Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the REACH Regulation (EC) 1907/2006 and its modifications.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
3M Novec Flux Remover

Product Identification Numbers
98-0212-3291-7 FF-9200-1186-4

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses
For Electronics Cleaning Only. Not Intended for Use as a Medical Device or Drug..

Restrictions on Use
Novec™ Aerosols are used in a wide variety of applications, including but not limited to precision cleaning of medical devices and as lubricant deposition solvents for medical devices. When the product is used for applications where the finished device is implanted into the human body, no residual Novec solvent may remain on the parts. It is highly recommended that the supporting test results and protocol be cited during FDA registration.

3M Electronics Markets Materials Division (EMMD) will not knowingly sample, support, or sell its products for incorporation in medical and pharmaceutical products and applications in which the 3M product will be temporarily or permanently implanted into humans or animals. The customer is responsible for evaluating and determining that a 3M EMMD product is suitable and appropriate for its particular use and intended application. The conditions of evaluation, selection, and use of a 3M product can vary widely and affect the use and intended application of a 3M product. Because many of these conditions are uniquely within the user's knowledge and control, it is essential that the user evaluate and determine whether the 3M product is suitable and appropriate for a particular use and intended application, and complies with all local applicable laws, regulations, standards, and guidance.

1.3. Details of the supplier of the safety data sheet
Address: 3M United Kingdom PLC, 3M Centre, Cain Road, Bracknell, Berkshire, RG12 8HT.
Telephone: +44 (0)1344 858 000
E Mail: tox.uk@mmm.com
Website: www.3M.com/uk

1.4. Emergency telephone number
+44 (0)1344 858 000

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture
CLP REGULATION (EC) No 1272/2008

CLASSIFICATION:
Aerosol, Category 3 - Aerosol 3; H229
Hazardous to the Aquatic Environment (Chronic), Category 3 - Aquatic Chronic 3; H412

For full text of H phrases, see Section 16.

Dangerous substances(67/548/EEC)/preparations(1999/45/EC) directive
Indication of danger
Dangerous for the environment; R52/53

For full text of R phrases, see Section 16.

2.2. Label elements
CLP REGULATION (EC) No 1272/2008

SIGNAL WORD
WARNING.

HAZARD STATEMENTS:

H229	Pressurised container. may burst if heated.
H412	Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS

Prevention:

P210A	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P251	Do not pierce or burn, even after use.

Storage:

P410 + P412	Protect from sunlight. Do not expose to temperatures exceeding 50C/122F.

Disposal:

P501	Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

SUPPLEMENTAL INFORMATION

Supplemental Hazard Statements:

EUH018	In use, may form flammable/explosive vapour-air mixture.

Notes on labelling
Updated per Regulation (EC) No. 648/2004 on detergents.
66-77% by mass of the contents are flammable.
H332 not applied per test data.
Classified as non-flammable per test data.

Dangerous substances(67/548/EEC)/preparations(1999/45/EC) directive

Symbol(s)

None.

Contains:

No ingredients are assigned to the label.

Risk phrases
R52/53 Harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Safety phrases
S61 Avoid release to the environment. Refer to special instructions/safety data sheets.

Special provisions concerning the labelling of certain substances

Pressurised container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.

Notes on labelling
Updated per Regulation (EC) 648/2004 on detergents.

66-77% by mass of the contents are flammable. R20 not applied due to testing.

2.3. Other hazards

None known.

