



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

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..

1.3. Details of the supplier of the substance or mixture

Address: 3M United Kingdom PLC, 3M Centre, Cain Road, Bracknell, Berkshire, RG12 8HT.

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

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

Indication of danger

R18

Dangerous for the environment; R52/53

For full text of R phrases, see Section 16.

2.2. Label elements

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

3M Novec Flux Remover**Symbol(s)**

None.

Contains:

No ingredients are assigned to the label.

Risk phrases

R18 In use, may form flammable/explosive vapour-air mixture.
 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 (Self Classified)
Ethyl nonafluorobutyl ether	163702-05-4	ELINCS 425-340-0	4 - 14	R53 (EU) Aquatic Chronic 4, H413 (Self Classified)
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,

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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

Non-combustible. Choose material suitable for surrounding fire. In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam.

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

<u>Substance</u>	<u>Condition</u>
Carbon monoxide.	During combustion.
Carbon dioxide.	During combustion.

5.3. Advice for fire-fighters

No unusual effects are anticipated during fire extinguishing operations. Avoid breathing the products and substances that may result from the thermal decomposition of the product or the other substances in the fire zone. Keep containers cool with water spray when exposed to fire to avoid rupture.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Ventilate the area with fresh air. Refer to other sections of this SDS for information regarding physical and

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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 toxic, corrosivity or flammability 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

For industrial or professional use only. Do not use in a confined area or areas with little or no air movement. Store work clothes separately from other clothing, food and tobacco products. 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. 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

Ingredient	CAS Nbr	Agency	Limit type	Additional comments
trans-dichloroethylene	156-60-5	Health and Safety Comm. (UK)	TWA:806 mg/m ³ (200 ppm);STEL:1010 mg/m ³ (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	Health and Safety Comm. (UK)	TWA:999 mg/m ³ (400 ppm);STEL:1250 mg/m ³ (500 ppm)	

Health and Safety Comm. (UK) : UK Health and Safety Commission

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TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
ppm: parts per million
mg/m³: milligrams per cubic metre
CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

For those situations where the material might be exposed to extreme overheating due to misuse or equipment failure, use with appropriate local exhaust ventilation sufficient to maintain levels of thermal decomposition products below their exposure guidelines. 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

The following eye protection(s) are recommended: Safety glasses with side shields.
Indirect vented goggles.

Skin/hand protection

Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials. Gloves made from the following material(s) are recommended: Fluoroelastomer
Polymer laminate

Respiratory protection

If thermal degradation products are expected, use a full facepiece supplied-air respirator. Select and use respiratory protection to prevent an inhalation exposure based on the results of an exposure assessment. Consult with your respirator manufacturer for selection of appropriate types of respirators.
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:
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	<i>No data available.</i>
pH	<i>Not applicable.</i>
Boiling point/boiling range	44 °C
Melting point	<i>Not applicable.</i>
Flammability (solid, gas)	Not applicable.
Explosive properties	Not classified
Oxidising properties	Not classified
Flash point	No flash point
Autoignition temperature	408 °C

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Flammable Limits(LEL)	5.9 % volume
Flammable Limits(UEL)	14.5 % volume
Vapour pressure	47,995.9 Pa [@ 25 °C] [<i>Details:</i> Internal pressure for aerosol can is approximately 75 psig @25C]
Relative density	1.3 [<i>Ref Std:</i> WATER=1]
Water solubility	Slight (less than 10%)
Solubility- non-water	<i>No data available.</i>
Partition coefficient: n-octanol/water	<i>No data available.</i>
Evaporation rate	<i>No data available.</i>
Vapour density	2.3 [@ 25 °C] [<i>Ref Std:</i> AIR=1]
Decomposition temperature	<i>No data available.</i>
Viscosity	0 Pa-s
Density	1.3 g/ml

9.2. Other information

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

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient

classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labelling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

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.

Skin contact

Mild Skin Irritation: Signs/symptoms may include localized 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 target organ effects after ingestion.

