



## 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 649 Engineered Fluid

REACH registration number	CASRN	EC Number	Ingredient Name
01-0000018239-65-0001	756-13-8	ELINCS 436-710-6	1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone

#### Product Identification Numbers

98-0212-3239-6      98-0212-3240-4      98-0212-3352-7  
 7100027554      7100023600      7100025284

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

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

#### 1.3. Details of the supplier of the safety data sheet

**Address:** 3M United Kingdom PLC, 3M Centre, Cain Road, Bracknell, Berkshire, RG12 8HT.  
**Telephone:** +44 (0)1344 858 000

**3M Novec 649 Engineered Fluid**

**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:**

Hazardous to the Aquatic Environment (Chronic), Category 3 - Aquatic Chronic 3; H412

For full text of H phrases, see Section 16.

**2.2. Label elements**

**CLP REGULATION (EC) No 1272/2008**

**Ingredients:**

Ingredient	CAS Nbr	EC No.	% by Wt
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	436-710-6	> 99.9

**HAZARD STATEMENTS:**

H412 Harmful to aquatic life with long lasting effects.

**PRECAUTIONARY STATEMENTS****Disposal:**

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

**2.3. Other hazards**

None known.

**SECTION 3: Composition/information on ingredients**

Ingredient	CAS Nbr	EC No.	REACH Registration No.	% by Wt	Classification
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	ELINCS 436-710-6		> 99.9	Aquatic Chronic 3, H412

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 are concerned, get medical advice.

##### 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

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

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.
Toxic Vapour/Gas	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

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

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

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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. 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

Contents may be under pressure, open carefully. Avoid inhalation of thermal decomposition products. For industrial or professional use only. 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 other materials. Store away from amines.

### 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
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)	

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.

#### Derived no effect level (DNEL)

Ingredient	Degradation Product	Population	Human exposure pattern	DNEL
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone		Consumer	Inhalation, Long-term exposure (24 hours), Systemic effects	580 mg/m <sup>3</sup>
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone		Consumer	Oral, Long-term exposure (24 hours), Systemic effects	74 mg/kg bw/d
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone		Worker	Dermal, Long-term exposure (8 hours), Systemic effects	147 mg/kg bw/d
1,1,1,2,2,4,5,5,5-Nonafluoro-4-		Worker	Inhalation, Long-term exposure (8 hours),	780 mg/m <sup>3</sup>

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(trifluoromethyl)-3-pentanone			Systemic effects	
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone		Worker	Inhalation, Short-term exposure, Systemic effects	1,286,130 mg/m <sup>3</sup>

**Predicted no effect concentrations (PNEC)**

Ingredient	Degradation Product	Compartment	PNEC
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Agricultural soil	12.43 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Agricultural soil	0.006893 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Agricultural soil	0.0113 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Air during emission	0.0002 mg/m <sup>3</sup>
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Freshwater	0.9 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Freshwater	0.0085 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Freshwater	0.0077 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Freshwater sediments	4.692 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Freshwater sediments	0.03082 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Freshwater sediments	0.0276 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Grassland average	12.43 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Grassland average	0.006893 mg/kg d.w.

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Nonafluoro-4-(trifluoromethyl)-3-pentanone	c acid (CAS 422-64-0)		
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Grassland average	0.0113 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Marine water	0.09 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Marine water	0.00085 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Marine water	0.00077 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Marine water sediments	0.4692 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Marine water sediments	0.003082 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Marine water sediments	0.00276 mg/kg d.w.
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Hydrogen Fluoride (CAS 7664-39-3)	Sewage Treatment Plant	51 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Pentafluoropropanoic acid (CAS 422-64-0)	Sewage Treatment Plant	1,000 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Trifluoroacetic acid (CAS 76-05-1)	Sewage Treatment Plant	1 mg/l

## 8.2. Exposure controls

In addition, refer to the annex for more information.

### 8.2.1. Engineering controls

Provide appropriate local exhaust when product is heated. 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

Eye protection not required.

#### Skin/hand protection

No chemical protective gloves are required.

#### Respiratory protection

If thermal degradation products are expected, use a full facepiece supplied-air respirator.

If thermal decomposition occurs:

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.

