

Substitute	Trade Name(s)	ODP	GWP	Flammable	SNAP Listing Date	Listing Status	Further Information
HCFC-225cb		0.033	595	no	December 20, 2002 ☒ <https://www.govinfo.gov/content/pkg/FR-2002-12-20/pdf/02-32130.pdf>	Acceptable	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.
HCFO-1233yd(Z)		0.00003	<1	no	January 20, 2022 ☒ <https://www.govinfo.gov/content/pkg/FR-2022-01-20/pdf/2022-00998.pdf>	Acceptable	
Heptafluorocyclopentane		0	250	no	December 18, 2000 ☒ <https://www.govinfo.gov/content/pkg/FR-2000-12-18/pdf/00-32150.pdf>	Acceptable	EPA expects users to adhere to an exposure limit of 123 ppm over an eight-hour time-weighted average, with a ceiling of 500 ppm.
HFC-365mfc		0	794	yes	December 18, 2000 ☒ <https://www.govinfo.gov/content/pkg/FR-2000-12-18/pdf/00-32150.pdf>	Acceptable	

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HFC-4310mee		0	1,640	no	April 28, 1999 [] June 8, 1999 []	Acceptable	Company-set time-weighted average workplace exposure standard of 200 ppm, and a workplace exposure ceiling of 400 ppm.
HFE-449s1 (methoxynonafluorobutane, iso and normal)	Novec™ 7100 Engineered Fluid (HFE-7100)	0	297	no	September 5, 1996 [] December 18, 2000 []	Acceptable	

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Substitute	Trade Name(s)	ODP	GWP	Flammable	SNAP Listing Date	Listing Status	Further Information
HFE-569sf2 (ethoxynonfluorobutane, iso and normal)	Novoc™ 7200 Engineered Fluid (HFE-7200)	0	59	no	December 6, 1999 ☒ <https://www.govinfo.gov/content/pkg/FR-1999-12-06/pdf/99-31544.pdf>; December 18, 2000 ☒ <https://www.govinfo.gov/content/pkg/FR-2000-12-18/pdf/00-32150.pdf>	Acceptable	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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Substitute	Trade Name(s)	ODP	GWP	Flammable	SNAP Listing Date	Listing Status	Further Information
Methylene chloride		0	8.7	no	March 18, 1994 ☒ < https://www.govinfo.gov/content/pkg/FR-1994-03-18/html/94-4753.htm >	Acceptable	OSHA and RCRA standards must be met. EPA issued Maximum Achievable Control Technology requirements under the Clean Air Act for vapor degreasing in November 1994.
Monochlorotoluenes and benzotrifluorides		N/A	N/A	N/A	May 22, 1996 ☒ < https://www.govinfo.gov/content/pkg/FR-1996-05-22/html/96-12625.htm >	Acceptable with Use Conditions: Subject to a 50 ppm workplace standard for monochlorotoluenes and a 100 ppm standard for benzotrifluoride.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluoride is based on the company-set acceptable exposure limit.

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Substitute	Trade Name(s)	ODP	GWP	Flammable	SNAP Listing Date	Listing Status	Further Information
Perfluorobutyl Iodide (PFBI)		<0.005	<5	no	October 4, 2011 ☒ <https://www.govinfo.gov/content/pkg/FR-2011-10-04/pdf/2011-25391.pdf>	Acceptable	CAS Reg. No. is 423-39-2; EPA recommends an acceptable exposure limit of 375ppm (8-hour time-weighted average) for PFBI; Observe recommendations in the manufacturer's MSDS and guidance for using this substitute, particularly with respect to disposal. Prevent the solvent from entering waterways; PFBI is currently defined as a volatile organic compound (VOC) under CAA regulations (see 40 CFR 51.100(s)).
Semi-aqueous cleaners		0	N/A	no	March 18, 1994 ☒ <https://www.govinfo.gov/content/pkg/FR-1994-03-18/html/94-4753.htm>	Acceptable	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.

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Substitute	Trade Name(s)	ODP	GWP	Flammable	SNAP Listing Date	Listing Status	Further Information
							substitute boils at room temperature. Therefore, EPA recommends using this substitute in equipment designed to minimize solvent losses, emissions and worker exposure. Examples of such equipment include containers with connected hoses and valves that allow for direct transfer of the solvent to cleaning equipment without opening of the storage container, and enclosed or low-emission cleaning equipment. Observe recommendations in the manufacturer's MSDS and guidance for using this substitute.

Substitute	Trade Name(s)	ODP	GWP	Flammable	SNAP Listing Date	Listing Status	Further Information
Trichloroethylene		0.00037	N/A	yes	March 18, 1994 ☒ <https://www.govinfo.gov/content/pkg/fr-1994-03-18/html/94-4753.htm>	Acceptable	OSHA and RCRA standards must be met. EPA issued Maximum Achievable Control Technology requirements under the Clean Air Act for vapor degreasing in November 1994.
Vanishing oils		0	N/A	no	March 18, 1994 ☒ <https://www.govinfo.gov/content/pkg/fr-1994-03-18/html/94-4753.htm>	Acceptable	Depending on geographic region, may be subject to VOC controls.
Volatile methyl siloxanes		0	N/A	yes	August 26, 1994 ☒ <https://www.govinfo.gov/content/pkg/fr-1994-08-26/html/94-20802.htm>	Acceptable	Approval is granted for the whole class of compounds.

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