# SAFETY DATA SHEET
# TMC-649 Engineered Fluid

## SECTION 1: IDENTIFICATION

### 1.1. Product identifier:

**Trade name:** TMC-649 Engineered Fluid
**Other names / Synonyms:** Perfluoro(2-methyl-3-pentanone)
**Product no.:** 1649, 1649-B, 1649-2.2, 1649-44, 1649-55, 1649-550
**Other means of identification:** CAS No.: 756-13-8

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

**▼Relevant identified uses of the substance or mixture:** Heat Transfer Fluid, Cooling Agent
Restricted to professional and industrial use.
**Uses advised against :** None known.

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

**Company and address:** **TMC Industries, Inc.**
1423 Mill Lane
Waconia, Minnesota 55387
USA
TF: +1 (800) 772-8179
www.tmcindustries.com
**Contact person:** Nick Hansen
**E-mail:** sales@tmcindustries.com
**SDS date:** 11/4/2026
**SDS Version:** 6.0
**Date of previous version:** 10/1/2025 (5.0)

### 1.4. Emergency telephone number:

VeolocityEHS 1-800-255-3924 within the US, Canada, Puerto Rico and the U.S. Virgin Islands. If outside those areas, call 1-813-248-0585 (Contract#: MIS8157133).

## SECTION 2: HAZARD(S) IDENTIFICATION

### 2.1. Classification of the substance or mixture:

Not classified according to HCS (29 CFR 1910.1200)

### 2.2. Label elements:

**Hazard pictogram(s):** Not applicable.
**Signal word:** Not applicable.
**Hazard statement(s):**
**Precautionary statement(s):**
**General:** Not applicable.
**▼Prevention:** Not applicable.
**▼Response:** Not applicable.
**Storage:** Not applicable.
**▼Disposal:** Not applicable.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. ▼Substances:

| Product/substance | Identifiers | % w/w | Classification | Note |
|---|---|---|---|---|
| Perfluoro(2-methly-3-pentanone) | CAS No.: 756-13-8 | >99.9% | | |

### 3.2. Mixtures:

Not applicable. This product is a substance.

Where the concentration of an ingredient is expressed as a range the exact concentration has been withheld as a trade secret.

See full text of H-phrases in section 16. Occupational exposure limits are listed in section 8, if these are available.

### Other information:

-

## SECTION 4: FIRST-AID MEASURES

### 4.1. ▼Description of first aid measures:

**General information:** If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).
Contact a doctor if in doubt about the injured person's condition or if the symptoms persist. Never give an unconscious person water or other drink.

**Inhalation:** Upon breathing difficulties or irritation of the respiratory tract: Bring the person into fresh air and stay with him/her.

**Skin contact:** Remove contaminated clothing and shoes immediately. Ensure to wash exposed skin thoroughly with water and soap. Skin cleanser can be used. DO NOT use solvents or thinners.

**Eye contact:** If in eyes: Flush eyes with water or saline water (20-30 °C) for at least 5 minutes. Remove contact lenses. Seek medical assistance and continue flushing during transport.

**▼Ingestion:** If the person is conscious, rinse the mouth with water and stay with the person.
In case of malaise, seek medical advice immediately and bring the safety data sheet or label from the product. Do not induce vomiting, unless recommended by the doctor.
Have the person lean forward with head down to avoid inhalation of or choking on vomited material.

**Burns:** Not applicable.

### 4.2. Most important symptoms and effects, both acute and delayed:

None known.

### 4.3. Indication of any immediate medical attention and special treatment needed:

Treat symptomatically.

### Information to medics:

Bring this safety data sheet or the label from this product.

## SECTION 5: FIRE-FIGHTING MEASURES

### 5.1. Extinguishing media:
Suitable extinguishing media: Alcohol-resistant foam, carbon dioxide, powder, water mist.
Unsuitable extinguishing media: Waterjets should not be used, since they can spread the fire.

### 5.2. Special hazards arising from the substance or mixture:
Fire will result in dense smoke. Exposure to combustion products may harm your health. Closed containers, which are exposed to fire, should be cooled with water. Do not allow fire-extinguishing water to enter the sewage system and nearby surface waters.
If the product is exposed to high temperatures, e.g. in the event of fire, dangerous decomposition compounds are produced. These are:
Halogenated compounds
Carbon oxides (CO / CO2)

### 5.3. Advice for firefighters:
No specific requirements.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures:
Contaminated areas may be slippery.

