6F13NO, C7F15NO, and C8F16).	Acceptable for high-performance, precision-engineered applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	The principal environmental characteristic of concern for PFCs is that they have long atmospheric lifetimes and high global warming potentials. Although actual contributions to global warming depend upon the quantities of PFCs emitted, the effects are for practical purposes irreversible. Users must observe this limitation on PFC acceptability by conducting a reasonable evaluation of other substitutes to determine that PFC use is necessary to meet performance or safety requirements. Documentation of this evaluation must be kept on file. For additional guidance regarding applications in which PFCs may be appropriate, users should consult the Preamble for this rule-making.
Precision cleaning w/ CFC-113, MCF.	Perfluoro-carbons (C5F12, C6F12, C6F14, C7F16, C8F18, C5F11NO, C6F13NO, C7F15NO, and C8F16).	Acceptable for high-performance, precision-engineered applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	The principal environmental characteristic of concern for PFCs is that they have long atmospheric lifetimes and high global warming potentials. Although actual contributions to global warming depend upon the quantities of PFCs emitted, the effects are for practical purposes irreversible. Users must observe this limitation on PFC acceptability by conducting a reasonable evaluation of other substitutes to determine that PFC use is necessary to meet performance or safety requirements. Documentation of this evaluation must be kept on file. For additional guidance regarding applications in which PFCs may be appropriate, users should consult the Preamble for this rule-making.

UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
Metals cleaning w/CFC-113.	HCFC 141b and its blends.	Unacceptable .....	High ODP; other alternatives exist. Effective date: As of 30 days after final rule for uses in new equipment (including retrofits made after the effective date); as of January 1, 1996, for uses in existing equipment. EPA will grant, if necessary, narrowed use acceptability listings for CFC-113 past the effective date of the prohibition.
Metals cleaning w/MCF ..	HCFC 141b and its blends.	Unacceptable .....	High ODP; other alternatives exist. Effective date: As of 30 days after final rule for uses in new equipment (including retrofits made after the effective date); as of January 1, 1996, for uses in existing equipment.

UNACCEPTABLE SUBSTITUTES—Continued

End-use	Substitute	Decision	Comments
Electronics cleaning w/ CFC-113.	HCFC 141b and its blends.	Unacceptable .....	High ODP; other alternatives exist. Effective date: As of 30 days after final rule for uses in new equipment (including retrofits made after the effective date); as of January 1, 1996, for uses in existing equipment. EPA will grant, if necessary, narrowed use acceptability listings for CFC-113 past the effective date of the prohibition.
Electronics cleaning w/ MCF.	HCFC 141b and its blends.	Unacceptable .....	High ODP; other alternatives exist. Effective date: As of 30 days after final rule for uses in new equipment (including retrofits made after the effective date); as of January 1, 1996, for uses in existing equipment.
Precision cleaning w/ CFC-113.	HCFC 141b and its blends.	Unacceptable .....	High ODP; other alternatives exist. Effective date: As of 30 days after final rule for uses in new equipment (including retrofits made after the effective date); as of January 1, 1996, for uses in existing equipment. EPA will grant, if necessary, narrowed use acceptability listings for CFC-113 past the effective date of the prohibition.
Precision cleaning w/ MCF.	HCFC 141b and its blends.	Unacceptable .....	High ODP; other alternatives exist. Effective date: As of 30 days after final rule for uses in new equipment (including retrofits made after the effective date); as of January 1, 1996, for uses in existing equipment.

FIRE SUPPRESSION AND EXPLOSION PROTECTION STREAMING AGENTS

Substitutes Acceptable Subject to Narrowed Use Limits

End-use	Substitute	Decision	Conditions	Comments
Halon 1211 Streaming Agents.	[CFC Blend] .....	Acceptable in non-residential uses only.	.....	Use of CFCs are controlled under CAA section 610 which bans use of CFCs in pressurized dispensers, and therefore are not permitted for use in portable fire extinguishers. EPA will list this agent as proposed unacceptable in the next SNAP proposed rule-making. Because CFCs are a Class I substance, production will be phased out by January 1, 1996. See additional comments 1, 2.
	HBFC-22B1 .....	.....	Acceptable in non-residential uses only.	Proper procedures regarding the operation of the extinguisher and ventilation following dispensing the extinguishant is recommended. Worker exposure may be a concern in small office areas. HBFC-22B1 is considered an interim substitute for Halon 1211. Because the HBFC-22B1 has an ODP of .74, production will be phased out (except for essential uses) on January 1, 1996. This agent was submitted to the Agency as a Premanufacture Notice (PMN) and is presently subject to requirements contained in a Toxic Substance Control Act (TSCA) Consent Order. See additional comments 1, 2.

FIRE SUPPRESSION AND EXPLOSION PROTECTION STREAMING AGENTS—Continued  
 Substitutes Acceptable Subject to Narrowed Use Limits

End-use	Substitute	Decision	Conditions	Comments
	C <sub>6</sub> F <sub>14</sub> .....	Acceptable for non-residential uses where other alternatives are not technically feasible due to performance or safety requirements:  a. due to the physical or chemical properties of the agent, or  b. where human exposure to the extinguishing agent may approach cardiosensitization levels or result in other unacceptable health effects under normal operating conditions.	.....  .....  .....	Users must observe the limitations on PFC acceptability by making reasonable effort to undertake 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 approach or result in cardiosensitization or other unacceptable toxicity effects under normal operating conditions; Documentation of such measures must 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 preamble to this rule-making.  See additional comments 1, 2.

Additional Comments:  
 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.

FIRE SUPPRESSION AND EXPLOSION PROTECTION STREAMING AGENTS  
 Unacceptable Substitutes

End-use	Substitute	Decision	Comments
Halon 1211 Streaming Agents.	[CFC-11] .....	Unacceptable .....	This agent has been suggested for use on large outdoor fires for which non-ozone depleting alternatives are currently used.