SECTION 3: Composition/information on ingredients

Ingredient	CAS Nbr	EU Inventory	% by Wt	Classification
Trans-dichloroethylene	156-60-5	EINECS 205-860-2	65 - 72	F:R11; Xn:R20; R52/53 - Nota C (EU) Flam. Liq. 2, H225; Acute Tox. 4, H332; Aquatic Chronic 3, H412 - Nota C (CLP)
Ethyl nonafluoroisobutyl ether	163702-06-5	ELINCS 425-340-0	6 - 16	R53 (EU) Aquatic Chronic 4, H413 (CLP)
Ethyl nonafluorobutyl ether	163702-05-4	ELINCS 425-340-0	4 - 14	R53 (EU) Aquatic Chronic 4, H413 (CLP)
Methyl nonafluoroisobutyl ether	163702-08-7	ELINCS 422-270-2	3 - 8	
Methyl nonafluorobutyl ether	163702-07-6	ELINCS 422-270-2	2 - 7	
Carbon dioxide	124-38-9	EINECS 204-696-9	1 - 5	Liquified gas, H280 (Self Classified)
Propan-2-ol	67-63-0	EINECS 200-661-7	1 - 5	F:R11; Xi:R36; R67 (EU) Flam. Liq. 2, H225; Eye Irrit. 2, H319; STOT SE 3, H336 (CLP)

Please see section 16 for the full text of any R phrases and H statements referred to in this section
Please refer to section 15 for the any applicable Notas that have been applied to the above components

For information on ingredient occupational exposure limits or PBT or vPvB status, see sections 8 and 12 of this SDS

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Remove person to fresh air. If you feel unwell, get medical attention.

Skin contact
Wash with soap and water. If signs/symptoms develop, get medical attention.

Eye contact
Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If swallowed
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1 Information on toxicological effects

4.3. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Extinguishing media
Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture
Closed containers exposed to heat from fire may build pressure and explode. Exposure to extreme heat can give rise to thermal decomposition.

Hazardous Decomposition or By-Products

Substance	Condition
Carbon monoxide.	During combustion.
Carbon dioxide.	During combustion.

5.3. Advice for fire-fighters
When fire fighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus,tunic and trousers (leggings),bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Ventilate the area with fresh air. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions

Avoid release to the environment. For larger spills, cover drains and build dykes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
If possible, seal leaking container. Place leaking containers in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors on an impermeable surface until appropriate packaging for the leaking container or its contents is available. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorised person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and Safety Data Sheet. Seal the container. Dispose of collected material as soon as possible.

6.4. Reference to other sections
Refer to Section 8 and Section 13 for more information

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid inhalation of thermal decomposition products. For industrial or professional use only. Do not use in a confined area with minimal air exchange. Store work clothes separately from other clothing, food and tobacco products. Do not pierce or burn, even after use. Avoid breathing dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Avoid contact with oxidising agents (eg. chlorine, chromic acid etc.) No smoking: Smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of hazardous decomposition products.

7.2. Conditions for safe storage including any incompatibilities
Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight. Do not expose to temperatures exceeding 50C/122F. Store away from heat. Store away from strong bases. Store away from oxidising agents.

7.3. Specific end use(s)
See information in Section 7.1 and 7.2 for handling and storage recommendations. See Section 8 for exposure controls and personal protection recommendations.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits
If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	CAS Nbr	Agency	Limit type	Additional comments
Carbon dioxide	124-38-9	UK HSC	TWA:9150 mg/m3(5000 ppm);STEL:27400 mg/m3(15000 ppm)	
trans-dichloroethylene	156-60-5	UK HSC	TWA:806 mg/m3(200 ppm);STEL:1010 mg/m3(250 ppm)	
Ethyl nonafluorobutyl ether	163702-05-4	Manufacturer determined	TWA(as total isomers):200 ppm	
Ethyl nonafluoroisobutyl ether	163702-06-5	Manufacturer determined	TWA(as total isomers):200 ppm	
Propan-2-ol	67-63-0	UK HSC	TWA:999 mg/m³(400 ppm);STEL:1250 mg/m³(500 ppm)	

UK HSC : UK Health and Safety Commission
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

Biological limit values
No biological limit values exist for any of the components listed in Section 3 of this safety data sheet.

8.2. Exposure controls

8.2.1. Engineering controls
Provide appropriate local exhaust when product is heated. Do not remain in area where available oxygen may be reduced. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapours/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Indirect vented goggles.

