



Safety Data Sheet

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SECTION 1: Identification

1.1. Product identifier

3M™ Novec™ 612 Magnesium Protection Fluid

Product Identification Numbers

98-0212-3188-5, 98-0212-3189-3, 98-0212-3190-1, 98-0212-3348-5, 98-0212-3349-3, 98-0212-3353-5, 98-0212-3435-0
7010400187, 7000145562, 7100035100

1.2. Recommended use and restrictions on use

Recommended use

Magnesium cover gas agent for protection of molten magnesium

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Electronics Materials Solutions Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification

Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2.2. Label elements

Signal word

Not applicable.

Symbols

Not applicable.

Pictograms

Not applicable.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
1,1,1,2,2,4,5,5,5-NOFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	756-13-8	>= 99.5

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

No need for first aid is anticipated.

Skin Contact:

No need for first aid is anticipated.

Eye Contact:

No need for first aid is anticipated.

If Swallowed:

No need for first aid is anticipated.

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

Exposure to extreme heat can give rise to thermal decomposition.

Hazardous Decomposition or By-Products

Substance

Carbon monoxide
Carbon dioxide
Toxic Vapor/Gas

Condition

During Combustion
During Combustion
During Combustion

5.3. Special protective actions 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, 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

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 dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up

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 authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. 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

Contents may be under pressure, open carefully. Do not breathe 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 release to the environment.

7.2. Conditions for safe storage including any incompatibilities

Protect from sunlight. Store in a well-ventilated place. Store at temperatures not exceeding 38C/100F. Store away from strong bases. Store away from amines.

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	C.A.S. No.	Agency	Limit type	Additional Comments
1,1,1,2,2,4,5,5,5- NONAFLUORO-4- (TRIFLUOROMETHYL)-3- PENTANONE	756-13-8	Manufacturer determined	TWA:150 ppm(1940 mg/m3)	

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

OSHA : United States Department of Labor - Occupational Safety and Health Administration

TWA: Time-Weighted-Average

STEL: Short Term Exposure Limit

CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

Provide appropriate local exhaust when product is heated. 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/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Eye protection not required.

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: Neoprene

If this product is used in a manner that presents a higher potential for exposure (eg. spraying, high splash potential etc.), then use of protective coveralls may be necessary. Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Apron - Neoprene

Respiratory protection

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.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state

Liquid

Color

Colorless

Specific Physical Form:

Liquid

Odor

Low Odor

Odor threshold

No Data Available

pH

Not Applicable

Melting point

-108 °C

Boiling Point

49 °C [*@ 760 mmHg*]

Flash Point

No flash point

Evaporation rate

> 1 Units not avail. or not appl. [*Ref Std:BUOAC=1*]

Flammability (solid, gas)

Not Applicable

Flammable Limits(LEL)

None detected

Flammable Limits(UEL)

None detected

Vapor Pressure

40.4 kPa [*@ 25 °C*]

Vapor Density

11.6 [*Ref Std:AIR=1*]

Density

1.6 g/ml

Specific Gravity

1.6 [*@ 68 °F*] [*Ref Std:WATER=1*]

Solubility in Water

Nil

Solubility- non-water

No Data Available

Partition coefficient: n-octanol/ water

No Data Available

Autoignition temperature

Not Applicable

Decomposition temperature

No Data Available

Viscosity

0.6 centipoise [*@ 25 °C*]

Molecular weight

No Data Available

Volatile Organic Compounds

1600 g/l [*Test Method:calculated SCAQMD rule 443.1*]

Percent volatile

100 %

VOC Less H2O & Exempt Solvents

1600 g/l [*Test Method:calculated SCAQMD rule 443.1*]

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 polymerization will not occur.

10.4. Conditions to avoid

Light

10.5. Incompatible materials

Strong bases

Amines

Alcohols

10.6. Hazardous decomposition products**Substance**

Hydrogen Fluoride

Condition

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 condition of heat from misuse or equipment failure, toxic decomposition products that include hydrogen fluoride and perfluoroisobutylene can occur. 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 labeling, 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:

No health effects are expected.

Skin Contact:

Contact with the skin during product use is not expected to result in significant irritation.

Eye Contact:

Contact with the eyes during product use is not expected to result in significant irritation.

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
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-	Dermal	Professio	LD50 estimated to be > 5,000 mg/kg

PENTANONE		nal judgeme nt	
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Ingestion	Professio nal judgeme nt	LD50 estimated to be > 5,000 mg/kg
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Inhalation- Vapor (4 hours)	Rat	LC50 > 1,227 mg/l

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Rabbit	No significant irritation

Skin Sensitization

Name	Species	Value
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Guinea pig	Not classified

Respiratory Sensitization

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

Germ Cell Mutagenicity

Name	Route	Value
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	In Vitro	Not mutagenic
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	In vivo	Not mutagenic

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
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Inhalation	Not classified for female reproduction	Rat	NOAEL 38.7 mg/l	prematuring & during gestation
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Inhalation	Not classified for male reproduction	Rat	NOAEL 38.7 mg/l	prematuring & during gestation
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE	Inhalation	Not classified for development	Rat	NOAEL 39.5 mg/l	during gestation

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
1,1,1,2,2,4,5,5,5-	Inhalation	nervous system	Not classified	Rat	NOAEL	2 hours

NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE					100,000 ppm	
1,1,1,2,2,4,5,5,5- NONAFLUORO-4-(TRIFLUOROMETHYL)- 3-PENTANONE	Inhalation	cardiac sensitization	Not classified	Dog	Sensitization Negative	17 minutes

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
1,1,1,2,2,4,5,5,5- NONAFLUORO-4-(TRIFLUOROMETHYL)- 3-PENTANONE	Inhalation	liver kidney and/or bladder heart endocrine system hematopoietic system muscles nervous system respiratory system vascular system	Not classified	Rat	NOAEL 38.6 mg/l	90 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**Ecotoxicological information**

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

Chemical fate information

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

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. 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.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

For Transport Information, please visit <http://3M.com/Transportinfo> or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information

15.1. US Federal Regulations

Contact 3M for more information.

EPCRA 311/312 Hazard Classifications:

Physical Hazards

Not applicable

Health Hazards

Not applicable

15.2. State Regulations

Contact 3M for more information.

15.3. Chemical Inventories

The components of this product are in compliance with the new substance notification requirements of CEPA.

The components of this material are in compliance with the China "Measures on Environmental Management of New Chemical Substance". Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of the Korean Toxic Chemical Control Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional 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.

Contact 3M for more information.

15.4. International Regulations

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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.

The NFPA Health code of 3 is due to emergency situations where the material may thermally decompose and release Hydrogen Fluoride. During normal use conditions, please reference Section 2 and Section 11 of the SDS for additional health hazard information.

HMIS Hazard Classification

Health: 0 **Flammability:** 1 **Physical Hazard:** 0 **Personal Protection:** X - See PPE section.

Hazardous Material Identification System (HMIS® IV) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use

and are not intended for use in emergency situations. HMIS® IV ratings are to be used with a fully implemented HMIS® IV program. HMIS® is a registered mark of the American Coatings Association (ACA).

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