FIRE SUPPRESSION AND EXPLOSION PROTECTION TOTAL FLOODING AGENTS  
Substitutes Acceptable Subject To Use Conditions

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 Total Flooding Agents.	HBFC-22B1 .....	Acceptable .....	<p>Until OSHA establishes applicable workplace requirements: Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 0.3%.</p> <p>Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 1.0%.</p> <p>HBFC-22B1 concentrations greater than 1.0% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p> <p>Until OSHA establishes applicable workplace requirements:</p>	<p>The comparative design concentration based on cup burner values is approximately 5.3%, while its cardiotoxic LOAEL is 1%. Thus, it is unlikely that this agent will be used in normally occupied areas. HBFC-22B1 can be considered only an interim substitute for Halon 1301. HBFC-22B1 has an ODP of .74; thus, production will be phased out January 1, 1996.</p> <p>This agent was submitted to the Agency as a Premanufacture Notice (PMN) and is presently subject to requirements contained in a Toxic Substance Control Act (TSCA) Consent Order. See additional comments 1, 2, 3, 4.</p>
	HCFC-22 .....	Acceptable .....	<p>Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 2.5%.</p> <p>Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 5.0%.</p> <p>HCFC-22 concentrations greater than 5.0% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p> <p>Until OSHA establishes applicable workplace requirements:</p>	<p>The comparative design concentration based on cup burner values is approximately 13.9% while its cardiotoxic LOAEL is 5.0%. Thus, it is unlikely that this agent will be used in normally occupied areas. See additional comments 1, 2, 3, 4.</p>
	HCFC-124 .....	Acceptable .....	<p>Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 1.0%.</p>	<p>The comparative design concentration based on cup burner values is approximately 8.4% while its cardiotoxic LOAEL is 2.5%. Thus, it is unlikely that this agent will be used in normally occupied areas. See additional comments 1, 2, 3, 4.</p>

[HFC BLEND] A .....	Acceptable .....	<p>Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL OF 2.5%.</p> <p>HFC-123 concentrations greater than 2.5% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p> <p>Until OSHA establishes applicable workplace requirements:</p> <p>Where egress from an area cannot be accomplished within one minute, the employer shall not use [HFC Blend] A in concentrations exceeding its cardiotoxic NOAEL of 10.0%.</p> <p>Where egress takes greater than 30 seconds but less than one minute, the employer shall not use [HFC Blend] A in a concentration greater than its cardiotoxic LOAEL of 10.0%.</p> <p>[HFC Blend] A concentrations greater than 10 percent are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p> <p>Until OSHA establishes applicable workplace requirements:</p> <p>Where egress from an area cannot be accomplished within one minute, the employer shall not use HFC-23 in concentrations exceeding 30%.</p> <p>Where egress takes greater than 30 seconds but less than one minute, the employer shall not use HFC-23 in a concentration greater than 50.0%.</p> <p>HFC-23 concentrations greater than 50 percent are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p> <p>The design concentration must result in an oxygen level of at least 16%.</p> <p>Until OSHA establishes applicable workplace requirements:</p> <p>Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 7.5%.</p>	<p>The comparative design concentration based on full-scale testing is approximately 8.6%.</p> <p>The agent should be recovered from the fire protection system in conjunction with testing or servicing, and should be recycled for later use or destroyed.</p> <p>See additional comments 1, 2, 3, 4.</p>
HFC-23 .....	Acceptable .....		<p>The comparative design concentration based on cup burner values is approximately 14.4% while data indicates that its cardiotoxic NOAEL is 30% without added oxygen and 50% with added oxygen. Its LOAEL is likely to exceed 50%.</p> <p>See additional comments 1, 2, 3, 4.</p>
HFC-125 .....	Acceptable .....		<p>The comparative design concentration based on cup burner values is approximately 11.3% while its cardiotoxic LOAEL is 10.0%. Thus, it is unlikely that this agent will be used in normally occupied areas.</p> <p>See additional comments 1, 2, 3, 4.</p>

FIRE SUPPRESSION AND EXPLOSION PROTECTION TOTAL FLOODING AGENTS—Continued  
Substitutes Acceptable Subject To Use Conditions

End-use	Substitute	Decision	Conditions	Comments
	HFC-134a .....	Acceptable .....	<p>Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 10.0%.</p> <p>HFC-125 concentrations greater than 10.0% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p> <p>Until OSHA establishes applicable workplace requirements:</p> <p>Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 4.0%.</p> <p>Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 8.0%.</p> <p>HFC-134a concentrations greater than 8.0% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p>	<p>The comparative design concentration based on cup burner values is approximately 12.6% while its cardiotoxic LOAEL is 8.0%. Thus, it is unlikely that this agent will be used in normally occupied areas. See additional comments 1, 2, 3, 4.</p>
	HFC-227ea .....	Acceptable .....	<p>Until OSHA establishes applicable workplace requirements:</p> <p>Where egress from an area cannot be accomplished within one minute, the employer shall not use HFC-227ea in concentrations exceeding its cardiotoxic NOAEL of 9.0%.</p> <p>Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 10.5%.</p> <p>HFC-227ea concentrations greater than 10.5% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.</p>	<p>The comparative design concentration based on cup burner values is approximately 7.0% while data indicate that its cardiotoxicity LOAEL is probably greater than 10.5%. EPA is accepting 10.5% as its LOAEL.</p> <p>This agent was submitted to the Agency as a Premanufacture Notice (PMN) agent and is presently subject to requirements contained in a Toxic Substances Control Act (TSCA) Significant New Use Rule (SNIUR).</p> <p>See additional comments 1, 2, 3, 4.</p>