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing.
Gloves made from the following material(s) are recommended:

Material	Thickness (mm)	Breakthrough Time
Nitrile rubber.	No data available	No data available

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
During heating:
Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

Half facepiece or full facepiece air-purifying respirator suitable for organic vapours

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid.
Specific Physical Form:	Aerosol
Appearance/Odour	Clear, colourless liquid with slight odour. Contents under pressure.
Odour threshold	*No data available.*
pH	*Not applicable.*

Boiling point/boiling range	44 ºC
Melting point	*Not applicable.*
Flammability (solid, gas)	Not applicable.
Explosive properties	Not classified
Oxidising properties	Not classified
Flash point	No flash point
Autoignition temperature	408 ºC
Flammable Limits(LEL)	5.9 % volume
Flammable Limits(UEL)	14.5 % volume
Vapour pressure	47,995.9 Pa [@ 25 ºC] [*Details:*Internal pressure for aerosol can is approximately 75 psig @25C]
Relative density	1.3 [*Ref Std:*WATER=1]
Water solubility	Slight (less than 10%)
Solubility- non-water	*No data available.*
Partition coefficient: n-octanol/water	*No data available.*
Evaporation rate	*No data available.*
Vapour density	2.3 [@ 25 ºC] [*Ref Std:*AIR=1]
Decomposition temperature	*No data available.*
Viscosity	0 Pa-s
Density	1.3 g/ml

9.2. Other information

Volatile organic compounds (VOC)	67 % [*Details:*by weight]
Percent volatile	100 %
VOC less H2O & exempt solvents	67 % [*Details:*by weight]

SECTION 10: Stability and reactivity

10.1 Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section

10.2 Chemical stability
Stable.

10.3 Possibility of hazardous reactions
Hazardous polymerisation will not occur.

10.4 Conditions to avoid
Heat.

10.5 Incompatible materials
Strong bases.
Strong oxidising agents.

10.6 Hazardous decomposition products

Substance	**Condition**
Hydrogen Chloride	At elevated temperatures. - extreme conditions of heat
Hydrogen Fluoride	At elevated temperatures. - extreme conditions of heat
Perfluoroisobutylene (PFIB).	At elevated temperatures. - extreme conditions of heat

Refer to section 5.2 for hazardous decomposition products during combustion.

If the product is exposed to extreme conditions of heat from misuse or equipment failure, toxic decomposition products that include hydrogen fluoride and perfluoroisobutylene can occur.

SECTION 11: Toxicological information

The information below may not agree with the EU material classification in Section 2 and/or the ingredient classifications in Section 3 if specific ingredient classifications are mandated by a competent authority. In addition, statements and data presented in Section 11 are based on UN GHS calculation rules and classifications derived from 3M assessments.

11.1 Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation
Respiratory tract irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause additional health effects (see below).

Skin contact
Mild Skin Irritation: Signs/symptoms may include localised redness, swelling, itching, and dryness.

Eye contact
Moderate eye irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion
Gastrointestinal irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhoea. May cause additional health effects (see below).

Additional Health Effects:

Single exposure may cause target organ effects:
Central nervous system (CNS) depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Inhalation-Vapor(4 hr)		No data available; calculated ATE >50 mg/l
Overall product	Ingestion		No data available; calculated ATE >5,000 mg/kg
Trans-dichloroethylene	Dermal	Rabbit	LD50 > 5,000 mg/kg
Trans-dichloroethylene	Inhalation-Vapor (4 hours)	Rat	LC50 95.6 mg/l
Trans-dichloroethylene	Ingestion	Rat	LD50 7,902 mg/kg
Ethyl nonafluoroisobutyl ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 989 mg/l
Ethyl nonafluoroisobutyl ether	Ingestion	Rat	LD50 > 2,000 mg/kg
Ethyl nonafluorobutyl ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 989 mg/l