Target Organ Effects:

Single exposure may cause:

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

Toxicological Data

Acute Toxicity

Name	Route	Species	Value
Overall product	Inhalation-Vapor(4 hr)		No test data available; calculated ATE >50 mg/l
Overall product	Ingestion		No test 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 1,000 mg/l
Ethyl nonafluoroisobutyl ether	Ingestion	Rat	LD50 >2000 mg/kg
Ethyl nonafluorobutyl ether	Inhalation-Vapor	Rat	LC50 1,000 mg/l
Ethyl nonafluorobutyl ether	Ingestion	Rat	LD50 >2000 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

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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		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
Carbon dioxide		No data available

Serious Eye Damage/Irritation

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

Skin Sensitisation

Name	Species	Value
Trans-dichloroethylene		No data available
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
Carbon dioxide		No data available

Respiratory Sensitisation

Name	Species	Value
Trans-dichloroethylene		No data available
Ethyl nonafluoroisobutyl ether		No data available
Ethyl nonafluorobutyl ether		No data available
Methyl nonafluoroisobutyl ether		No data available
Methyl nonafluorobutyl ether		No data available
Propan-2-ol		No data available
Carbon dioxide		No data available

Germ Cell Mutagenicity

Name	Route	Value
Trans-dichloroethylene	In Vitro	Not mutagenic
Trans-dichloroethylene	Ingestion	Not mutagenic
Ethyl nonafluoroisobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluorobutyl ether	In Vitro	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
Carbon dioxide		No data available

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Name	Route	Species	Value
Trans-dichloroethylene			No data available
Ethyl nonafluoroisobutyl ether			No data available
Ethyl nonafluorobutyl ether			No data available
Methyl nonafluoroisobutyl ether			No data available
Methyl nonafluorobutyl ether			No data available
Propan-2-ol	Inhalation	Rat	Some positive data exist, but the data are not sufficient for classification
Carbon dioxide			No data available

Reproductive Toxicity**Reproductive and/or Developmental Effects**

Name	Route	Value	Species	Test result	Exposure Duration
Trans-dichloroethylene	Ingestion	Not toxic to reproduction and/or development		NOAEL 3,000 mg/kg/day	
Trans-dichloroethylene	Inhalation	Some positive reproductive/developmental data exist, but the data are not sufficient for classification		NOEL 6,000 ppm	
Ethyl nonafluoroisobutyl ether	Ingestion	Not toxic to reproduction and/or development	Rat	NOAEL 1,000 mg/kg	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	Not toxic to reproduction and/or development	Rat	NOAEL 3,000 ppm	
Ethyl nonafluorobutyl ether	Ingestion	Not toxic to reproduction and/or development	Rat	NOAEL 1,000 mg/kg	28 days
Ethyl nonafluorobutyl ether	Inhalation	Not toxic to reproduction and/or development	Rat	NOAEL 3,000 ppm	
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 mg/l	1 generation
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	Ingestion	Not toxic to male	Rat	NOAEL	28 days

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nonafluorobutyl ether		reproduction		1,000 mg/kg/day	
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	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		Irritation Positive	
Trans-dichloroethylene	Inhalation	central nervous system depression	Some positive data exist, but the data are not sufficient for classification			
Trans-dichloroethylene	Ingestion	central nervous system depression	May cause drowsiness or dizziness		LOAEL 4,500 mg/kg	
Ethyl nonafluoroisobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 55.4 mg/l	
Ethyl nonafluoroisobutyl ether	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rat	Irritation Positive	28 days
Ethyl nonafluorobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not	Dog	NOAEL 55.4 mg/l	

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			sufficient for classification			
Ethyl nonafluorobutyl ether	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rat	Irritation Positive	28 days
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
Carbon dioxide			No data available			

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		NOAEL 4,000 ppm	
Trans-dichloroethylene	Ingestion	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification		NOAEL 625 mg/kg/day	
Trans-dichloroethylene	Ingestion	blood liver	Some positive data exist, but the data are not sufficient for classification		NOAEL 156 mg/kg/day	