<p>C<sub>4</sub> F<sub>10</sub> .....</p>	<p>Acceptable .....                  where other alternatives are not technically feasible due to performance or safety requirements:                  a. due to their physical or chemical properties, or                  b. where human exposure to the extinguishing agents may approach cardiotoxicity levels or result in other unacceptable health effects under normal operating conditions.</p>	<p>Until OSHA establishes applicable workplace requirements:                  For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 40%.                  Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e., for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL.</p>	<p>The comparative design concentration based on cup burner values is approximately 6.6%.                  Users must observe the limitations on PFC acceptability by making reasonable efforts to undertake the following measures:                  (i) conduct an evaluation of foreseeable conditions of end use;                  (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiotoxicity or other unacceptable toxicity effects under normal operating conditions; and                  (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use.</p> <p>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.</p> <p>For additional guidance regarding applications in which PFCs may be appropriate, users should consult the description of potential uses which is included in this rulemaking.                  See additional comments 1, 2, 3, 4.</p>

FIRE SUPPRESSION AND EXPLOSION PROTECTION TOTAL FLOODING AGENTS—Continued  
Substitutes Acceptable Subject To Use Conditions

End-use	Substitute	Decision	Conditions	Comments
	[IG-541] .....	Acceptable .....	Until OSHA establishes applicable workplace requirements: The design concentration must result in at least 10% oxygen and no more than 5% CO <sub>2</sub> . If the oxygen concentration of the atmosphere falls below 10%, personnel must be evacuated and egress must occur within 30 seconds.	Studies have shown that healthy, young individuals can remain in a 10% to 12% oxygen atmosphere for 30 to 40 minutes without impairment. However, in a fire emergency, the oxygen level may be reduced below safe levels, and the combustion products formed by the fire are likely to cause harm. Thus, the Agency does not contemplate personnel remaining in the space after system discharge during a fire without Self Contained Breathing Apparatus (SCBA) as required by OSHA. See additional comments 1, 2.

*Additional Comments:*

- 1—Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code.
- 2—Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must reenter the area.
- 3—Discharge testing should be strictly limited only 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.

FIRE SUPPRESSION AND EXPLOSION PROTECTION TOTAL FLOODING AGENTS  
Substitutes Acceptable Subject to Narrowed Use Limits

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 Total Flooding Agents.	C <sub>4</sub> F <sub>10</sub> .....	Acceptable where other alternatives are not technically feasible due to performance or safety requirements.	Until OSHA establishes applicable workplace requirements: For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 40%.	The comparative design concentration based on cup burner values is approximately 6.6%. Users must observe the limitations on PFC approval by undertaking the following measures: (i) Conduct an evaluation of foreseeable conditions of end use; (ii) Determine that human exposure to the other alternative extinguishing agents may approach or result in cardiorespiratory or other unacceptable toxicity effects under normal operating conditions; and

<p>(iii) Determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; Documentation of such measures must 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 preamble to this rulemaking. See additional comments 1, 2, 3, 4.</p>	<p>Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e. for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C<sub>1</sub>F<sub>10</sub> exceeds 40%. Design concentration must result in oxygen levels of at least 16%.</p>	<p>a. Due to their physical or chemical properties, or b. Where human exposure to the extinguishing agents may approach cardiosensitization levels or result in other unacceptable health effects under normal operating conditions...</p>
<p><i>Additional Comments</i> 1—Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code. 2—Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must reenter the area. 3—Discharge testing should be strictly limited only 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.</p>		

APPENDIX B TO SUBPART G OF PART 82—SUBSTITUTES SUBJECT TO USE RESTRICTIONS AND UNACCEPTABLE SUBSTITUTES

REFRIGERANTS—ACCEPTABLE SUBJECT TO USE CONDITIONS

Application	Substitute	Decision	Conditions	Comments
CFC-12 Automobile Motor Vehicle Air Conditioning (Retrofit and New Equipment/NIKS).	HFC-134a, R-401C, HCFC Blend Beta.	Acceptable .....	—must be used with unique fittings. —must be used with detailed labels. —all CFC-12 must be removed from the system prior to retrofitting. Refer to the text for a full description.	EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment. For the purposes of this rule, no distinction is made between “retrofit” and “drop-in” refrigerants; retrofitting a car to use a new refrigerant includes all procedures that result in the air conditioning system using a new refrigerant.

REFRIGERANTS—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Comments
CFC-11, CFC-12, CFC-113, CFC-114, CFC-115 Non-Mechanical Heat Transfer, New.	C <sub>3</sub> F <sub>8</sub> , C <sub>4</sub> F <sub>10</sub> , C <sub>5</sub> F <sub>12</sub> , C <sub>5</sub> F <sub>11</sub> NO, C <sub>6</sub> F <sub>14</sub> , C <sub>6</sub> F <sub>13</sub> NO, C <sub>7</sub> F <sub>16</sub> , C <sub>7</sub> F <sub>15</sub> NO, C <sub>8</sub> F <sub>18</sub> , C <sub>8</sub> F <sub>16</sub> O, and C <sub>9</sub> F <sub>21</sub> N.	Acceptable only where no other alternatives are technically feasible due to safety or performance requirements.	Users must observe the limitations on PFC acceptability by determining that the physical or chemical properties or other technical constraints of the other available agents preclude their use. Documentation of such measures must be available for review upon request. The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. EPA strongly recommends recovery and recycling of these substitutes.

REFRIGERANTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
CFC-11, CFC-12, CFC-113, CFC-114, R-500 Centrifugal Chillers (Retrofit and New Equipment/NIKS).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Reciprocating Chillers (Retrofit and New Equipment/NIKS).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-11, CFC-12, R-502 Industrial Process Refrigeration (Retrofit and New Equipment/NIKS).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
CFC-12, R-502 Ice Skating Rinks (Retrofit and New Equipment/NIKS).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.