Ethyl nonafluorobutyl ether	Ingestion	Rat	LD50 > 2,000 mg/kg
Methyl nonafluoroisobutyl ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 1,000 mg/l
Methyl nonafluoroisobutyl ether	Ingestion	Rat	LD50 > 5,000 mg/kg
Methyl nonafluorobutyl ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 1,000 mg/l
Methyl nonafluorobutyl ether	Ingestion	Rat	LD50 > 5,000 mg/kg
Propan-2-ol	Dermal	Rabbit	LD50 12,870 mg/kg
Propan-2-ol	Inhalation-Vapor (4 hours)	Rat	LC50 72.6 mg/l
Propan-2-ol	Ingestion	Rat	LD50 4,710 mg/kg
Carbon dioxide	Inhalation-Gas (4 hours)	Rat	LC50 > 53,000 ppm

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Trans-dichloroethylene	Rabbit	Minimal irritation
Ethyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Ethyl nonafluorobutyl ether	Rabbit	No significant irritation
Methyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Methyl nonafluorobutyl ether	Rabbit	No significant irritation
Propan-2-ol	Multiple animal species	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
Trans-dichloroethylene	Rabbit	Moderate irritant
Ethyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Ethyl nonafluorobutyl ether	Rabbit	No significant irritation
Methyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Methyl nonafluorobutyl ether	Rabbit	No significant irritation
Propan-2-ol	Rabbit	Severe irritant

Skin Sensitisation

Name	Species	Value
Ethyl nonafluoroisobutyl ether	Guinea pig	Not sensitizing
Ethyl nonafluorobutyl ether	Guinea pig	Not sensitizing
Methyl nonafluoroisobutyl ether	Guinea pig	Not sensitizing
Methyl nonafluorobutyl ether	Guinea pig	Not sensitizing
Propan-2-ol	Guinea pig	Not sensitizing

Respiratory Sensitisation

For the component/components, either no data is currently available or the data is not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value
Trans-dichloroethylene	In Vitro	Not mutagenic
Trans-dichloroethylene	In vivo	Not mutagenic
Ethyl nonafluoroisobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluoroisobutyl ether	In vivo	Not mutagenic

Ethyl nonafluorobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluorobutyl ether	In vivo	Not mutagenic
Methyl nonafluoroisobutyl ether	In Vitro	Not mutagenic
Methyl nonafluoroisobutyl ether	In vivo	Not mutagenic
Methyl nonafluorobutyl ether	In Vitro	Not mutagenic
Methyl nonafluorobutyl ether	In vivo	Not mutagenic
Propan-2-ol	In Vitro	Not mutagenic
Propan-2-ol	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
Propan-2-ol	Inhalation	Rat	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test result	Exposure Duration
Trans-dichloroethylene	Ingestion	Not toxic to female reproduction	Rat	NOAEL 3,000 mg/kg/day	90 days
Trans-dichloroethylene	Inhalation	Not toxic to female reproduction	Rat	NOAEL 16 mg/l	90 days
Trans-dichloroethylene	Ingestion	Not toxic to male reproduction	Rat	NOAEL 3,000 mg/kg/day	90 days
Trans-dichloroethylene	Inhalation	Not toxic to male reproduction	Rat	NOAEL 16 mg/l	90 days
Trans-dichloroethylene	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 24 mg/l	during organogenesis
Ethyl nonafluoroisobutyl ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 260.1 mg/l	during gestation
Ethyl nonafluoroisobutyl ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	during gestation
Ethyl nonafluorobutyl ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 260.1 mg/l	during gestation
Ethyl nonafluorobutyl ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluorobutyl ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	during gestation
Methyl nonafluoroisobutyl ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluoroisobutyl ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl nonafluoroisobutyl ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluoroisobutyl ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 129	1 generation

				mg/l	
Methyl nonafluoroisobutyl ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 307 mg/l	during gestation
Methyl nonafluorobutyl ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluorobutyl ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl nonafluorobutyl ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluorobutyl ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl nonafluorobutyl ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 307 mg/l	during gestation
Propan-2-ol	Ingestion	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 400 mg/kg/day	during organogenesis
Propan-2-ol	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	LOAEL 9 mg/l	during gestation
Carbon dioxide	Inhalation	Some positive male reproductive data exist, but the data are not sufficient for classification	Mouse	LOAEL 350,000 ppm	not available
Carbon dioxide	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	LOAEL 60,000 ppm	24 hours

