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™ 4710 Insulating Gas

REACH registration number	CASRN	EC Number	Ingredient Name
01-2120046668-46-0000	42532-60-5	806-451-7	Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-

Product Identification Numbers
98-0212-4852-5 98-0212-4905-1 98-0212-4908-5

7100046675 7100108890 7100109636

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

Identified uses
For industrial use only. Not intended for use as a medical device or drug.

Restrictions on Use
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:
Gas Under Pressure, Press. Gas (Liq.); H280
Acute Toxicity, Category 4 - Acute Tox. 4; H332

For full text of H phrases, see Section 16.

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

SIGNAL WORD
WARNING.

Symbols:
GHS04 (Gas cylinder) |GHS07 (Exclamation mark) |

Pictograms

Ingredients:

Ingredient	CAS Nbr	EC No.	% by Wt
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	806-451-7	>= 99

HAZARD STATEMENTS:

H280	Contains gas under pressure; may explode if heated.
H332	Harmful if inhaled.

PRECAUTIONARY STATEMENTS

Prevention:

P261C	Avoid breathing gas.

Response:

P312	Call a POISON CENTRE or doctor/physician if you feel unwell.

Storage:

P410 + P403	Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

May cause frostbite.

SECTION 3: Composition/information on ingredients

Ingredient	CAS Nbr	EC No.	REACH Registration No.	% by Wt	Classification
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	806-451-7		>= 99	Liquified gas, H280; Acute Tox. 4, H332

Note: Any entry in the EC# column that begins with the numbers 6, 7, 8, or 9 are a Provisional List Number provided by ECHA pending publication of the official EC Inventory Number for the substance.
Please see section 16 for the full text of any H statements referred to in this section

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
Thaw frosted skin with lukewarm water. Do not rub affected area. Get medical attention.

Eye contact
Immediately flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. Get medical attention.

If swallowed
No need for first aid is anticipated.

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
Material will not burn. 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.
Hydrogen Fluoride	During combustion.
Toxic vapour, gas, particulate.	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. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapours, in accordance with good industrial hygiene practice. 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
Not applicable.

6.3. Methods and material for containment and cleaning up
Close cylinder. Place in a closed container approved for transportation by appropriate authorities. 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. Avoid breathing dust/fume/gas/mist/vapours/spray. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.

7.2. Conditions for safe storage including any incompatibilities
Protect from sunlight. Store in a well-ventilated place. Store away from heat.

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
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	Manufacturer determined	TWA:65 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
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:
Full face shield.
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

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. 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 supplied-air respirator

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

Thermal hazards
Wear cold insulating gloves/face shield/eye protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Gas.
Appearance/Odour	Colourless gas.
Odour threshold	*No data available.*
pH	*Not applicable.*
Boiling point/boiling range	-4.7 ºC
Melting point	-118 ºC [*Details:*Freezing point]
Flammability (solid, gas)	Not classified
Explosive properties	Gas under pressure: Liquefied gas.
Oxidising properties	Not classified
Flash point	No flash point
Autoignition temperature	*Not applicable.*
Flammable Limits(LEL)	*Not applicable.*
Flammable Limits(UEL)	*Not applicable.*
Vapour pressure	253 kPa [@ 20 ºC]
Relative density	*No data available.*
Water solubility	0.272 ppm
Solubility- non-water	*No data available.*
Partition coefficient: n-octanol/water	*Not applicable.*

Evaporation rate	*No data available.*
Vapour density	0.008
Decomposition temperature	*Not applicable.*
Viscosity	0.2 mm²/sec [@ 20 ºC] [*Details:*Liquid under pressure]
Density	1.35 g/cm3 [*Details:*Liquid density under pressure.]

9.2. Other information

EU Volatile Organic Compounds	*No data available.*
Molecular weight	*No data available.*
Percent volatile	100 %

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
None known.

10.6 Hazardous decomposition products

Substance	Condition
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

Extreme heat arising from situations such as misuse or equipment failure can generate hydrogen fluoride as a decomposition product.

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
Harmful if inhaled.

Skin contact
Frostbite: Signs/symptoms may include intense pain, discoloration of skin, and tissue destruction.

Eye contact
Frostbite: Signs/symptoms may include intense pain, clouding of the cornea, redness, swelling, and blindness.

Ingestion
No known health effects.

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
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	Inhalation-Gas (4 hours)	Rat	LC50 >10,000 - <15,000 ppm

ATE = acute toxicity estimate

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

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

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

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
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	In Vitro	Not mutagenic

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

Reproductive Toxicity

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

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 516 ppm	28 days

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
Propanenitrile, 2,3,3,3-	Inhalation	hematopoietic	Not classified	Rat	NOAEL	28 days

tetrafluoro-2-(trifluoromethyl)-		system | immune system | heart | endocrine system | bone, teeth, nails, and/or hair | liver | muscles | nervous system | eyes | kidney and/or bladder | vascular system			1,512 ppm	

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
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	Water flea	Experimental	48 hours	EC50	>100 mg/l
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	Green Algae	Experimental	72 hours	EC50	>100 mg/l
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	Green algae	Experimental	72 hours	NOEC	10 mg/l

12.2. Persistence and degradability

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	Data not available or insufficient for classification	N/A	N/A	N/A	N/A

12.3 : Bioaccumulative potential

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)-	42532-60-5	Data not available or insufficient for classification	N/A	N/A	N/A	N/A

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. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include HF. Facility must be capable of handling halogenated materials. The facility should be equipped to handle gaseous waste. 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

SECTION 14: Transportation information

98-0212-4852-5, 98-0212-4905-1, 98-0212-4908-5

ADR/RID: UN3163, Liquefied gas, n.o.s., 2.2, (C/E), ADR Classification Code: 2A, Carriage in accordance with 1.1.4.2.1.
IMDG-CODE: UN3163, LIQUEFIED GAS, N.O.S., 2.2, IMDG-Code segregation code: NONE, EMS: FC,SV.
ICAO/IATA: UN3163, LIQUEFIED GAS, N.O.S., 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.

15.2. Chemical Safety Assessment
Not applicable

SECTION 16: Other information

List of relevant H statements

H280	Contains gas under pressure; may explode if heated.
H332	Harmful if inhaled.

Revision information:
Section 1: Product identification numbers information was modified.
Section 1: Product name information was modified.
Section 1: REACH registration number information was modified.

Section 01: SAP Material Numbers information was modified.
CLP: Ingredient table information was modified.
Label: CLP Classification information was modified.
Section 9: Property description for optional properties information was modified.
Section 11: Target Organs - Repeated Table information was modified.
Section 12: Component ecotoxicity information information was modified.

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