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REFRIGERANTS—UNACCEPTABLE SUBSTITUTES—Continued

End-use	Substitute	Decision	Comments
CFC-12, R-502 Cold Storage Warehouses (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500, R-502 Refrigerated Transport (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Retail Food Refrigeration (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Commercial Ice Machines (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Vending Machines (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Water Coolers (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Household Refrigerators (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Household Freezers (Retrofit and New Equipment/NIKs).	R-403B .....	Unacceptable .....	R-403B contains R-218, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.

REFRIGERANTS—UNACCEPTABLE SUBSTITUTES—Continued

End-use	Substitute	Decision	Comments
CFC-12, R-500 Residential Dehumidifiers (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Motor Vehicle Air Conditioners (Retrofit and New Equipment/NIKs).	R-405A .....	Unacceptable .....	R-405A contains R-c318, a PFC, which has an extremely high GWP and lifetime. Other substitutes exist which do not contain PFCs.
	Hydrocarbon Blend B	Unacceptable .....	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
	Flammable Substitutes.	Unacceptable .....	The risks associated with using flammable substitutes in this end-use have not been addressed by a risk assessment.

SOLVENT CLEANING SECTOR—ACCEPTABLE SUBJECT TO USE CONDITIONS SUBSTITUTES

Application	Substitute	Decision	Conditions	Comments
Electronics Cleaning w/CFC-113, MCF.	HCFC-225 ca/cb .....	Acceptable .....	Subject to the company set exposure limit of 25 ppm of the -ca isomer.	HCFC-225 ca/cb blend is offered as a 45%-ca/55%-cb blend. The company set exposure limit of the -ca isomer is 25 ppm. The company set exposure limit of the -cb isomer is 250 ppm. It is the Agency's opinion that with the low emission cold cleaning and vapor degreasing equipment designed for this use, the 25 ppm limit of the HCFC-225 ca isomer can be met. The company is submitting further exposure monitoring data.
Precision Cleaning w/CFC-113, MCF.	HCFC-225 ca/cb .....	Acceptable .....	Subject to the company set exposure limit of 25 ppm of the -ca isomer.	HCFC-225 ca/cb blend is offered as a 45%-ca/55%-cb blend. The company set exposure limit of the -ca isomer is 25 ppm. The company set exposure limit of the -cb isomer is 250 ppm. It is the Agency's opinion that with the low emission cold cleaning and vapor degreasing equipment designed for this use, the 25 ppm limit of the HCFC-225 ca isomer can be met. The company is submitting further exposure monitoring data.

SOLVENT CLEANING SECTOR—UNACCEPTABLE SUBSTITUTES

End use	Substitute	Decision	Comments
Metals cleaning w/CFC-113	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Metals cleaning w/MCF .....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.

SOLVENT CLEANING SECTOR—UNACCEPTABLE SUBSTITUTES—Continued

End use	Substitute	Decision	Comments
Electronics cleaning w/CFC-113.	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Electronics cleaning w/MCF ..	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Precision cleaning w/CFC-113.	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.
Precision cleaning w/MCF ....	Dibromomethane .....	Unacceptable .....	High ODP; other alternatives exist.

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

Application	Substitute	Decision	Conditions	Comments
Halon 1301 Total Flooding Agents.	C <sub>3</sub> F <sub>8</sub> .....	Acceptable where other alternatives are not technically feasible due to performance or safety requirements: a. due to their physical or chemical properties, or. b. where human exposure to the extinguishing agents may approach cardiosensitization levels or result in other unacceptable health effects under normal operating conditions.	Until OSHA establishes applicable workplace requirements: For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 30%. Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e. for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C <sub>3</sub> F <sub>8</sub> exceeds 30%. Design concentration must result in oxygen levels of at least 16%.	The comparative design concentration based on cup burner values is approximately 8.8%. Users must observe the limitations on PFC acceptability by making reasonable efforts to undertake the following measures: (i) conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiosensitization or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; Documentation of such measures must 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 Rulemaking (59 FR 13043). See additional comments 1, 2, 3, 4.
	CF <sub>3</sub> I .....	Acceptable in normally unoccupied areas.	EPA requires that any employee who could possibly be in the area must be able to escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	Manufacturer has not applied for listing for use in normally occupied areas. Preliminary cardiosensitization data indicates that this agent would not be suitable for use in normally occupied areas. EPA is awaiting results of ODP calculations. See additional comments 1, 2, 3, 4.
	Gelled Halocarbon/Dry Chemical Suspension.	Acceptable in normally unoccupied areas.	EPA requires that any employee who could possibly be in the area must be able to escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	The manufacturer's SNAP application requested listing for use in unoccupied areas only. See additional comment 2.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—ACCEPTABLE SUBJECT TO USE CONDITIONS:  
TOTAL FLOODING AGENTS—Continued

Application	Substitute	Decision	Conditions	Comments
	Inert Gas/Powdered Aerosol Blend.	Acceptable as a Halon 1301 substitute in normally unoccupied areas.	In areas where personnel could possibly be present, as in a cargo area, EPA requires that the employer shall provide a pre-discharge employee alarm capable of being perceived above ambient light or noise levels for alerting employees before system discharge. The pre-discharge alarm shall provide employees time to safely exit the discharge area prior to system discharge.	The manufacturer's SNAP application requested listing for use in unoccupied areas only. See additional comment 2.

*Additional Comments*

- 1—Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code.
- 2—Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must enter/reenter the area.
- 3—Discharge testing should be strictly limited only 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.

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

Application	Substitute	Decision	Conditions	Comments
Halon 1301, Total Flooding Agents.	C <sub>3</sub> F <sub>8</sub> .....	Acceptable where other alternatives are not technically feasible due to performance or safety requirements: a. due to their physical or chemical properties, or b. where human exposure to the extinguishing agents may approach cardiotoxicity levels or result in other unacceptable health effects under normal operating conditions.	Until OSHA establishes applicable workplace requirements: For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 30%. Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e. for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C <sub>3</sub> F <sub>8</sub> exceeds 30%. Design concentration must result in oxygen levels of at least 16%.	The comparative design concentration based on cup burner values is approximately 8.8%. Users must observe the limitations on PFC acceptability by making reasonable efforts to undertake the following measures: (i) conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiotoxicity or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; Documentation of such measures must 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 Rulemaking (58 FR 13043).