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
Trans-dichloroethylene	Inhalation	central nervous system depression	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
Trans-dichloroethylene	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
Trans-dichloroethylene	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Rat	LOAEL 4,500 mg/kg	not applicable
Ethyl nonafluoroisobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes
Ethyl nonafluoroisobutyl ether	Inhalation	respiratory irritation	All data are negative	Rat	NOAEL 989 mg/l	4 hours
Ethyl nonafluorobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes
Ethyl nonafluorobutyl ether	Inhalation	respiratory irritation	All data are negative	Rat	NOAEL 989 mg/l	4 hours
Methyl nonafluoroisobutyl ether	Inhalation	nervous system	Some positive data exist, but the data are not sufficient for classification	Dog	LOAEL 913 mg/l	10 minutes
Methyl nonafluoroisobutyl ether	Inhalation	cardiac sensitization	All data are negative	Dog	NOAEL 913 mg/l	10 minutes
Methyl nonafluorobutyl ether	Inhalation	nervous system	Some positive data exist, but the data are not sufficient for classification	Dog	LOAEL 913 mg/l	10 minutes
Methyl nonafluorobutyl ether	Inhalation	cardiac sensitization	All data are negative	Dog	NOAEL 913 mg/l	10 minutes
Propan-2-ol	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Propan-2-ol	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	

Propan-2-ol	Inhalation	auditory system	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL 13.4 mg/l	24 hours
Propan-2-ol	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
Trans-dichloroethylene	Inhalation	endocrine system | liver | kidney and/or bladder | respiratory system	All data are negative	Rat	NOAEL 16 mg/l	90 days
Trans-dichloroethylene	Ingestion	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 2,000 mg/kg/day	14 weeks
Trans-dichloroethylene	Ingestion	blood | liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 125 mg/kg/day	14 weeks
Trans-dichloroethylene	Ingestion	heart | immune system | respiratory system	All data are negative	Rat	NOAEL 2,000 mg/kg/day	14 weeks
Ethyl nonafluoroisobutyl ether	Inhalation	liver | kidney and/or bladder | respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Inhalation	heart | endocrine system | bone marrow | hematopoietic system | immune system | nervous system	All data are negative	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Ingestion	blood | liver | kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluoroisobutyl ether	Ingestion	heart | endocrine system | bone marrow | hematopoietic system | immune system | nervous system | respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	liver | kidney and/or bladder | respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluorobutyl ether	Inhalation	heart | endocrine system | bone marrow | hematopoietic system | immune system | nervous system	All data are negative	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluorobutyl ether	Ingestion	blood | liver | kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Ingestion	heart | endocrine system | bone marrow | hematopoietic system | immune system | nervous system | respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluoroisobutyl ether	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 155 mg/l	13 weeks
Methyl nonafluoroisobutyl	Inhalation	bone, teeth, nails,	Some positive data exist, but the	Rat	NOAEL 129	11 weeks

ether		and/or hair	data are not sufficient for classification		mg/l	
Methyl nonafluoroisobutyl ether	Inhalation	heart | skin | endocrine system | hematopoietic system | immune system | muscles | nervous system | eyes | kidney and/or bladder | respiratory system	All data are negative	Rat	NOAEL 155 mg/l	13 weeks
Methyl nonafluoroisobutyl ether	Ingestion	endocrine system | liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluoroisobutyl ether	Ingestion	heart | hematopoietic system | immune system | nervous system | eyes | kidney and/or bladder | respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluorobutyl ether	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 155 mg/l	13 weeks
Methyl nonafluorobutyl ether	Inhalation	bone, teeth, nails, and/or hair	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 129 mg/l	11 weeks
Methyl nonafluorobutyl ether	Inhalation	heart | skin | endocrine system | hematopoietic system | immune system | muscles | nervous system | eyes | kidney and/or bladder | respiratory system	All data are negative	Rat	NOAEL 155 mg/l	13 weeks
Methyl nonafluorobutyl ether	Ingestion	endocrine system | liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl nonafluorobutyl ether	Ingestion	heart | hematopoietic system | immune system | nervous system | eyes | kidney and/or bladder | respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
Propan-2-ol	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 12.3 mg/l	24 months
Propan-2-ol	Inhalation	nervous system	All data are negative	Rat	NOAEL 12 mg/l	13 weeks
Propan-2-ol	Ingestion	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 400 mg/kg/day	12 weeks
Carbon dioxide	Inhalation	heart | bone, teeth, nails, and/or hair | liver | nervous system | kidney and/or bladder | respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 60,000 ppm	166 days

