# Safety Data Sheet



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|---|---|---|---|
| **Document group:** | 33-6330-6 | **Version number:** | 1.00 |
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This Safety Data Sheet has been prepared in accordance with the GHS guidelines & India Hazardous substances (Classification, Labeling & Packaging) Draft Rules 2011.

## SECTION 1: Identification

**1.1. Product identifier**
3M™ Novec™ 4710 Insulating Gas

**1.2. Recommended use and restrictions on use**

**Recommended use**
For industrial use only. Not intended for use as a medical device or drug.

**Restrictions on use**
3M Electronics Materials Solutions Division (EMSD) 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 EMSD 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. Supplier's details**

| | |
|---|---|
| **Address:** | 3M India Limited, plot-48-51, Electronic city, Hosur road, Bangalore-560100 |
| **Telephone:** | 080-45543000, contact Product EHS team |
| **E Mail:** | productehs.in@mmm.com |
| **Website:** | http://solutions.3mindia.co.in |

**1.4. Emergency telephone number**
080-45543000 (Contact hours: 8:00 AM to 5:00 PM)

## SECTION 2: Hazard identification

Under MSIHC Rules, information is noted below on flammability, acute toxicity and explosivity relevant to this product. In line with international standards, information on other hazard classes and associated precautionary statements relevant to this product are included as well.

**2.1. Classification of the substance or mixture**
Gas under pressure: Liquefied gas.
Acute Toxicity (inhalation): Category 4.

**2.2. Label elements**
**Signal Word**
WARNING!

**Symbols**
Gas cylinder |Exclamation mark |

**Pictograms**

**HAZARD STATEMENTS:**

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

**PRECAUTIONARY STATEMENTS**

**Prevention:**

| | |
|---|---|
| P261 | Avoid breathing dust/fume/gas/mist/vapours/spray. |

**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

This material is a mixture.

| Ingredient | CAS Nbr | % by Wt |
|---|---|---|
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | >= 99 |

## 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**
Rinse mouth. If you feel unwell, get medical attention.

**4.2. Most important symptoms and effects, both acute and delayed**
No critical symptoms or effects. 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. Suitable 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.

**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. Special protective actions for fire-fighters**
Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, 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 vapors, 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**
Avoid release to the environment.

**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 in accordance with applicable local/regional/national/international regulations.

## SECTION 7: Handling and storage

**7.1. Precautions for safe handling**
Avoid inhalation of thermal decomposition products. For industrial/occupational use only. Not for consumer sale or use. 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.

## 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 | |

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association
CMRG : Chemical Manufacturer's Recommended Guidelines
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
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. 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. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.
Gloves made from the following material(s) are recommended: Polymer laminate

**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:
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. |
| **Color** | Colorless |
| **Odor** | Odourless |
| **Odour threshold** | *No data available.* |
| **pH** | *Not applicable.* |

| | |
|---|---|
| **Melting point/Freezing point: NA** | -118 ºC [*Details:*Freezing point ] |
| **Boiling point/Initial boiling point/Boiling range** | -4.7 ºC |
| **Flash point** | *Not applicable.* |
| **Evaporation rate** | *No data available.* |
| **Flammability (solid, gas)** | Not classified |
| **Flammable Limits(LEL)** | *Not applicable.* |
| **Flammable Limits(UEL)** | *Not applicable.* |
| **Vapour pressure** | 253 kPa [@ 20 ºC ] |
| **Vapor Density and/or Relative Vapor Density** | 8.16 |
| **Density** | 1.35 g/cm3 [*Details:*Liquid density under pressure. ] |
| **Relative density** | *No data available.* |
| **Water solubility** | 0.272 ppm |
| **Solubility- non-water** | *No data available.* |
| **Partition coefficient: n-octanol/water** | *Not applicable.* |
| **Autoignition temperature** | *Not applicable.* |
| **Decomposition temperature** | *Not applicable.* |
| **Viscosity/Kinematic Viscosity** | 0.2 mm²/sec [@ 20 ºC ] [*Details:*Liquid under pressure ] |
| **Volatile organic compounds (VOC)** | *No data available.* |
| **Percent volatile** | 100 % |
| **VOC less H2O & exempt solvents** | *No data available.* |
| **Molecular weight** | 195.04 g/mole |

**Nanoparticles**
This material does not contain nanoparticles.

## 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**
Water

**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 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**
Harmful if inhaled.
Respiratory tract irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

**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 information available.

**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 ppm |

ATE = acute toxicity estimate

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

**Serious Eye Damage/Irritation**

| Name | Species | Value |
|---|---|---|
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | Rabbit | No significant irritation |

**Sensitization:**

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

**Respiratory Sensitisation**
For the component/components, either no data are currently available or the data are not sufficient for classification.