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

Application	Substitute	Decision	Conditions	Comments
	Sulfurhexa-fluoride (SF <sub>6</sub> ).	Acceptable as a discharge test agent in military uses and in civilian aircraft uses only.	.....	This agent has an atmospheric lifetime greater than 1,000 years, with an estimated 100-year, 500-year, and 1,000-year GWP of 16,100, 26,110 and 32,803 respectively. Users should limit testing only to that which is essential to meet safety or performance requirements. This agent is only used to test new Halon 1301 systems.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—UNACCEPTABLE SUBSTITUTES

Application	Substitute	Decision	Comments
Halon 1301 Total Flooding Agents.	HFC-32 .....	Unacceptable .....	Data indicate that HFC-32 is flammable and therefore is not suitable as a halon substitute.

[60 FR 31103, June 13, 1995]

APPENDIX C TO SUBPART G OF PART 82—SUBSTITUTES SUBJECT TO USE RESTRICTIONS AND UNACCEPTABLE SUBSTITUTES LISTED IN THE MAY 22, 1996 FINAL RULE, EFFECTIVE JUNE 21, 1996

REFRIGERATION AND AIR CONDITIONING SECTOR—ACCEPTABLE SUBJECT TO USE CONDITIONS

HCFC Blend Delta and Blend Zeta are acceptable subject to the following conditions when used to retrofit a CFC-12 motor vehicle air conditioning system:

1. Each refrigerant may only be used with a set of fittings that is unique to that refrigerant. These fittings (male or female, as appropriate) must be used with all containers of the refrigerant, on can taps, on recovery, recycling, and charging equipment, and on all air conditioning system service ports. These fittings must be designed to mechanically prevent cross-charging with another refrigerant. A refrigerant may only be used with the fittings and can taps specifically intended for that refrigerant. Using an adapter or deliberately modifying a fitting to use a different refrigerant will be a violation of this use condition. In addition, fittings shall meet the following criteria, derived from Society of Automotive Engineers (SAE) standards and recommended practices:

a. When existing CFC-12 service ports are to be retrofitted, conversion assemblies shall attach to the CFC-12 fitting with a thread lock adhesive and/or a separate mechanical latching mechanism in a manner that permanently prevents the assembly from being removed.

b. All conversion assemblies and new service ports must satisfy the vibration testing requirements of sections 3.2.1 or 3.2.2 of SAE J1660, as applicable, excluding references to SAE J639 and SAE J2064, which are specific to HFC-134a.

c. In order to prevent discharge of refrigerant to the atmosphere, systems shall have a device to limit compressor operation before the pressure relief device will vent refrigerant. This requirement is waived for systems that do not feature such a pressure relief device.

d. All CFC-12 service ports not retrofitted with conversion assemblies shall be rendered permanently incompatible for use with CFC-12 related service equipment by fitting with a device attached with a thread lock adhesive and/or a separate mechanical latching mechanism in a manner that prevents the device from being removed.

2. When a retrofit is performed, a label must be used as follows:

a. The person conducting the retrofit must apply a label to the air conditioning system in the engine compartment that contains the following information:

- i. The name and address of the technician and the company performing the retrofit.
- ii. The date of the retrofit.
- iii. The trade name, charge amount, and, when applicable, the ASHRAE refrigerant numerical designation of the refrigerant.
- iv. The type, manufacturer, and amount of lubricant used.
- v. If the refrigerant is or contains an ozone-depleting substance, the phrase "ozone depleter."
- vi. If the refrigerant displays flammability limits as measured according to ASTM E681,

the statement “This refrigerant is FLAMMABLE. Take appropriate precautions.”

b. This label must be large enough to be easily read and must be permanent.

c. The background color must be unique to the refrigerant.

d. The label must be affixed to the system over information related to the previous refrigerant, in a location not normally replaced during vehicle repair.

e. Information on the previous refrigerant that cannot be covered by the new label must be permanently rendered unreadable.

3. No substitute refrigerant may be used to “top-off” a system that uses another refrigerant. The original refrigerant must be recovered in accordance with regulations issued under section 609 of the CAA prior to charging with a substitute.

SOLVENT CLEANING SECTOR—PROPOSED ACCEPTABLE SUBJECT TO USE CONDITIONS SUBSTITUTES

Application	Substitute	Decision	Conditions	Comments
Metals Cleaning with CFC-113, MCF and HCFC-141b.	Monochlorotoluenes and benzotrifluorides.	Acceptable .....	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 25 ppm standard for benzotrifluorides.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluorides is based on a recent toxicology study.
Electronics Cleaning w/ CFC-113, MCF and HCFC-141b.	Monochlorotoluenes and benzotrifluorides.	Acceptable .....	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 25 ppm standard for benzotrifluorides.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluorides is based on a recent toxicology study.
Precision Cleaning w/ CFC-113, MCF and HCFC-141b.	Monochlorotoluenes and benzotrifluorides.	Acceptable .....	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 25 ppm standard for benzotrifluorides.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluorides is based on a recent toxicology study.

