• 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.

Since these use conditions necessitate unique fittings and labels, it will be necessary for developers of automotive refrigerants to consult with EPA about the existence of other alternatives. Such discussions will lower the risk of duplicating fittings already in use.

No SNAP determination guarantees satisfactory performance from a refrigerant. Consult the original equipment manufacturer or service personnel for further information on using a refrigerant in a particular system.

(a) HFC–134a. *HFC–134a is acceptable as a substitute for CFC–12 in retrofitted and new motor vehicle air conditioners, subject to the use conditions applicable to motor vehicle air conditioning described above.* HFC–134a does not contribute to ozone depletion. HFC–134a's GWP and atmospheric lifetime are close to those of other alternatives which have been determined to be acceptable for this end-use. However, HFC–134a's contribution to global warming could be significant in leaky end-uses such as motor vehicle air conditioning systems (MVACS). EPA has determined that the use of HFC–134a in these applications is acceptable because industry continues to develop technology to limit emissions. In addition, the number of substitutes available for use in MVACS is currently limited. HFC–134a is not flammable and its toxicity is low. While HFC–134a is compatible with most existing refrigeration and air conditioning equipment parts, it is not compatible with the mineral oils currently used in such systems. An appropriate ester-based, polyalkylene glycol-based, or other type of lubricant should be used. Consult the original equipment manufacturer or the retrofit kit manufacturer for further information.

(b) R–401C.

R–401C, which consists of HCFC–22, HFC–152a, and HCFC–124, is acceptable as a substitute for CFC–12 in retrofitted and new motor vehicle air conditioners, subject to the use conditions applicable to motor vehicle air conditioning described above. HCFC–22 and HCFC–124 contribute to ozone depletion, but to a much lesser degree than CFC–12. The production of HCFC–22 will be phased out according to the accelerated phaseout schedule (published 12/10/93, 58 FR 65018). The GWP of HCFC–22 is somewhat higher than other alternatives for this end-use. Experimental data indicate that HCFC–22 may leak through flexible hosing in mobile air conditioners at a high rate. In order to preserve the blend's composition and to reduce its contribution to global warming, EPA strongly recommends using barrier hoses when hose assemblies need to be replaced during a retrofit procedure. The GWPs of the other components are low. Although this blend does contain one flammable constituent, the blend itself is not flammable. Leak testing demonstrated that the blend never becomes flammable.

(c) HCFC Blend Beta. *HCFC Blend Beta, which consists of HCFC–124, HFC–134a, and isobutane, is acceptable as a substitute for CFC–12 in retrofitted and new motor vehicle air conditioners, subject to the use conditions applicable to motor vehicle air conditioning described above.* The composition of this blend has been claimed confidential by the manufacturer. This blend contains at least one HCFC, and therefore contributes to ozone depletion, but to a much lesser degree than CFC–12. Regulations regarding recycling and reclamation issued under section 609 of the Clean Air Act apply to this blend. Its production will be phased out according to the accelerated schedule (published 12/10/93, 58 FR 65018). The GWPs of the components are moderate to low. This blend is nonflammable, and leak testing has demonstrated that the blend never becomes flammable.

c. Acceptable Subject to Narrowed Use Limits

(1) CFC–11, CFC–12, CFC–113, CFC–114, CFC–115 Heat Transfer, New. (a) Perfluorocarbons. *Perfluorocarbons are acceptable as substitutes for CFC–11, CFC–12, CFC–113, CFC–114, and CFC–115 in heat transfer systems only where no other alternatives are technically feasible due to safety or performance requirements.* PFCs covered by this determination are C_3F_8, C_4F_{10}, C_5F_{12}, $C_5F_{11}NO$, C_6F_{14}, $C_6F_{13}NO$, C_7F_{16}, $C_7F_{15}NO$, C_8F_{18}, $C_8F_{16}O$, and $C_9F_{21}N$. The principal characteristic of concern for PFCs is that they have very long atmospheric lifetimes and have the potential to contribute to global climate change. For instance, C_5F_{12} has a lifetime of 4,100 years and a 100-year GWP of 5,600.

Despite concerns about high global warming potential, EPA is listing PFCs as acceptable in certain limited applications because a PFC may be the only substitute that can satisfy safety or performance requirements. These requirements might include very high dielectric strength, noncorrosivity, thermal stability, materials compatibility, and chemical inertness. In addition, PFCs do not contribute to stratospheric ozone depletion. Examples of applications where PFCs may represent the only alternative to ODS include uranium isotope separation, chemical processing, electrical inverters, ozone generation for water purification, space simulators, air purification, and integrated chip manufacturing.

Users should note, however, that use of a PFC should be an ODS substitute of last resort. As the determination states, PFCs should be used ''only where no other alternatives are technically feasible due to safety or performance requirements.'' Potential users are required to conduct a thorough review of other more environmentally acceptable substitutes. Although EPA does not require users to submit the results of their substitute evaluation, companies must keep the results on file for future reference.

In cases where users must adopt PFCs, they should make every effort to:

• Recover and recycle these fluids during servicing;

• Adopt maintenance practices that reduce leakage as much as is technically feasible;

• Recover these fluids after the end of the equipment's useful life and either recycle them or destroy them; and

• Continue to search for other long-term alternatives.

Users of PFCs should note that if other alternatives become available, EPA could be petitioned to list PFCs as unacceptable due to the availability of other suitable substitutes. If such a petition were granted, EPA would determine whether to grandfather existing uses based upon consideration of cost and timing of testing and implementation of new substitutes.

d. Unacceptable Substitutes. (1) R–403B. *R–403B, which consists of HCFC–22, R–218, and propane, is unacceptable as a substitute for R–502 in the following new and retrofitted end-uses:*

• Industrial process refrigeration;
• Cold storage warehouses;
• Refrigerated transport;
• Retail food refrigeration;
• Commercial ice machines; and
• Household freezers.

R–218, perfluoropropane, has an extremely high GWP and lifetime, which pose additional risk beyond that of other acceptable substitutes for these end-uses. In particular, the lifetime of R–218 is over 2000 years, which means that global warming effects would be essentially irreversible. While other substitutes may have high GWPs, they do not exhibit such long lifetimes.