### 8.2.3. Environmental exposure controls

Refer to Annex

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	Liquid.
Specific Physical Form:	Liquid.
Appearance/Odour	Clear colourless liquid with low odour
Odour threshold	No data available.
pH	Not applicable.
Boiling point/boiling range	49 °C [ @ 101,324.72 Pa ]
Melting point	-108 °C
Flammability (solid, gas)	Not applicable.
Explosive properties	Not classified
Oxidising properties	Not classified
Flash point	No flash point
Autoignition temperature	Not applicable.
Flammable Limits(LEL)	None detected
Flammable Limits(UEL)	None detected
Vapour pressure	40.4 kPa [ @ 25 °C ]
Relative density	1.6 [ @ 20 °C ] [Ref Std: WATER=1]
Water solubility	Nil
Solubility- non-water	No data available.
Partition coefficient: n-octanol/water	No data available.
Evaporation rate	> 1 [Ref Std: BUOAC=1]
Vapour density	11.6 [Ref Std: AIR=1]
Decomposition temperature	No data available.
Viscosity	0.6 mPa-s [ @ 25 °C ]
Density	1.6 g/ml

### 9.2. Other information

EU Volatile Organic Compounds	1,600 g/l
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

Light.

### 10.5 Incompatible materials

Strong bases.

Amines.

Alcohols.

### 10.6 Hazardous decomposition products

<u>Substance</u>	<u>Condition</u>
Hydrogen Fluoride	At elevated temperatures. - extreme conditions of heat

Refer to section 5.2 for hazardous decomposition products during combustion.

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

No known health effects.

#### 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.



**3M Novec 649 Engineered Fluid****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-pentanone	Dermal	Professional judgement	LD50 estimated to be > 5,000 mg/kg
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Ingestion	Professional judgement	LD50 estimated to be > 5,000 mg/kg
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation-Vapour (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 Sensitisation**

Name	Species	Value
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Guinea pig	Not classified

**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
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 is currently available or the data is 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 3,000 ppm	pre mating & during gestation
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	Not classified for male reproduction	Rat	NOAEL 3,000 ppm	pre mating & during gestation
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	Not classified for development	Rat	NOAEL 3,000 ppm	pre mating & during

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					gestation
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**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-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	nervous system	Not classified	Rat	NOAEL 100,000 ppm	2 hours
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	cardiac sensitisation	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 3,000 ppm	90 days

**Aspiration Hazard**

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

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

**SECTION 12: Ecological information**

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

**12.1. Toxicity**

No product test data available.

Material	CAS #	Organism	Type	Exposure	Test endpoint	Test result
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Fathead minnow	Experimental	96 hours	LC50	>1,070 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Green algae	Experimental	96 hours	LC50	10.6 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Water flea Daphnid	Experimental	48 hours	EC50	>1,080 mg/l
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Green algae	Experimental	96 hours	NOEC	3.71 mg/l

**3M Novec 649 Engineered Fluid****12.2. Persistence and degradability**

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Experimental Photolysis		Photolytic half-life (in air)	7.3 days (t 1/2)	Other methods
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Experimental Aquatic Biodegrad. - Aerobic	28 days	CO2 evolution	3 % weight	OECD 301B - Modified sturm or CO2
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Experimental Hydrolysis		Hydrolytic half-life	<2.5 minutes (t 1/2)	Other methods

**12.3 : Bioaccumulative potential**

Material	Cas No.	Test type	Duration	Study Type	Test result	Protocol
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Experimental BCF-Carp	28 days	Bioaccumulation factor	<4.8	OECD 305E - Bioaccumulation flow-through fish test

**12.4. Mobility in soil**

Please contact manufacturer for more details

**12.5. Results of the PBT and vPvB assessment**

This material does not contain any substances that are assessed to be a PBT or vPvB

**12.6. Other adverse effects**

Material	CAS Nbr	Ozone Depletion Potential	Global Warming Potential
1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	0	

**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. 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.

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)**

- 070103\* Organic halogenated solvents, washing liquids and mother liquors
- 14 06 02\* Other halogenated solvents and solvent mixtures

**SECTION 14: Transportation information**

98-0212-3239-6, 98-0212-3240-4, 98-0212-3352-7

Not hazardous for transportation

**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. One or more of the components of this product have been notified to ELINCS (European List of Notified or New Chemical Substances). Certain restrictions apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of the Korea Chemical Control Act. 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 material are in compliance with the provisions of Philippines RA 6969 requirements. Certain restrictions may apply. Contact the selling division for additional information. The components of this product are in compliance with the new substance notification requirements of CEPA. The components of this product are in compliance with the chemical notification requirements of TSCA. This product complies with Measures on Environmental Management of New Chemical Substances. All ingredients are listed on or exempt from on China IECSC inventory.