Aspiration Hazard
For the component/components, either no data is currently available or the data is not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

The information below may not agree with the EU material classification in Section 2 and/or the ingredient classifications in Section 3 if specific ingredient classifications are mandated by a competent authority. In addition, statements and data presented in Section 12 are based on UN GHS calculation rules and classifications derived from 3M assessments.

12.1. Toxicity

No product test data available.

Material	CAS Nbr	Organism	Type	Exposure	Test endpoint	Test result
Trans-dichloroethylene	156-60-5	Bluegill	Estimated	96 hours	LC50	140 mg/l
Trans-dichloroethylene	156-60-5	Water flea	Experimental	48 hours	EC50	220 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Green Algae	Experimental	96 hours	EC50	>8.9 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Water flea	Experimental	48 hours	EC50	>10 mg/l
Carbon dioxide	124-38-9	Fish	Experimental	96 hours	LC50	112.2 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Water flea	Experimental	48 hours	EC50	>100 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Fathead minnow	Experimental	96 hours	LC50	>100 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Green Algae	Experimental	96 hours	EC50	>100 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Water flea	Experimental	48 hours	EC50	>100 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Fathead minnow	Experimental	96 hours	LC50	>100 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Green Algae	Experimental	96 hours	EC50	>100 mg/l
Propan-2-ol	67-63-0	Crustacea	Experimental	48 hours	EC50	1,400 mg/l
Propan-2-ol	67-63-0	Algae	Experimental	24 hours	EC50	>1,000 mg/l
Propan-2-ol	67-63-0	Fathead minnow	Experimental	96 hours	LC50	6,120 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Water flea	Experimental	48 hours	EC50	>10 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Green Algae	Experimental	96 hours	EC50	>8.9 mg/l

Methyl nonafluoroisobutyl ether	163702-08-7	Fathead minnow	Experimental	96 hours	LC50	>7.9 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Green Algae	Experimental	96 hours	NOEC	>8.9 mg/l
Carbon dioxide	124-38-9	Atlantic Salmon	Experimental	43 days	NOEC	26 mg/l
Propan-2-ol	67-63-0	Water flea	Experimental	21 days	NOEC	30 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Green Algae	Experimental	96 hours	NOEC	>8.9 mg/l

12.2. Persistence and degradability

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
Ethyl nonafluorobutyl ether	163702-05-4	Estimated Hydrolysis		Hydrolytic half-life	648 days (t 1/2)	Other methods
Ethyl nonafluorobutyl ether	163702-05-4	Experimental Biodegradation	28 days	BOD	0 % weight	OECD 301D - Closed bottle test
Methyl nonafluorobutyl ether	163702-07-6	Experimental Biodegradation	28 days	BOD	22 % weight	OECD 301D - Closed bottle test
Methyl nonafluoroisobutyl ether	163702-08-7	Experimental Biodegradation	28 days	BOD	22 % weight	OECD 301D - Closed bottle test
Ethyl nonafluoroisobutyl ether	163702-06-5	Estimated Hydrolysis		Hydrolytic half-life	648 days (t 1/2)	Other methods
Ethyl nonafluoroisobutyl ether	163702-06-5	Experimental Biodegradation	28 days	BOD	0 % weight	OECD 301D - Closed bottle test
Trans-dichloroethylene	156-60-5	Experimental Photolysis		Photolytic half-life (in air)	13 days (t 1/2)	Other methods
Trans-dichloroethylene	156-60-5	Experimental Biodegradation	28 days	BOD	8 % weight	OECD 301D - Closed bottle test
Carbon dioxide	124-38-9	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
Propan-2-ol	67-63-0	Experimental Biodegradation	14 days	BOD	86 % weight	OECD 301C - MITI test (I)