**Germ Cell Mutagenicity**

| Name | Route | Value |
|---|---|---|
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | In vivo | Not mutagenic |

| | | |
|---|---|---|
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | In Vitro | Some positive data exist, but the data are not sufficient for classification |

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

**Reproductive Toxicity**

**Reproductive and/or Developmental Effects**

| Name | Route | Value | Species | Test result | Exposure Duration |
|---|---|---|---|---|---|
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | Inhalation | Not classified for male reproduction | Rat | NOAEL 1,498 ppm | 28 days |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | Inhalation | Not classified for development | Rat | NOAEL 1,498 ppm | premating into lactation |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | Inhalation | Not classified for female reproduction | Rat | NOAEL 748 ppm | premating into lactation |

**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-tetrafluoro-2-(trifluoromethyl)- | Inhalation | respiratory system | Not classified | Rat | NOAEL 516 ppm | 28 days |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | Inhalation | hematopoietic system \| immune system \| heart \| endocrine system \| gastrointestinal tract \| bone, teeth, nails, and/or hair \| liver \| muscles \| nervous system \| eyes \| kidney and/or bladder \| vascular system | Not classified | Rat | NOAEL 1,512 ppm | 28 days |

**Aspiration Hazard**
For the component/components, either no data are currently available or the data are 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 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. As it is not possible to perform aquatic toxicity As it is not possible to perform aquatic toxicity tests on NOVEC 4710 due to rapid hydrolysis upon forced dissolution in an aqueous environment, test data on the hydrolysis product CAS# 662-20-4 are used for the environmental classifications.

**Chronic aquatic hazard:**
Not chronically toxic to aquatic life by GHS criteria. As it is not possible to perform aquatic toxicity As it is not possible to perform aquatic toxicity tests on NOVEC 4710 due to rapid hydrolysis upon forced dissolution in an aqueous environment, test data on the hydrolysis product CAS# 662-20-4 are used for the environmental classifications.

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 | Chinese rare minnow | Transformation Product | 96 hours | LC50 | >127 mg/l |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | Green Algae | Transformation Product | 72 hours | EC50 | >100 mg/l |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | Water flea | Transformation Product | 48 hours | EC50 | >100 mg/l |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | Green algae | Transformation Product | 72 hours | NOEC | 10 mg/l |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | Activated sludge | Transformation Product | 3 hours | EC50 | >1,000 mg/l |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | Redworm | Transformation Product | 14 days | LC50 | 64.7 mg/kg (Dry Weight) |

**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 | Estimated Photolysis | | Photolytic half-life (in air) | 20.8 years (t 1/2) | |
| Propanenitrile, 2,3,3,3- | 42532-60-5 | Transformation product | 28 days | BOD | 4 % BOD/ThBOD | OECD 301F - Manometric |

| | | | | | | |
|---|---|---|---|---|---|---|
| tetrafluoro-2-(trifluoromethyl)- | | Biodegradation | | | | respirometry |

**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 | Experimental Bioconcentration | | Log Kow | 4.3 | |
| Propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | Transformation product Bioconcentration | | Log Kow | 1.7 | 830.7550 Part.Coef Shake Flask |

**12.4. Mobility in soil**
Please contact manufacturer for more details

**12.5 Other Adverse effects**

| | | | |
|---|---|---|---|
| propanenitrile, 2,3,3,3-tetrafluoro-2-(trifluoromethyl)- | 42532-60-5 | | 2100 |

## SECTION 13: Disposal considerations

**13.1. Disposal methods**
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

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.

## SECTION 14: Transport Information

**Air Transport (IATA)Regulations**

**UN No** UN3163
**Proper Shipping Name** LIQUEFIED GAS, N.O.S. (PROPANENITRILE, 2,3,3,3-TETRAFLUORO-2-(TRIFLUOROMETHYL)-)
**Hazard Classs/Division** 2.2
**Subsidiary Risk** Not applicable
**Packing Group:** Not applicable

**Marine Transport (IMDG)**
**UN No** UN3163
**Proper Shipping Name** LIQUEFIED GAS, N.O.S. (PROPANENITRILE, 2,3,3,3-TETRAFLUORO-2-

(TRIFLUOROMETHYL)-)
**Hazard Classs/Division** 2.2
**Subsidiary Risk** Not applicable
**Packing Group:** Not applicable
**Environmental Hazards:** Not applicable

## 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. All required components of this product are listed on the active portion of the TSCA Inventory.

**Applicable Environmental, Health and Safety Regulations**
The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
Hazardous Waste(Management , Handling & Transboundary) Rules, 2008
Hazardous Chemicals (Classification, Packaging and Labelling Draft Rules), 2011

The following ingredients are listed as hazardous on Part II of Schedule I of the India Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) rules
None.

The following ingredients are classified as hazardous based on the criteria listed under Part I of Schedule I of the India Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) rules:
The product is classified as Non-Hazardous.

## SECTION 16: Other information

**NFPA Hazard Classification**
**Health:** 3 **Flammability:** 1 **Instability:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

**Revision information:**
No revision information

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**3M India SDSs are available at http://solutions.3mindia.co.in**