### 6.2. Environmental precautions:
Avoid discharge to lakes, streams, sewers, etc.
Keep unauthorized persons away from the spill

### 6.3. Methods and material for containment and cleaning up:
Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations.
Wherever possible cleaning should be performed with normal cleaning agents. Avoid use of solvents.

### 6.4. Reference to other sections:
See section 13 “Disposal considerations” on handling of waste.
See section 8 "Exposure controls/personal protection" for protective measures.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling:
Smoking, drinking and consumption of food is not allowed in the work area.
See section 8 "Exposure controls/personal protection" for information on personal protection.

### 7.2. Conditions for safe storage, including any incompatibilities:
Containers that have been opened must be carefully resealed and kept upright to prevent leakage.

| | |
|---|---|
| **Recommended storage material:** | Always store in containers of the same material as the original container. |
| **Storage conditions:** | Keep container tightly closed<br>Dry, cool and well ventilated<br>Use only in a chemical fume hood |
| **Incompatible materials:** | Strong acids, strong bases, and strong oxidizing agents. |

### 7.3. Specific end use(s):
This product should only be used for applications quoted in section 1.2.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters:

No substances are listed with a permissible exposure limit (ref: 29 CFR 1910.1000 TABLE Z-1)
No substances are listed with a permissible exposure limit CIB 66 [NIOSH 2014-100]

## 8.2. Exposure controls:

Apply general control to prevent unnecessary exposure

**General recommendations:** Smoking, drinking and consumption of food is not allowed in the work area.

**Exposure scenarios:** There are no exposure scenarios implemented for this product.

**Exposure limits:** Occupational exposure limits have not been defined for the substances in this product.

**Appropriate technical measures:** Apply standard precautions during use of the product. Avoid inhalation of vapours.

**Hygiene measures:** In between use of the product and at the end of the working day all exposed areas of the body must be washed thoroughly. Pay special attention to hands, forearms and face.

**Measures to avoid environmental exposure:** No specific requirements.

### Individual protection measures, such as personal protective equipment:

**Generally:** Use only protective equipment with a recognized certification mark, e.g. the UL mark.

**Respiratory Equipment:**

| Work situation | Type | Class | Colour | Standards | |
|---|---|---|---|---|---|
| if the situation requires. | Positive pressure supplied air respirator. | | | |  |

**Skin protection:**

| Recommended | Type/Category | Standards | |
|---|---|---|---|
| Use proper protective clothing | Use proper protective clothing | | |
| Chemical resistant boots | | |  |

**Hand protection:**

| Material | Glove thickness (mm) | Breakthrough time (min.) | Standards | |
|---|---|---|---|---|
| Chemical Resistant gloves | | | |  |

**▼Eye protection:**

| Type | Standards | |
|---|---|---|
| Safety glasses | EN 166 / EN ISO 16321-1 |  |

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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

**Physical state:** Liquid

**Color:** Clear, Colourless

**Odor:** Low odor

**Odor threshold (ppm):** No data available

| | |
|---|---|
| **pH:** | Not applicable |
| **Density (g/cm³):** | 1.6 |
| **Kinematic viscosity:** | 0.6 cPs (77 °F) |
| **Particle characteristics:** | No data available |

### Phase changes:

| | |
|---|---|
| **Melting point/freezing point (°F):** | -162.4 |
| **Melting point/freezing point (°C):** | -108 |
| **Softening point/range (°F):** | Does not apply to liquids. |
| **Boiling point (°F):** | 120.6 |
| **Boiling point (°C):** | 49.2 |
| **Vapor pressure:** | 244 mmHg (68 °F) |
| **Relative vapor density:** | (Water = 1):1.6 |
| **▼Evaporation rate (n-butylacetate = 100):** | >1 |
| **Decomposition temperature (°F):** | No data available |

### Data on fire and explosion hazards:

| | |
|---|---|
| **Flash point (°F):** | No flash point |
| **Flammability (°F):** | Not applicable |
| **Auto-ignition temperature (°F):** | Not applicable |
| **Explosion limits (% v/v):** | No data available |

### Solubility:

| | |
|---|---|
| **Solubility in water:** | <0.001% by weight |
| **n-octanol/water coefficient (LogKow):** | No data available |
| **Solubility in fat (g/L):** | Not determined |

### 9.2. Other information:

| | |
|---|---|
| **Thermal stability:** | Stable under normal conditions. |
| **Other physical and chemical parameters:** | No data available. |
| **Molecular Weight (g/mol):** | 316 |
| **Oxidizing properties:** | Not an oxidizer |

## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity:
No data available.