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

Application	Substitute	Decision	Conditions	Comments
Halon 1301 .....	IG-55 (formerly [Inert Gas Blend] B).	Acceptable .....	Until OSHA establishes applicable workplace requirements:	The Agency does not contemplate personnel remaining in the space after system discharge during a fire without Self Contained Breathing Apparatus (SCBA) as required by OSHA.
Total Flooding Agents.	.....	.....	IG-55 systems may be designed to an oxygen level of 10% if employees can egress the area within one minute, but may be designed only to the 12% oxygen level if it takes longer than one minute to egress the area.  If the possibility exists for the oxygen to drop below 10%, employees must be evacuated prior to such oxygen depletion.  A design concentration of less than 10% may only be used in normally unoccupied areas, as long as any employee who could possibly be exposed can egress within 30 seconds.	EPA does not encourage any employee to intentionally remain in the area after system discharge, even in the event of accidental discharge. In addition, the system must include alarms and warning mechanisms as specified by OSHA.  See additional comments 1, 2.

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**FIRE SUPPRESSION AND EXPLOSION PROTECTION—ACCEPTABLE SUBJECT TO USE CONDITIONS:  
TOTAL FLOODING AGENTS—Continued**

Application	Substitute	Decision	Conditions	Comments
	IG-01 (formerly [Inert Gas Blend] C).	Acceptable .....	<p>Until OSHA establishes applicable workplace requirements:</p> <p>IG-01 systems may be designed to an oxygen level of 10% if employees can egress the area within one minute, but may be designed only to the 12% oxygen level if it takes longer than one minute to egress the area.</p> <p>If the possibility exists for the oxygen to drop below 10%, employees must be evacuated prior to such oxygen depletion.</p> <p>A design concentration of less than 10% may only be used in normally unoccupied areas, as long as any employee who could possibly be exposed can egress within 30 seconds.</p>	<p>The Agency does not contemplate personnel remaining in the space after system discharge during a fire without Self Contained Breathing Apparatus (SCBA) as required by OSHA.</p> <p>EPA does not encourage any employee to intentionally remain in the area after system discharge, even in the event of accidental discharge. In addition, the system must include alarms and warning mechanisms as specified by OSHA.</p> <p>See additional comments 1, 2.</p>

1—Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code.  
2—Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must reenter the area.

**ACCEPTABLE SUBJECT TO NARROWED USE LIMITS: STREAMING AGENTS**

Application	Substitute	Decision	Comments
Halon 1211 ..... Streaming Agents	CF <sub>3</sub> I .....	Acceptable in non-residential uses only.	

**AEROSOLS—PROPOSED ACCEPTABLE SUBJECT TO USE CONDITIONS SUBSTITUTES**

Application	Substitute	Decision	Conditions	Comments
CFC-113, MCF and HCFC-141b as solvent.	Monochlorotoluenes and benzotrifluorides.	Acceptable .....	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 25 ppm standard for benzotrifluorides.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluorides is based on a recent toxicology study.

**ADHESIVES, COATINGS AND INKS—PROPOSED ACCEPTABLE SUBJECT TO USE CONDITIONS SUBSTITUTES**

Application	Substitute	Decision	Conditions	Comments
CFC-113, MCF and HCFC-141b.	Monochlorotoluenes and benzotrifluorides.	Acceptable .....	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 25 ppm standard for benzotrifluorides.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluorides is based on a recent toxicology study.

[61 FR 25592, May 22, 1996]

EFFECTIVE DATE NOTE: At 61 FR 25592, May 22, 1996, Appendix C to Part 82 Subpart G was added. This appendix contains information collection and recordkeeping requirements which will not become effective until approval has been given by the Office of Management and Budget.

APPENDIX D TO SUBPART G OF PART 82—  
SUBSTITUTES SUBJECT TO USE RE-  
STRICTIONS AND UNACCEPTABLE SUB-  
STITUTES

*Summary of Decisions*

Refrigeration and Air Conditioning Sector  
Acceptable Subject to Use Conditions

R-406A/"GHG"/"McCool", "GHG-HP", "GHG-X4"/"Autofrost"/"Chill-It", and "Hot Shot"/"Kar Kool" are acceptable substitutes for CFC-12 in retrofitted motor vehicle air conditioning systems (MVACs) subject to the use condition that a retrofit to these refrigerants must include replacing non-barrier hoses with barrier hoses.

For all refrigerants submitted for use in motor vehicle air conditioning systems, subsequent to the effective date of this FRM, in addition to the information previously required in the March 18, 1994 final SNAP rule (58 FR 13044), SNAP submissions must include specifications for the fittings similar to those found in SAE J639, samples of all fittings, and the detailed label described below at the same time as the initial SNAP submission, or the submission will be considered incomplete. Under section 612 of the Clean Air Act, substitutes for which submissions are incomplete may not be sold or used, regardless of other acceptability determinations, and the prohibition against sale of a new refrigerant will not end until 90 days after EPA determines the submission is complete.

In addition, the use of a) R-406A/"GHG"/"McCool", "GHG-HP", "GHG-X4"/"Autofrost"/"Chill-It", "Hot Shot"/"Kar Kool", and "FREEZE 12" as CFC-12 substitutes in MVACs, and b) all refrigerants submitted for, and listed in, subsequent Notices of Acceptability as substitutes for CFC-12 in MVACs, must meet the following conditions:

1. Each refrigerant may only be used with a set of fittings that is unique to that refrigerant. These fittings (male or female, as appropriate) must be designed by the manufacturer of the refrigerant. The manufacturer is responsible to ensure that the fittings meet all of the requirements listed below, including testing according to SAE standards. These fittings must be designed to mechanically prevent cross-charging with another refrigerant, including CFC-12.

The fittings must be used on all containers of the refrigerant, on can taps, on recovery, recycling, and charging equipment, and on

all air conditioning system service ports. A refrigerant may only be used with the fittings and can taps specifically intended for that refrigerant and designed by the manufacturer of the refrigerant. Using a refrigerant with a fitting designed by anyone else, even if it is different from fittings used with other refrigerants, is a violation of this use condition. Using an adapter or deliberately modifying a fitting to use a different refrigerant is a violation of this use condition.

