SAFETY DATA SHEET

TMC HFE-347E Engineered Fluid

SECTION 1: IDENTIFICATION

1.1. Product identifier:

Trade name: TMC HFE-347E Engineered Fluid
Other names / Synonyms: 1,1,2,2-tetrafluoro-1-(2,2,2-trifluoroethoxy)ethane
Product no.: 2502E, 2502E-B, 2502E-2.2, 2502E-12, 2502E-50, 2502E-550
Other means of identification: CAS No.: 406-78-0

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

Relevant identified uses of the substance or mixture: Solvent (for cleaning and degreasing)
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: 11/3/2026
SDS Version: 9.0
Date of previous version: 11/3/2026 (8.0)

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

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

2.1. ▼Classification of the substance or mixture:

Eye Irrit. 2B; H320, Causes eye irritation
STOT SE 3; H335, May cause respiratory irritation.

2.2. Label elements:

Hazard pictogram(s):



Signal word: Warning
▼Hazard statement(s): Causes eye irritation (H320)
May cause respiratory irritation. (H335)
Precautionary statement(s):
General: Not applicable.

▼Prevention:	Do not get in eyes, on skin, or on clothing. (P262)
▼Response:	Not applicable.
▼Storage:	Not applicable.
▼Disposal:	Refer to the manufacturer/supplier for information on disposal/ recovery/ recycling. (P503)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. ▼Substances:

Product/substance	Identifiers	% w/w	Classification	Note
1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether	CAS No.: 406-78-0	>99.5%	Eye Irrit. 2B, H320 STOT SE 3, H335	

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:	Upon irritation: rinse with water. In the event of continued irritation, seek medical assistance.
▼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:

Irritation effects: This product contains substances, which may cause irritation upon exposure to skin, eyes or lungs. Exposure may result in an increased absorption potential of other hazardous substances at the area of exposure.

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

If eye irritation persists: Get medical advice/attention.

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:
Wear self-contained breathing apparatus and protective clothing to prevent contact. Upon direct exposure contact the Poison Help Line on 1-800-222-1222 (24/7) in order to obtain further advice.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. ▼Personal precautions, protective equipment and emergency procedures:
Ensure adequate ventilation, especially in confined areas.
Avoid inhalation of vapours from spilled material.
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:
Limit spillage and collect using granular absorbent or similar materials, and dispose of it in accordance with the regulations on dangerous waste.
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:	Comply with laws.
Storage conditions:	Keep container tightly closed

Store in a cool, dark and well-ventilated place

Incompatible materials: 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.	Vapor respirator				

Skin protection:

Work situation	Recommended	Type/Category	Standards	
if the situation requires.	Wear appropriate protection clothing, e.g. coveralls in polypropylene or working clothes in cotton or polyester.	-	-	
if the situation requires.	Protective boots	Protective boots		

Hand protection:

Work situation	Material	Glove thickness (mm)	Breakthrough time (min.)	Standards	
if the situation requires.	Chemical Resistant gloves				

Eye protection:

Work situation	Type	Standards	
if the situation requires.	Safety glasses	EN 166 / EN ISO 16321-1	
if the situation requires.	Face shield	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: Colorless - Very pale yellow
Odor: No data available
Odor threshold (ppm): No data available
pH: No data available
Density (g/cm³): No data available
Relative density: 1.487 (77 °F)
Kinematic viscosity: No data available
Particle characteristics: No data available

Phase changes:

▼Melting point/freezing point (°F): -131.8
Melting point/freezing point (°C): -91
Softening point/range (°F): Does not apply to liquids.
▼Boiling point (°F): 133.1
▼Boiling point (°C): 56.2
Vapor pressure: No data available
Relative vapor density: No data available
Evaporation rate (n-butylacetate = 100): No data available
Decomposition temperature (°F): No data available

Data on fire and explosion hazards:

Flash point (°F): None
Flammability (°F): No data available
Auto-ignition temperature (°F): No data available
Explosion limits (% v/v): No data available

Solubility:

Solubility in water: No data available
n-octanol/water coefficient (LogKow): No data available
Solubility in fat (g/L): No data available

9.2. Other information:

Thermal stability:	Stable under normal conditions
Other physical and chemical parameters:	No data available.
▼Refractive Index:	1.276
Molecular Weight (g/mol):	200.06
Oxidizing properties:	No data available

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:
Mechanical influences (e.g. Shock, pressure, impact, friction). Fire, sparks or other ignition sources.

10.5. Incompatible materials:
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	1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species:	Rat
Route of exposure:	Oral
Test:	LD50
Result:	>2000 mg/kg

Product/substance	1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species:	Rat
Route of exposure:	Inhalation
Test:	LC50
Result:	>24.8 mg/L

Product/substance	1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species:	Rat
Route of exposure:	Dermal
Test:	LD50
Result:	>2000 mg/kg

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

▼Skin corrosion/irritation:

Product/substance	1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
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 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species: Rabbit
Result: Adverse effect observed (Slightly irritating)

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

Respiratory sensitisation:

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

Skin sensitisation:

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species: Rat
Result: No adverse effect observed (not sensitising)

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

Germ cell mutagenicity:

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Conclusion: No data available or the data not sufficient for classification.

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

Carcinogenicity:

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Conclusion: Not Classified

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

Reproductive toxicity:

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Conclusion: No data available or the data not sufficient for classification.

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

STOT-single exposure:

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Conclusion: No data available or the data not sufficient for classification.

May cause respiratory irritation.

STOT-repeated exposure:

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species: Rat
Route of exposure: Inhalation
Duration: 5 days
Test: NOAEL
Result: 1800 ppm
Other information: Test Additional Information

Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species: Rat
Route of exposure: Inhalation
Duration: 90 days
Test: NOAEL
Result: 1000 ppm

Conclusion: No adverse effect observed

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

Aspiration hazard:
Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
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:
Irritation effects: This product contains substances, which may cause irritation upon exposure to skin, eyes or lungs. Exposure may result in an increased absorption potential of other hazardous substances at the area of exposure.

Other information:
None known.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity:
Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Species: Fish, Carp
Duration: 96 hours
Test: LC50
Result: >76 mg/L

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

12.2. Persistence and degradability:
Based on available data, the classification criteria are not met.

12.3. Bioaccumulative potential:
Product/substance 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether
Conclusion: Not biodegradable
Test: OECD 301C

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): 1,1,2,2-Tetrafluoroethyl-2,2,2-trifluoroethyl ether 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

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

Full text of H-phrases as mentioned in section 3:
H320, Causes eye irritation
H335, May cause respiratory irritation.

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:
The classification of the mixture in regard of health hazards is in accordance with the calculation methods given by HCS (29 CFR 1910.1200).

The safety data sheet is validated by:
TMC Industries - QC Department

SDS date:
11/3/2026

Date of previous version:
11/3/2026 (8.0)

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