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Trans-dichloroethylene	Ingestion	heart immune system respiratory system	All data are negative		NOAEL 2,500 mg/kg/day	
Ethyl nonafluoroisobutyl ether	Inhalation	nervous system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 8,844 ppm	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 3,006 ppm	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,066 ppm	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	heart	All data are negative	Rat	NOAEL 25,386 ppm	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	hematopoietic system	All data are negative	Rat	NOAEL 24,386 ppm	28 days
Ethyl nonafluoroisobutyl ether	Ingestion	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 40 mg/kg	28 days
Ethyl nonafluoroisobutyl ether	Ingestion	blood kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 200 mg/kg	28 days
Ethyl nonafluoroisobutyl ether	Ingestion	endocrine system hematopoietic system immune system nervous system	All data are negative	Rat	NOAEL 1,000 mg/kg	28 days
Ethyl nonafluorobutyl ether	Inhalation	nervous system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 8,844 ppm	28 days
Ethyl nonafluorobutyl ether	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 3,006 ppm	28 days
Ethyl nonafluorobutyl ether	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,066 ppm	28 days
Ethyl nonafluorobutyl ether	Inhalation	heart	All data are negative	Rat	NOAEL 25,386 ppm	28 days
Ethyl nonafluorobutyl ether	Inhalation	hematopoietic system	All data are negative	Rat	NOAEL 24,386 ppm	28 days

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yl ether						
Ethyl nonafluorobutyl ether	Ingestion	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 40 mg/kg	28 days
Ethyl nonafluorobutyl ether	Ingestion	blood kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 200 mg/kg	28 days
Ethyl nonafluorobutyl ether	Ingestion	endocrine system hematopoietic system immune system nervous system	All data are negative	Rat	NOAEL 1,000 mg/kg	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 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 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	Rat	NOAEL 129 mg/l	11 weeks

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			classification			
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

Name	Value
Trans-dichloroethylene	Not an aspiration hazard
Ethyl nonafluoroisobutyl ether	Not an aspiration hazard
Ethyl nonafluorobutyl ether	Not an aspiration hazard
Methyl nonafluoroisobutyl ether	Not an aspiration hazard
Methyl nonafluorobutyl ether	Not an aspiration hazard
Propan-2-ol	Not an aspiration hazard
Carbon dioxide	Not an aspiration hazard

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 be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. Additional information leading to material classification in Section 2 is available upon request. In addition, environmental fate and effects data on ingredients may not be reflected in this section because an ingredient is present below the threshold for labelling, an ingredient is not expected to be available for exposure, or the data is considered not relevant to the material as a whole.

12.1. Toxicity

Acute aquatic hazard:

Not acutely toxic to aquatic life by GHS criteria.

Chronic aquatic hazard:

GHS Chronic 4: May cause long lasting harmful effects to aquatic organisms.

No product test data available.

No component test data available.

12.2. Persistence and degradability

No test data available.

12.3 : Bioaccumulative potential

No test data available.

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

Dispose of contents/ container in accordance with the local/regional/national/international regulations

Dispose of waste product in a permitted industrial waste 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

3M Novec Flux Remover

EU waste code (product container after use)

15 01 04 Metallic packaging

SECTION 14: Transportation information

FF-9200-1186-4

ADR/RID: UN1950, AEROSOLS, LIMITED QUANTITY, 2.2, (E), ADR Classification Code: 5A.

IMDG-CODE: UN1950, AEROSOLS, 2.2, 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.

List of ingredients according to Annex VII D of the regulation on detergents 648/2004/EC

The following ingredient information is provided per Regulation EC No. 648/2004 on Detergents:

Ingredient	CAS No.	Concentration
1,2-Trans-dichloroethylene	156-60-5	>10%
Ethyl perfluoroisobutyl ether	163702-06-5	>10%
Ethyl perfluorobutyl ether	163702-05-4	>10%
Methyl perfluoroisobutyl ether	163702-08-7	1-10%
Methyl perfluorobutyl ether	163702-07-6	1-10%
Carbon dioxide	124-38-9	1-10%
Isopropyl alcohol	67-63-0	1-10%

15.2. Chemical Safety Assessment

Not applicable

SECTION 16: Other information

List of relevant H statements

H225	Highly flammable liquid and vapour.
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.
R18	In use, may form flammable/explosive vapour-air mixture.
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.
Remarks53 Updated per Regulation (EC) 648/2004 on detergents.

