United States
Environmental Protection Agency

Air and Radiation
Global Programs Division
6205J

Substitute Aerosol Solvents and Propellants Under SNAP as of September 28, 2006

SNAP Information: http://www.epa.gov/ozone/snap

EPA has created the Significant New Alternatives Policy (SNAP) Program under section 612 of the Clean Air Act Amendments. SNAP evaluates alternatives to ozone-depleting substances. Substitutes are reviewed on the basis of ozone depletion potential, global warming potential, toxicity, flammability, and exposure potential as described in the March 18, 1994 final SNAP rule (59 FR 13044). Lists of acceptable and unacceptable substitutes will be updated periodically in the Federal Register. The following SNAP notices and subsequent final rules are included in this list: August 26, 1994 (59 FR 44240), January 13, 1995 (60 FR 3318), June 13, 1995 (60 FR 31092), July 28, 1995 (60 FR 38729), February 8, 1996 (61 FR 4736), May 22, 1996 (61 FR 25585), September 5, 1996 (61 FR 47012), October 16, 1996 (61 FR 54030), March 10, 1997 (62 FR 10700), June 3, 1997 (62 FR 30275) , February 24, 1998 (63 FR 9151), May 22, 1998 (63 FR 28251), January 26, 1999 (64 FR 3861), April 28, 1999 (64 FR 22981), June 8, 1999 (64 FR 30410), December 6, 1999 (64 FR 68039), April 11, 2000 (65 FR 19327), June 19, 2000 (65 FR 37900), December 18, 2000 (65 FR 78977), March 22, 2002 (67 FR 13272), December 20, 2002 (67 FR 77927), August 21, 2003(68 FR 50533), and September 28, 2006 (71 FR 56884).

Substitutes for Aerosol PROPELLANTS Under the Significant New Alternatives Policy (SNAP) Program as of September 28, 2006

Substitute	ODS Being Replaced	Decision	Conditions or Restrictions	Comments
Saturated light hydrocarbons, C3-C6 (e.g., propane, isobutane, n-butane)	CFC-11, HCFC-22, HCFC-142b	Acceptable	None	Hydrocarbons are flammable materials. Use with the necessary precautions.
Dimethyl ether	CFC-11, HCFC-22, HCFC-142b	Acceptable	None	DME is flammable. Use with the necessary precautions. Blends of DME with HCFCs are subject to section 610 restrictions.
HFC-152a, HFC-134a, HFC-125	CFC-11, HCFC-22, HCFC-142b	Acceptable	None	HFC-134a, HFC-125 and HFC-152a are potential greenhouse gases.
HFC-227ea	CFC-11, CFC-12, CFC-114, HCFC-22, HCFC-142b	Acceptable	None	Despite the relatively high global warming potential of this compound, the agency has listed this substitute as acceptable since it meets a specialized application in MDIs where other substitutes do not provide acceptable performance.
Alternative processes (pumps, mechanical pressure dispensers, non-spray dispensers)	CFC-11, HCFC-22, HCFC-142b	Acceptable	None	None
Compressed Gases (carbon dioxide, air, nitrogen, nitrous oxide)	CFC-11, HCFC-22, HCFC-142b	Acceptable	None	None

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HCFC-22, HCFC-142b	CFC-11	Acceptable	None	All aerosol propellant uses of HCFC-22 and HCFC-142b are already prohibited as of January 1, 1994, under Section 610(d) of the Clean Air Act. Only one exemption exists. It is described in the section on aerosol substitutes in 59 FR 13044.
SF_6	CFC-11, CFC-12, HCFC-22, HCFC-142b	Unacceptable	N/A	SF_6 has the highest GWP of all industrial gases, and other compressed gases meet user needs equally well.