**15.2. Chemical Safety Assessment**

A chemical safety assessment has been carried out for this substance/mixture in accordance with Regulation (EC) No 1907/2006, as amended.

**SECTION 16: Other information****List of relevant H statements**

H412 Harmful to aquatic life with long lasting effects.

**Revision information:**

CLP: Ingredient table information was added.

Section 12: Component ecotoxicity information information was added.

Section 12: Material ecotoxicity information information was deleted.

Prints No Data if Material ecotoxicity information is not present information was added.

Section 12: No PBT/vPvB information available warning information was modified.

Section 12: Persistence and Degradability information information was modified.

Section 15: Chemical Safety Assessment information was modified.

**Annex**

<b>1. Title</b>	
<b>Substance identification</b>	1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone; EC No. 436-710-6; CAS Nbr 756-13-8;
<b>Exposure Scenario Name</b>	Industrial Use in Closed Systems
<b>Lifecycle Stage</b>	Use at industrial sites
<b>Contributing activities</b>	PROC 01 -Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.

### 3M Novec 649 Engineered Fluid

	ERC 01 -Manufacture of the substance ERC 07 -Use of functional fluid at industrial site
<b>Processes, tasks and activities covered</b>	Charging material in closed systems with minimal opportunity for exposure. Use as heat transfer fluids.
<b>2. Operational conditions and risk management measures</b>	
<b>Operating Conditions</b>	<b>Physical state:</b> Liquid. <b>General operating conditions:</b> Closed process; Duration of exposure per day at workplace [for one worker]: 8 hours/day; Fraction of applied product lost from process/use to waste: 980,030 kg; Fraction of applied product lost from process/use to waste gas: 0.0001 ; Fraction of applied product lost from process/use to waste water: 0 ; Frequency of exposure at workplace [for one worker]: 220 days/year; Indoor use without Local Exhaust Ventilation; Intermittent release; Large factory building (> 500 m³);
<b>Risk management measures</b>	Under the operational conditions described above the following risk management measures apply: <b>General risk management measures:</b> <b>Human health:</b> None needed; <b>Environmental:</b> None needed;
<b>Waste management measures</b>	Do not release to waterways or sewers; Incinerate in a permitted hazardous waste incinerator;
<b>3. Prediction of exposure</b>	
<b>Prediction of exposure</b>	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted.Contact 3M at the address or phone number listed on the first page of the SDS for information on exposure estimation.

<b>1. Title</b>	
<b>Substance identification</b>	1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone; EC No. 436-710-6; CAS Nbr 756-13-8;
<b>Exposure Scenario Name</b>	Professional Use in Closed Systems
<b>Lifecycle Stage</b>	Widespread use by professional workers
<b>Contributing activities</b>	PROC 01 -Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions. ERC 09a -Widespread use of functional fluid (indoor)
<b>Processes, tasks and activities covered</b>	Draining material from closed systems.
<b>2. Operational conditions and risk management measures</b>	
<b>Operating Conditions</b>	<b>Physical state:</b> Liquid. <b>General operating conditions:</b> Closed process; Duration of exposure per day at workplace [for one worker]: 8 hours/day; Frequency of exposure at workplace [for one worker]: 220 days/year; Intermittent release; Outdoor use;
<b>Risk management measures</b>	Under the operational conditions described above the following risk management measures apply: <b>General risk management measures:</b> <b>Human health:</b> None needed; <b>Environmental:</b>

<b>3M Novec 649 Engineered Fluid</b>
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	None needed;
<b>Waste management measures</b>	Do not release to waterways or sewers; Incinerate in a permitted hazardous waste incinerator;
<b>3. Prediction of exposure</b>	
<b>Prediction of exposure</b>	Human and environmental exposures are not expected to exceed the DNELs and PNECs when the identified risk management measures are adopted. Contact 3M at the address or phone number listed on the first page of the SDS for information on exposure estimation.

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.

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