Revision information:

Revision Changes:

Section 8: Respiratory protection - recommended respirators information was modified.

Risk phrase was modified.

Safety phrase was modified.

Section 8: Respiratory protection - recommended respirators was modified.

Sections 3 and 9: Odour, colour, grade information was modified.

Section 9: pH information was modified.

Section 1: Product use information was modified.

Section 16: UK disclaimer was modified.

Section 1: Product identification numbers heading was modified.

Section 1: Product identification numbers was modified.

Section 9: Evaporation Rate information was modified.

Section 9: Viscosity information was modified.

Section 16: List of relevant R phrase information was modified.

Section 3: Composition/ Information of ingredients table was modified.

Section 9: n-octanol/water coefficient information was modified.

Section 9: Boiling point information was modified.

Section 9: Relative density information was modified.

Section 9: Solubility in water text was modified.

Section 12: Contact manufacturer for more detail. was modified.

Section 13: EU waste code (product as sold) information was modified.

Section 13: EU waste code (product container after use) information was modified.

Section 9: Flammability (solid, gas) information was modified.

Section 2: Label remarks was modified.

Section 16: Regulations - Inventories - EU ONLY was modified.

Copyright was modified.

Section 9: Flash point information was modified.

Section 9: Melting point information was modified.

Section 9: Flammable limits (LEL) information was modified.

Section 9: Flammable limits (UEL) information was modified.

Section 9: Vapour density value was modified.

Section 9: Vapour pressure value was modified.

Section 9: Density information was modified.

Section 9: Property description for optional properties was modified.

Section 2: Additional label requirements phrase was modified.

Section 8: Occupational exposure limit table was modified.

Section 8: mg/m³ key was modified.

Aspiration Hazard Table was modified.

Section 11: Acute Toxicity table was modified.

Carcinogenicity Table was modified.

Serious Eye Damage/Irritation Table was modified.

Germ Cell Mutagenicity Table was modified.

Skin Sensitisation Table was modified.

Respiratory Sensitisation Table was modified.

Reproductive Toxicity Table was modified.

Skin Corrosion/Irritation Table was modified.

Target Organs - Repeated Table was modified.

Target Organs - Single Table was modified.

Section 11: Health Effects - Eye information was modified.

Section 11: Health Effects - Skin information was modified.

Section 11: Health Effects - Inhalation information was modified.

Section 11: Health Effects - Ingestion information was modified.
Section 12: No PBT/vPvB information available warning was modified.
Section 5: Hazardous combustion products table was modified.
Section 5: Fire - Extinguishing media information was modified.
Section 5: Fire - Special hazards information was modified.
Section 5: Fire - Advice for fire fighters information was modified.
Section 6: Accidental release personal information was modified.
Section 6: Accidental release clean-up information was modified.
Section 7: Precautions safe handling information was modified.
Section 7: Conditions safe storage was modified.
Section 8: Appropriate Engineering controls information was modified.
Section 8: Personal Protection - Skin/hand information was modified.
Section 10: Hazardous decomposition or by-products table was modified.
Section 13: Standard Phrase Category Waste GHS was modified.
Two-column table displaying the unique list of H Codes and statements (std phrases) for all components of the given material. was modified.
Section 8: Respiratory protection - recommended respirators guide was added.
Section 2: Indication of danger heading was added.
Section 2: Indication of danger information was added.
Section 8: Personal Protection - Respiratory Information was added.
Section 9: Odour Threshold was added.
Section 9: Solubility (non-water) was added.
Section 09: Decomposition Temperature was added.
Section 11: Single exposure may cause: heading was added.
Section 11: Single exposure may cause standard phrases was added.
Section 9: Autoignition temperature information was added.
Section 2: R phrase reference was added.
Label: Graphic was added.
Section 02: Graphic information was added.
Section 9: Flammability (solid, gas) information was added.
Section 2: Symbols heading was deleted.
Section 15: Symbol information was deleted.
Section 11: UN GHS Classification table heading was deleted.
Section 11: Health Effects - Other information was deleted.
Section 8: Personal Protection - Thermal hazards information was deleted.
Section 8: Personal Protection - Thermal hazards 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