Substitutes for Aerosol SOLVENTS under the Significant New Alternatives Policy (SNAP) Program as of September 28, 2006

Substitute	ODS Being Replaced	Decision	Conditions or Restrictions	Comments
C5-C20 Petroleum hydrocarbons	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	Petroleum hydrocarbons are flammable. Use with the necessary precautions. Pesticide aerosols must adhere to FIFRA standards.
Chlorinated solvents (trichloroethylene, perchloroethylene, methylene chloride)	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	Extensive regulations under other statutes govern use of these chemicals, including VOC standards, workplace standards, waste management standards, and pesticide formulation and handling standards. Should be used only for products where nonflammability is a critical feature.
Oxygenated organic solvents (esters, ethers, alcohols, ketones)	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	These substitutes are flammable. Use with the necessary precautions.
Terpenes	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	These substitutes are flammable. Use with the necessary precautions.
Water-based formulations	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	None
Trans-1,2-dichloroethylene	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	The OSHA set exposure limit is 200 ppm.
HCFC-225ca/cb	CFC-113, MCF, HCFC-141b	Acceptable	None	EPA recommends observing the manufacturer's recommended exposure guidelines of 50 ppm for the -ca isomer, 400 ppm for the -cb isomer, and 100 ppm for the commercial mixture of HCFC-225ca/cb. EPA encourages users to consider other alternatives that do not have an ozone depletion potential.
HFE-7200	CFC-113, MCF, HCFC-141b, CFC-11	Acceptable	None	The Agency expects that any exposures will not exceed any acceptable exposure limits set by any voluntary consensus standards organization, including the American Conference of Governmental Industrial Hygienists' (ACGIH) threshold limit values (TLVs) or the American Industrial Hygiene Association's (AIHA) workplace environmental exposure limits (WEELs).

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Hydrofluoroether (HFE) 7100: C4F9OCH3 (methoxy-nonafluorobutane, iso and normal)	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable	None	None
HCFC-141b and its blends	CFC-11, CFC-113, MCF	Acceptable	None	All aerosol solvent uses of HCFC-141b, either by itself or blended with other compounds, were prohibited as of January 1, 1994 under Section 610 (d) of the Clean Air Act. Limited exemptions exist, and are described in the section on aerosol substitutes in 59 FR 13044.
HFC-365mfc	CFC-113, MCF, HCFC-141b	Acceptable	None	None
HFC-245fa	CFC-113, HCFC-141b	Acceptable	None	EPA expects that the workplace environmental exposure will not exceed the Workplace Environmental Exposure Limit of 300 ppm and that users will observe the manufacturer's recommendations in MSDSs.
HFE-7000 (heptafluoropropyl methyl ether)	CFC-113, MCF, HCFC-141b	Acceptable	None	EPA expects that the workplace environmental exposure will not exceed the workplace exposure limit of 75 ppm and that users will observe the manufacturer's recommendations in MSDSs.
The Mini-Max Cleaner	CFC-113, MCF, HCFCs	Acceptable	None	None
Monochlorotoluene/ benzotrifluorides	CFC-11, CFC-113, MCF, HCFC-141b	Acceptable subject to use conditions	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 100 ppm acceptable exposure limit (AEL) for benzotrifluoride.	None
HFC-4310mee	CFC-113, MCF, HCFC-141b	Acceptable subject to use conditions	Subject to a 200 ppm time-weighted average workplace exposure standard and a 400 ppm workplace exposure ceiling.	None
Perfluorocarbons	CFC-113, MCF, HCFC-141b	Acceptable subject to narrowed use limits	Acceptable 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 GWPs. This decision reflects these concerns and is patterned after the SNAP decision on PFCs in the solvent cleaning sector.
Perfluoropolyethers	CFC-113, MCF, HCFC-141b	Acceptable subject to narrowed use limits	Acceptable only where reasonable efforts have been made to ascertain	PFPEs have similar global warming profile to the PFCs, and the SNAP decision on PFPEs parallels that

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			that other alternatives are not technically feasible due to performance or safety requirements.	for PFCs in the solvent cleaning sector.
Chlorobromomethane	CFC-113, MCF, HCFC-141b	Unacceptable	N/A	Other alternatives exist with zero or much lower ODP.