Fittings shall meet the following criteria, derived from Society of Automotive Engineers (SAE) standards and recommended practices:

a. When existing CFC-12 service ports are retrofitted, conversion assemblies shall attach to the CFC-12 fitting with a thread lock adhesive and/or a separate mechanical latching mechanism in a manner that permanently prevents the assembly from being removed.

b. All conversion assemblies and new service ports must satisfy the vibration testing requirements of section 3.2.1 or 3.2.2 of SAE J1660, as applicable, excluding references to SAE J639 and SAE J2064, which are specific to HFC-134a.

c. In order to prevent discharge of refrigerant to the atmosphere, systems shall have a device to limit compressor operation before the pressure relief device will vent refrigerant.

d. All CFC-12 service ports not retrofitted with conversion assemblies shall be rendered permanently incompatible for use with CFC-12 related service equipment by fitting with a device attached with a thread lock adhesive and/or a separate mechanical latching mechanism in a manner that prevents the device from being removed.

2. When a retrofit is performed, a label must be used as follows:

a. The person conducting the retrofit must apply a label to the air conditioning system in the engine compartment that contains the following information:

i. The name and address of the technician and the company performing the retrofit.

ii. The date of the retrofit.

iii. The trade name, charge amount, and, when applicable, the ASHRAE refrigerant numerical designation of the refrigerant.

iv. The type, manufacturer, and amount of lubricant used.

v. If the refrigerant is or contains an ozone-depleting substance, the phrase "ozone depleter".

vi. If the refrigerant displays flammability limits as measured according to ASTM E681, the statement "This refrigerant is FLAMMABLE. Take appropriate precautions."

b. The label must be large enough to be easily read and must be permanent.

c. The background color must be unique to the refrigerant.

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d. The label must be affixed to the system over information related to the previous refrigerant, in a location not normally replaced during vehicle repair.

e. In accordance with SAE J639, testing of labels must meet ANSI/UL 969-1991.

f. Information on the previous refrigerant that cannot be covered by the new label must be rendered permanently unreadable.

3. No substitute refrigerant may be used to "top-off" a system that uses another refrigerant. The original refrigerant must be recovered in accordance with regulations issued under section 609 of the CAA prior to charging with a substitute.

**SOLVENT CLEANING SECTOR**  
[Acceptable Subject to Use Conditions Substitutes]

Application	Substitute	Decision	Conditions	Comments
Electronics Cleaning w/CFC-113 and MCF.	HFC-4310mee	Acceptable	Subject to a 200 ppm time-weighted average workplace exposure standard and a 400 ppm workplace exposure ceiling.	
Precision Cleaning w/CFC-113 and MCF.	HFC-4310mee	Acceptable	Subject to a 200 ppm time-weighted average workplace exposure standard and a 400 ppm workplace exposure ceiling.	

**SOLVENT SECTOR**

[Acceptable Subject to Narrowed Use Limits]

Application	Substitute	Decision	Comments
Electronics Cleaning w/CFC-113 and MCF.	Perfluoropolyethers	Perfluoropolyethers are acceptable substitutes for CFC-113 and MCF in the precision cleaning sector for high performance, precision-engineered applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	PFPEs have similar global warming profile to the PFCs, and the SNAP decision on PFPEs parallels that for PFCs.
Precision Cleaning w/CFC-113 and MCF	Perfluoropolyethers	Perfluoropolyethers are acceptable substitutes for CFC-113 and MCF in the precision cleaning sector for high performance, precision-engineered applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	PFPEs have similar global warming profile to the PFCs, and the SNAP decision on PFPEs parallels that for PFCs.

Unacceptable Substitutes

End-use	Substitute	Decision	Comments
Electronics Cleaning w/CFC-113 and MCF	HCFC-141b	Extension of existing unacceptability determination to grant existing uses in high-performance electronics permission to continue until January 1, 1997.	This determination extends the use date for HCFC-141b in solvent cleaning, but only for existing users in high-performance electronics and only for one year.
Precision Cleaning w/CFC-113 and MCF	HCFC-141b	Extension of existing unacceptability determination to grant existing uses in precision cleaning permission to continue until January 1, 1997.	This determination extends the use date for HCFC-141b in solvent cleaning, but only for existing users in precision cleaning and only for one year.

AEROSOLS SECTOR			
Acceptable Subject to Narrowed Use Limits			
Application	Substitute	Decision	Comments
CFC-113, MCF, and HCFC-141b as aerosol solvents.	Perfluorocarbons .....	Perfluorocarbons are acceptable substitutes for aerosol applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	PFCs have extremely long atmospheric lifetimes and high Global Warming Potentials. This decision reflects these concerns and is patterned after the SNAP decision on PFCs in the solvent cleaning sector. PFPEs have similar global warming profile to the PFCs, and the SNAP decision on PFPEs parallels that for PFCs in the solvent cleaning sector.
	Perfluoropolyethers .....	Perfluorocarbons are acceptable substitutes for aerosol applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	
Unacceptable Substitutes			
End-use	Substitute	Decision	Comments
CFC-11, CFC-12, HCFC-22, and HCFC-142b as aerosol propellants.	SF6 .....	Unacceptable .....	SF6 has the highest GWP of all industrial gases, and other compressed gases meet user needs in this application equally well.