### 10.2. Chemical stability:
The product is stable under the conditions, noted in section 7 “Handling and storage”.

### 10.3. Possibility of hazardous reactions, including those associated with foreseeable emergencies:
None known.

### 10.4. Conditions to avoid:

Sunlight
Ultraviolet Light.

### 10.5. Incompatible materials:
Strong acids, strong bases, and strong oxidizing agents.

### 10.6. Hazardous decomposition products:
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on toxicological effects:

#### ▼Acute toxicity:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Professional judgement |
| Route of exposure: | Dermal |
| Test: | LD50 |
| Result: | >5000 mg/kg |

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Professional judgement |
| Route of exposure: | Oral |
| Test: | LD50 |
| Result: | >5000 mg/kg |

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rat |
| Route of exposure: | Inhalation |
| Test: | LC50 |
| Result: | >1227 mg/L |

Based on available data, the classification criteria are not met.

#### ▼Skin corrosion/irritation:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rabbit |
| Result: | No adverse effect observed (Not irritating) |

Based on available data, the classification criteria are not met.

#### ▼Serious eye damage/irritation:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rabbit |
| Result: | No adverse effect observed (Not irritating) |

Based on available data, the classification criteria are not met.

#### ▼Respiratory sensitisation:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Result: | For the components(s), either no data are available or the data are not sufficient for the classification. |

Based on available data, the classification criteria are not met.

#### ▼Skin sensitisation:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Guinea pig |
| Result: | For the components(s), either no data are available or the data are not sufficient for the classification. |

Based on available data, the classification criteria are not met.

### ▼Germ cell mutagenicity:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Conclusion: | No data available or the data not sufficient for classification. |

Based on available data, the classification criteria are not met.

### ▼Carcinogenicity:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Conclusion: | No data available or the data not sufficient for classification. |

Based on available data, the classification criteria are not met.

### ▼Reproductive toxicity:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rat |
| Duration: | During gestation |
| Test: | NOAEL |
| Result: | 38.7 mg/L |
| Conclusion: | Not Classified |

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rabbit |
| Duration: | During gestation |
| Test: | LOAEL |
| Result: | 38.7 mg/L |
| Conclusion: | Toxic to development |

Based on available data, the classification criteria are not met.

### ▼STOT-single exposure:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rat |
| Route of exposure: | Inhalation |
| Target organ: | Central nervous system |
| Duration: | 2 hours |
| Test: | NOAEL |
| Result: | 100000 ppm |
| Conclusion: | Not Classified |

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Dog |
| Route of exposure: | Inhalation |
| Target organ: | Cardiac sensitization |
| Duration: | 17 minutes |
| Conclusion: | No adverse effect observed |

Based on available data, the classification criteria are not met.

### ▼STOT-repeated exposure:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Species: | Rat |
| Route of exposure: | Inhalation |
| Target organ: | Endocrine system, liver, heart, hematopoietic system, immune system, nervous system, kidney/bladder |
| Duration: | 90 days |
| Test: | NOAEL |
| Result: | 38.6 mg/L |
| Conclusion: | Not Classified |

Based on available data, the classification criteria are not met.

### ▼Aspiration hazard:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Conclusion: | No data available or the data is not sufficient for classification. |

Based on available data, the classification criteria are not met.

### Long term effects:
None known.

### Other information:
None known.

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. ▼Toxicity:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Other information: | None known. |

Based on available data, the classification criteria are not met.

### 12.2. Persistence and degradability:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Conclusion: | No Data Available |

### 12.3. Bioaccumulative potential:

| | |
|---|---|
| Product/substance | Perfluoro(2-methly-3-pentanone) |
| Conclusion: | No Data Available |

### 12.4. Mobility in soil:
No data available.

### 12.5. Results of PBT and vPvB assessment:
This mixture/product does not contain any substances known to fulfil the criteria for PBT and vPvB classification.

### 12.6. Other adverse effects:
None known.

## SECTION 13: DISPOSAL CONSIDERATIONS

### Waste treatment methods:
This material can be reclaimed by the manufacturer if required or disposed of at an approved facility according to local regulations.