12.3 : Bioaccumulative potential

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
Ethyl nonafluorobutyl ether	163702-05-4	Experimental BCF-Carp	56 days	Bioaccumulation factor	919	OECD 305E - Bioaccumulation flow-through fish test
Methyl nonafluorobuty	163702-07-6	Experimental Bioconcentrati		Log Kow	3.54	Other methods

l ether		on				
Methyl nonafluoroisobutyl ether	163702-08-7	Experimental Bioconcentration		Log Kow	3.54	Other methods
Ethyl nonafluoroisobutyl ether	163702-06-5	Experimental BCF-Carp	56 days	Bioaccumulation factor	919	OECD 305E - Bioaccumulation flow-through fish test
Trans-dichloroethylene	156-60-5	Experimental Bioconcentration		Log Kow	2.09	Other methods
Carbon dioxide	124-38-9	Experimental Bioconcentration		Log Kow	0.83	Other methods
Propan-2-ol	67-63-0	Experimental Bioconcentration		Log Kow	0.05	Other methods

12.4. Mobility in soil
Please contact manufacturer for more details

12.5. Results of the PBT and vPvB assessment

No information available at this time, contact manufacturer for more details

12.6. Other adverse effects
No information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
See Section 11.1 Information on toxicological effects

Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Facility must be capable of handling aerosol cans. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

The coding of a waste stream is based on the application of the product by the consumer. Since this is out of the control of 3M, no waste code(s) for products after use will be provided. Please refer to the European Waste Code (EWC - 2000/532/EC and amendments) to assign the correct waste code to your waste stream. Ensure national and/or regional regulations are complied with and always use a licensed waste contractor.

EU waste code (product as sold)
16 05 04* Gases in pressure containers (including halons) containing dangerous substances

EU waste code (product container after use)
15 01 04 Metallic packaging

SECTION 14: Transportation information

98-0212-3291-7

ADR/RID: UN1950, AEROSOLS, LIMITED QUANTITY, 2.2, (E), ADR Classification Code: 5A.
IMDG-CODE: UN1950, AEROSOLS, 2.2, IMDG-Code segregation code: NONE, LIMITED QUANTITY, EMS: FD,SU.
ICAO/IATA: UN1950, AEROSOLS, NON-FLAMMABLE, 2.2.

FF-9200-1186-4

ADR/RID: UN1950, AEROSOLS, LIMITED QUANTITY, 2.2, (E), ADR Classification Code: 5A.
IMDG-CODE: UN1950, AEROSOLS, 2.2, IMDG-Code segregation code: NONE, LIMITED QUANTITY, EMS: FD,SU.
ICAO/IATA: UN1950, AEROSOLS, NON-FLAMMABLE, 2.2.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Global inventory status
Contact 3M for more information. The components of this product are in compliance with the chemical notification requirements of TSCA.

15.2. Chemical Safety Assessment
Not applicable

SECTION 16: Other information

List of relevant H statements

H225	Highly flammable liquid and vapour.
H229	Pressurised container. may burst if heated.
H280	Contains gas under pressure; may explode if heated.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H336	May cause drowsiness or dizziness.
H412	Harmful to aquatic life with long lasting effects.
H413	May cause long lasting harmful effects to aquatic life.

List of relevant R-phrases

R11	Highly flammable.
R20	Harmful by inhalation.
R36	Irritating to eyes.
R52/53	Harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
R53	May cause long-term adverse effects in the aquatic environment.
R67	Vapours may cause drowsiness and dizziness.