[61 FR 54040, Oct. 16, 1996]

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—TOTAL FLOODING AGENTS—ACCEPTABLE SUBJECT TO USE CONDITIONS

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement.	C3F8	<p>Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements:</p> <p>(a) because of their physical or chemical properties, or</p> <p>(b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions</p>	<p>For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 30%. Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e., for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before design concentration of C3F8 exceeds 30%. Design concentration must result in oxygen levels of at least 16%.</p> <p>See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 8.8%. Users should observe the limitations on PFC acceptability by taking the following measures:</p> <p>(i) conduct an evaluation of foreseeable conditions of end-use;</p> <p>(ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and</p> <p>(iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions.</p> <p>Documentation of such measures should be available for review upon request.</p> <p>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).</p> <p>See additional comments 1, 2, 3, 4.</p>

FIRE SUPPRESSION AND EXPLOSION PROTECTION—TOTAL FLOODING AGENTS—ACCEPTABLE SUBJECT TO USE CONDITIONS—Continued

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement.	C4F10	<p>Acceptable for nonresidential uses where other alternatives are not technically feasible due to performance or safety requirements:</p> <p>(a) because of their physical or chemical properties, or</p> <p>(b) where human exposure to the extinguishing agents may result in failure to meet applicable use conditions</p>	<p>For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 40%.</p> <p>Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e., for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL.</p> <p>All personnel must be evacuated before concentration of C4F10 exceeds 40%.</p> <p>Design concentration must result in oxygen levels of at least 16%.</p> <p>See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 6.6%. Users should observe the limitations on PFC acceptability by taking the following measures:</p> <p>(i) conduct an evaluation of foreseeable conditions of end-use;</p> <p>(ii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; and</p> <p>(iii) determine that human exposure to the other alternative extinguishing agents may result in failure to meet applicable use conditions.</p> <p>Documentation of such measures should be available for review upon request.</p> <p>The principal environmental characteristic of concern for PFCs is that they have high GWPs and long atmospheric lifetimes. Accidental 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).</p> <p>See additional comments 1, 2, 3, 4.</p>

<p>Halon 1301 replacement.</p>	<p>HFC-236fa</p>	<p>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 applicable use conditions</p>	<p>For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 10%.                      For occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL of 15%.                      All personnel must be evacuated before concentration of HFC-236fa exceeds 15%.                      Design concentration must result in oxygen levels of at least 16%.                      See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 6.4%. 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 applicable use conditions.                      Documentation of such measures should be available for review upon request.                      Feasible for use in a normally occupied area.                      See additional comments 1, 2, 3, 4.</p>
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Additional comments

- 1—Should conform with OSHA requirements, 29 CFR 1910, Subpart L, Section 1910.160.
- 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 EPA's regulation of halon substitutes.

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

End-use	Substitute	Decision	Conditions	Comments
Halon 1301 replacement ...	C3F8	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	For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 30%; Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e., for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C3F8 exceeds 30%. Design concentration must result in oxygen levels of at least 16%. See additional comment 5	The comparative design concentration based on cup burner values is approximately 8.8%. 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 additional comments 1, 2, 3, 4.
Halon 1301 replacement ...	C4F10	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	For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 40%; Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e., for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C4F10 exceeds 40%. Design concentration must result in oxygen levels of at least 16%. See additional comment 5	The comparative design concentration based on cup burner values is approximately 6.6%. 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 additional comments 1, 2, 3, 4.

<p>Halon 1301 replacement ... HFC-236fa</p>	<p>Acceptable when manufactured using any process that does not convert perfluoroisobutylene (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 applicable use conditions</p>	<p>For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardio-toxicity NOAEL of 10%. For occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL of 15%. All personnel must be evacuated before concentration of HFC-236fa exceeds 15%. Design concentration must result in oxygen levels of at least 16%. See additional comment 5</p>	<p>The comparative design concentration based on cup burner values is approximately 6.4%. 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 applicable use conditions. Documentation of such measures should be available for review upon request. Feasible for use in a normally occupied area. See additional comments 1, 2, 3, 4.</p>
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Additional comments:  
 1 Should conform with OSHA requirements, 29 CFR 1910, Subpart L, Section 1910.160.  
 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 EPA's regulation of 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		

- 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]

APPENDIX I TO SUBPART G OF PART 82—SUBSTITUTES SUBJECT TO USE RESTRICTIONS, LISTED IN THE APRIL 26, 2000, FINAL RULE, EFFECTIVE MAY 26, 2000

FIRE SUPPRESSION AND EXPLOSION PROTECTION—TOTAL FLOODING AGENTS  
[Substitutes Acceptable Subject to Use Conditions]

End Use	Substitute	Decision	Conditions	Comments
Halon 1301 Total Flooding Systems.	IG-100	Acceptable .....	IG-100 systems should be designed to maintain an oxygen level of 10%. A design concentration of less than 10% may only be used in normally unoccupied areas and in areas where egress is possible within 30 seconds. If it is not possible to egress an area within one minute, IG-100 systems must be designed to maintain an oxygen level of 12% If the possibility exists for oxygen levels to drop below 10%, employees must be evacuated prior to such oxygen depletion.	IG-100 systems must include alarms and warning mechanisms. Workplace personnel and employees should not remain in or re-enter the area after system discharge (even if such discharge is accidental) without appropriate personal protective equipment. See additional comments 1, 2, 3.

*Additional Comments:*  
 1. Should conform with OSHA 29 CFR 1910, Subpart L, Section 1910.160.  
 2. Per OSHA requirements, protective gear (SCBA) should be available in the event personnel must re-enter the area.  
 3. 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 EPA's regulation of halon substitutes.

FIRE SUPPRESSION AND EXPLOSION PROTECTION—STREAMING AGENTS  
[Substitutes Acceptable Subject to Narrowed Use Limits]

End Use	Substitute	Decision	Limitations	Comments
Halon 1211 Streaming Agents ...	HCFC Blend E .....	Acceptable .....	Nonresidential uses only.	As with other streaming agents, EPA recommends that potential risks of combustion by-products be labeled on the extinguisher (see UL 2129). See additional comments 1, 2.

*Additional Comments:*  
 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.

[65 FR 24392, Apr. 26, 2000]

**Subpart H—Halon Emissions Reduction**

**§ 82.250 Purpose and scope.**

SOURCE: 63 FR 11096, Mar. 5, 1998, unless otherwise noted.

(a) The purpose of this subpart is to reduce the emissions of halon in accordance with section 608 of the Clean Air Act by banning the manufacture of