

MIL-STD-1330D(SH)
APPENDIX E
w/ Change 1

NAVSEA APPROVED HALOGENATED SOLVENTS

E.1 SCOPE

E.1.1 Scope. This appendix is a mandatory part of the standard. The information contained herein is intended for compliance. This appendix identifies the NAVSEA approved halogenated solvents, and specifies information regarding safe and effective use.

E.2 APPLICABLE DOCUMENTS

E.2.1 General. The documents listed in this section are specified in Appendix E of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in Appendix E of this standard, whether or not they are listed.

E.2.2 Government documents.

E.2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

COMMERCIAL ITEM DESCRIPTIONS

- A-A-50427 - Cleaning Compound, Solvent, 1,1-Dichloro-1-Fluoroethane, HCFC-141B, for Oxygen Systems
- A-A-59150 - Cleaning Compound, Solvent, Hydrofluoroether (HFE)
- A-A-59743 - Cleaning Compound Solvent, Dichloropentafluoropropane (HCFC-225)

DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-C-81302 - Cleaning, Compound, Solvent, Trichlorotrifluoroethane

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

TABLE E-I. NAVSEA approved halogenated solvents.

Attribute	Approved halogenated solvents ^{1/}			
	CFC-113 ^{2/}	HCFC-141b ^{3/}	HCFC-225 ^{4/}	HFE-7100 ^{5/}
Applications				
1. Gauges	Yes	Yes	Yes	Yes
2. O2N2 producers	Yes	Yes	Yes	No
3. Field wipe ^{6/}	Yes	No	^{4/}	Yes
Specifications	^{2/}	A-A-50427 ^{3/}	A-A-59743	A-A-59150
Recommended 8-hour time weighted average exposure criteria	1000 ppm	500 ppm	^{4/}	600 ppm
Recommended short term exposure limit	1250 ppm	750 ppm	^{4/}	900 ppm
Boiling point	118 °F	89 °F	129 °F	140 °F

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TABLE E-I. NAVSEA approved halogenated solvents. Continued.

Attribute	Approved halogenated solvents ^{1/}			
	CFC-113 ^{2/}	HCFC-141b ^{3/}	HCFC-225 ^{4/}	HFE-7100 ^{5/}
Ozone depleting substance	Yes	Yes	Yes	No
Ozone depletion potential	0.8	0.11	0.03	0.0
Production phase-out	1996	2003	2015	NA
Process verification methods				
1. Infrared spectrophotometry	Yes	No	No	No
2. NVR	Yes	Yes	Yes	Yes
3. SQM	Yes	Yes	Yes	Yes
Non-metallic compatibility ^{7/}	^{8/}	^{8/}	^{8/}	^{8/}
1. PTFE (Teflon)	C	C	C	C
2. PCTFE (Kel-F)	C	C	C	C
3. Vespel SP-21	C	C	C	C
4. Viton	12L	1L	1L	1L
5. Silicone	I	12L	I	I

NOTES:

^{1/} HFE-7100 is the preferred solvent for cleaning gages and instruments. HCFC-225 is the preferred solvent for cleaning oxygen-nitrogen producers.

^{2/} For naval activities, the use of CFC-113 is restricted to those authorized by NAVSEA to access the mission critical reserve maintained by the Defense Logistics Agency or reserves maintained by Naval Shipyards. Refer to Navy ODS Advisories 95-01 and 96-01 for additional information. CFC-113 procured for gauge cleaning shall be equivalent to MIL-C-81302, Type I. CFC-113 procured for oxygen-nitrogen producer cleaning and field wipe shall be equivalent to MIL-C-81302, Type I or II. Recycled CFC-113 shall be equivalent to MIL-C-81302, Type I, with the following exceptions: moisture content shall be 35 ppm maximum; organic cleanliness shall be less than 5 ppm determined as specified in 5.13.2; and particulate cleanliness shall be as specified in 5.13.3.2.

^{3/} Domestic availability of HCFC-141b is extremely limited based on the production phase-out, and there is no mission critical reserve. If available, HCFC-141b in accordance with A-A-50427 can be used for cleaning gauges and oxygen-nitrogen producers. To comply with environmental regulations, and since approved alternatives exist, HCFC-141b should not be used for field wipe. Be advised that HCFC-141b is reported to have upper and lower explosion limits of 17.7 and 7.6 percent, respectively. When purging or drying equipment cleaned with HCFC-141b, ensure purging is performed with nitrogen and is directed to a well ventilated area free of any ignition sources. Recognize that HCFC-141b at the lower explosive level is toxic representing an immediate hazard to life. HCFC-141b in accordance with A-A-50427 has been satisfactory tested for compatibility with gaseous and liquid oxygen demonstrating no ignition or flash point.

^{4/} HCFC-225 in accordance with A-A-59743 has been satisfactory tested for compatibility with gaseous and liquid oxygen demonstrating no ignition or flash points, and is available as either HCFC-225G or HCFC-225M. The recommended 8-hour time weighted average exposure for HCFC-225G is 400 ppm and for HCFC-225M is 100 ppm. The recommended short term (30-minute) exposure limit for HCFC-225G is 900 ppm and for HCFC-225M is 180 ppm. HCFC-225G in accordance with A-A-59743 is approved for cleaning gauges, oxygen-nitrogen producers and for field wipe. HCFC-225M in accordance with A-A-59743 is approved for oxygen-nitrogen producers when appropriate ventilation and other engineering controls can minimize personnel exposure. HCFC-225M in accordance with A-A-59743 should not be used shipboard, for gauges or for field wipe because of the low allowable exposure limit.

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TABLE E-I. NAVSEA approved halogenated solvents. Continued.

NOTES:

- ^{5/} HFE-7100 in accordance with A-A-59150 is approved for use to clean gages and instruments. Since HFE-7100 has marginal hydrocarbon soil removal performance, it shall not be used as a precleaner. An acceptable precleaner is HFE-71DE, which is a blend of HFE-7100 and 1,2 TransDichloroethylene (TDCE). This solvent has soil removal performance similar to CFC-113. However, HFE-71DE is not compatible with gaseous or liquid oxygen, and is more toxic than CFC-113, having a vendor recommended allowable exposure limit of 200 ppm. Therefore, HFE-71DE shall only be used as a precleaner. The performance of HFE-7100 as a wipe solvent is dependent on the type of soil being removed. HFE-7100 is an excellent wipe solvent for halogenated oils and greases. HFE-7100 is a poor solvent for hydrocarbon oils and greases including silicone.
- ^{6/} For critical applications, a NAVSEA approved halogenated solvent may only be used for field wipe with local engineering approval.
- ^{7/} The only non-metallic materials listed are those common to oxygen systems. For other materials, consult the manufacturer, local engineering, or NAVSEA. Where specific information is lacking, perform compatibility testing as specified in A.3.1 of Appendix A.
- ^{8/} C = Compatible. 12L = Limit exposure to a maximum of 12 hours per cleaning. 1L = Limit exposure to a maximum of 1 hour per cleaning. I = Incompatible. NT = Not tested.

Preparing activity:
Navy – SH
(Project 4730-2352-000)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.