Revision information:
Revision Changes:
Risk phrase information was modified.
Section 01: 1.3. Details of the supplier of the safety data sheet heading information was modified.
Section 1: Product identification numbers information was modified.
Section 16: List of relevant R phrase information information was modified.
Section 2: Indication of danger information information was modified.
Section 12: Persistence and Degradability information information was modified.
Section 12:Bioccumulative potential information information was modified.
Copyright information was modified.
Label: Signal Word information was modified.

Section 15: Label remarks and EU Detergent information was modified.
Section 8: Occupational exposure limit table information was modified.
OEL Reg Agency Desc information was modified.
Section 11: Additional Health Effects heading information was modified.
Section 11: Health Effects - Skin information information was modified.
Section 11: Health Effects - Inhalation information information was modified.
Section 11: Health Effects - Ingestion information information was modified.
Section 7: Precautions safe handling information information was modified.
Section 11: Single exposure may cause target organ effects heading information was modified.
Section 8: Occupational exposure limit table information was added.
Section 1: Restrictions on use information information was added.
Section 1: Restrictions on use header information was added.
Section 11: Aspiration Hazard text information was added.
Section 11: Respiratory Sensitization text information was added.
Section 11: Skin Sensitization table - Name heading information was added.
Section 11: Skin Sensitization table - Species heading information was added.
Section 11: Skin Sensitization table - Value heading information was added.
Section 11: Serious Eye Damage/Irritation table - Name heading information was added.
Section 11: Serious Eye Damage/Irritation table - Species heading information was added.
Section 11: Serious Eye Damage/Irritation table - Value heading information was added.
Section 11: Skin Corrosion/Irritation table - Name heading information was added.
Section 11: Skin Corrosion/Irritation table - Species heading information was added.
Section 11: Skin Corrosion/Irritation table - Value heading information was added.
Section 11: Germ Cell Mutagenicity table - Name heading information was added.
Section 11: Germ Cell Mutagenicity table - Route heading information was added.
Section 11: Germ Cell Mutagenicity table - Value heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Name heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Route heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Target Organ(s) heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Value heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Species heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Test Result heading information was added.
Section 11: Specific Target Organ Toxicity - repeated exposure table - Exposure Duration heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Name heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Route heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Target Organ(s) heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Value heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Species heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Test Result heading information was added.
Section 11: Specific Target Organ Toxicity - single exposure table - Exposure Duration heading information was added.
Section 11: Reproductive and/or Developmental Effects table - Name heading information was added.
Section 11: Reproductive and/or Developmental Effects table - Route heading information was added.
Section 11: Reproductive and/or Developmental Effects table - Value heading information was added.
Section 11: Reproductive and/or Developmental Effects table - Species heading information was added.
Section 11: Reproductive and/or Developmental Effects table - Test Result heading information was added.
Section 11: Reproductive and/or Developmental Effects text information was added.
Section 11: Carcinogenicity table - Name heading information was added.
Section 11: Carcinogenicity table - Route heading information was added.
Section 11: Carcinogenicity table - Species heading information was added.
Section 11: Carcinogenicity table - Value heading information was added.
Section 8: glove data - Material heading information was added.
Section 8: glove data - Thickness heading information was added.
Section 8: glove data - Breakthrough Time heading information was added.
Section 8: glove data value information was added.
Section 8: Skin protection - recommended gloves information information was deleted.
Section 11: Exposure Duration table heading information was deleted.

Section 11: Test Result table heading information was deleted.

DISCLAIMER: The information on this Safety Data Sheet is based on our experience and is correct to the best of our knowledge at the date of publication, but we do not accept any liability for any loss, damage or injury resulting from its use (except as required by law). The information may not be valid for any use not referred to in this Data Sheet or use of the product in combination with other materials. For these reasons, it is important that customers carry out their own test to satisfy themselves as to the suitability of the product for their own intended applications.

3M United Kingdom MSDSs are available at www.3M.com/uk