### RCRA Hazardous waste ("P" and "U" list) (40 CFR 261):
None of the components are listed

### Specific labelling:

### Contaminated packing:
Packaging containing residues of the product must be disposed of similarly to the product.

## SECTION 14: TRANSPORT INFORMATION

| | 14.1 UN / ID *** | 14.2 UN proper shipping name | 14.3 Hazard class(es) | 14.4 PG* | 14.5 Env** | Other information: |
|---|---|---|---|---|---|---|
| DOT | - | - | - | - | - | - |
| IMDG | - | - | - | - | - | - |
| IATA | - | - | - | - | - | - |

* Packing group
** Environmental hazards
*** UN number or ID number

### Additional information:
Not dangerous goods according to DOT, IATA and IMDG.

### 14.6. Special precautions for user:
Not applicable.

### 14.7. Transport in bulk according to IMO instruments:
No data available.

## SECTION 15: REGULATORY INFORMATION

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture:

### 15.2. U.S. Federal regulations:

**TSCA (the non-confidential portion):** Perfluoro(2-methly-3-pentanone) is listed

**Clean Air Act:** None of the components are listed

**EPCRA Section 302:** None of the components are listed

**EPCRA Section 304:** None of the components are listed

**EPCRA section 313:** None of the components are listed

**CERCLA:** None of the components are listed

**Hazardous chemical inventory reporting:**

### 15.3. State regulations:

**California / Prop. 65:** None of the components are listed

**Massachusetts / Right To Know Act:** None of the components are listed

**New Jersey / Right To Know Act:** None of the components are listed

**New York / Right To Know Act:** None of the components are listed

**Pennsylvania / Right To Know Act:** None of the components are listed

**NFPA:**
Health hazard: 3
Fire hazard: 1
Instability hazard: 0
Specific hazard: None

### 15.4. Restrictions for application:
Restricted to professional users.

### 15.5. Demands for specific education:

No specific requirements.

### 15.6. Additional information:
Not applicable.

### 15.7. Chemical safety assessment:
No

### 15.8. Sources:
OSHA Hazard Communication Standard (29 CFR 1910.1200)

## SECTION 16: OTHER INFORMATION

### The full text of identified uses as mentioned in section 1:
None known.

### Abbreviations and acronyms:
ACGIH = American Conference of Governmental Industrial Hygienists
ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway
ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
CAS = Chemical Abstracts Service
CERCLA = Comprehensive Environmental Response Compensation and Liability Act
DOT = Department of Transportation
EINECS = European Inventory of Existing Commercial chemical Substances
EPCRA = Emergency Planning and Community Right-To-Know Act
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
HCIS = Hazardous Chemical Information System
HNOC = Hazards Not Otherwise Classified
IARC = International Agency for Research on Cancer
IATA = International Air Transport Association
IMDG = International Maritime Dangerous Goods
LogKow = logarithm of the n-octanol/water coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
NFPA = National Fire Protection Association
NIOSH = National Institute for Occupational Safety and Health
OECD = Organisation for Economic Co-operation and Development
OSHA = Occupational Safety and Health Administration
PBT = Persistent, Bioaccumulative and Toxic
RCRA = Resource Conservation and Recovery Act
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail
RRN = REACH Registration Number
SARA = Superfund Amendments and Reauthorization Act
SCL = A specific concentration limit.
STEL = Short-term exposure limits
STOT-RE = Specific Target Organ Toxicity - Repeated Exposure
STOT-SE = Specific Target Organ Toxicity - Single Exposure
TSCA = The Toxic Substances Control Act
TWA = Time weighted average
UN = United Nations
UVCB = Unknown or variable composition, complex reaction products or of biological materials
VOC = Volatile Organic Compound
vPvB = Very Persistent and Very Bioaccumulative

## Additional information:
Not applicable.

## The safety data sheet is validated by:
GJ

## SDS date:
11/4/2026

## Date of previous version:
10/1/2025 (5.0)

## Other:
A change (in proportion to the last essential change (first cipher in SDS version, see section 1)) is marked with a triangle.
The information in this safety data sheet applies only to this specific product (mentioned in section 1) and is not necessarily correct for use with other chemicals/products.
It is recommended to hand over this safety data sheet to the actual user of the product. Information in this safety data sheet cannot be used as a product specification.
Country-language: US-en