Date of Issue:
24 April 2023

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

RM Number: 8692

RM Name: Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Film-Forming Foams (AFFF) Formulation III

Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Reference Material (RM) is an aqueous mixture intended primarily for the use in methods of analysis. A unit of RM 8692 consists of four 2 ml ampoules each containing 1 ml.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
E-mail: SRMMSDS@nist.gov
Website: https://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
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2. Hazards Identification

Classification

Physical Hazard:	Flammable Liquid	Category 2
Health Hazard:	Acute Toxicity, Oral	Category 3
	Acute Toxicity, Inhalation	Category 3
	Acute Toxicity, Dermal	Category 3
	Carcinogenicity	Category 2
	Reproductive Toxicity	Category 2
	STOT, Repeated Exposure	Category 2
	STOT, Single Exposure	Category 1

Label Elements

Symbol:

Signal Word: DANGER

Hazard Statement(s):

H225	Highly flammable liquid and vapor.
H301+H311+H331	Toxic if swallowed, in contact with skin or if inhaled.
H304	May be fatal if swallowed and enters airways
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H370	Causes damage to eyes, kidney, liver, heart, central nervous system.
H373	May cause damage to organs (liver, immune system) through prolonged or repeated exposure.

Precautionary Statement(s):

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.

P260	Do not breathe fumes, gas, mist, vapors or spray.
P210	Keep away from heat, sparks, open flames, hot surfaces. — No smoking.
P233	Keep container tightly closed.
P241	Use explosion-proof electrical, ventilating, lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection, protective gloves and clothing.
P301+P310	If swallowed: Immediately call a doctor
P330	Rinse mouth.
P303+P361+P364+P353	If on skin (or hair): take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water.
P312	Call a doctor if you feel unwell.
P304 + P340 + P311	If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a doctor.
P308 + P313	If exposed or concerned: Get medical attention.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Aqueous mixture.

Other Designations: Not applicable.

Components are listed in compliance with OSHA's 29 CFR 1910.1200.

Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Methanol	67-56-1	200-659-6	90
Diethylene glycol butyl ether	112-34-5	203-961-6	0.5 - < 1.0
Mixture of fluorosurfactant	Proprietary	-	0.01- < 0.1
Anionic hydrocarbon surfactant	Proprietary	-	0.1 - < 0.3
Amphoteric hydrocarbon surfactant	Proprietary	-	0.01- < 0.1
Water	7732-18-5	231-141-8	balance

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. If necessary, seek medical attention.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If a large amount is swallowed, seek medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness. Loss of appetite, and lethargy. Pain, vomiting, abdominal tenderness, nausea, blood in vomitus, and blood in feces.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Severe fire hazard. Vapor/air mixtures are explosive above the flash point. Vapors or gases may ignite at distant ignition sources and flash back. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use appropriate media to surrounding fire.
Unsuitable: Not listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Notify safety personnel of spills. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handle in accordance with all current regulations and standards. Protect from light, keep refrigerated. Keep separated from incompatible substances (see Section 10, "Stability and Reactivity").

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Component: Methanol
ACGIH (TWA): 200 ppm (TWA)
250 ppm (STEL)
Skin – potential significant contribution to overall exposure by the cutaneous route.
NIOSH: 200 ppm (TWA); 260 mg/m^3 (TWA)
250 ppm (STEL); 325 mg/m^3 (STEL)
6000 ppm IDLH
Potential for dermal absorption.

Component: Diethylene glycol butyl ether
ACGIH (TWA): 10 ppm (8 h TWA)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear chemical resistant safety goggles. An eyewash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties	
Appearance (physical state, color, etc.)	yellowish transparent liquid
Molecular Formula	not applicable
Molar Mass (g/mol)	not applicable
Odor	not available
Odor Threshold	not available
pH	not available
Evaporation Rate	not available
Melting Point/Freezing Point	–94 °C (–137 °F) (methanol)
Relative Density as specific gravity (water = 1)	not available
Vapor Pressure	not available
Vapor Density (air = 1)	not available
Viscosity	not available
Solubility(ies)	soluble in water
Partition Coefficient (n-octanol/water)	not available
Particle Size	not available
Thermal Stability Properties	
Autoignition Temperature	385 °C (725 °F) (methanol)
Thermal Decomposition	not available
Initial Boiling Point and Boiling Range	65 °C (149 °F) (methanol)
Explosive Limits, LEL	6 % (methanol)
Explosive Limits, UEL	36 % (methanol)
Flash Point	11 °C (51.8 °F) (methanol)
Flammability (solid, gas)	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: No data available.

Conditions to Avoid: Avoid heat, flames, sparks, and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

Incompatible Materials: Halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, bases, acids, and amines.

Fire/Explosion Information: See Section 5, “Fire Fighting Measures”.

Hazardous Decomposition: Oxides of carbon and fluorine.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Fatigue, weakness, anorexia, anemia, jaundice, encephalopathy, skin irritation, eye irritation, central nervous system depression, and nerve damage. May cause blindness.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Acute and chronic exposure may cause irritation, cough, ringing in the ears, constipation, headache, drowsiness, dizziness, tingling sensation, pain in extremities, tremors, loss of coordination, blood disorders, and nerve damage. Chronic exposure may also cause sensitivity to light, changes in blood pressure, digestive issues, difficulty breathing, irregular heartbeat, visual disturbances, blindness, bluish skin color, lung congestion, heart damage, kidney damage, liver damage, reproductive effects, effects on the brain, convulsions, unconsciousness,

and coma. Short term inhalation may cause irritation, nausea, vomiting, kidney damage, liver damage. Prolonged exposure may result in an accumulation in body tissues and exert adverse effects on the blood, nervous system, heart, endocrine and immune systems, liver, and reproduction.

Skin Contact: Prolonged or repeated exposure may cause irritation and dermatitis, absorption may occur, headache, drowsiness, loss of coordination, blood disorders, and nerve damage.

Eye Contact: Acute and chronic exposure may cause irritation; acute may cause eye damage.

Ingestion: Ingestion may cause liver damage; chronic ingestion may result in accumulation in body tissues and may also cause cancer. Ingestion may cause aspiration pneumonitis: signs/symptoms can include coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.

Numerical Measures of Toxicity:

Acute Toxicity: Category 3 for oral, inhalation, and dermal.
Human, Oral, LDLo: 143 mg/kg
Rat, Oral, LD50: 5628 mg/kg
Rat, Inhalation, LC50: 83.2 mg/L (4 h); 145 000 ppm (1 h); 64 000 ppm (4 h)
Rabbit, Dermal, LD50: 15 800 mg/kg

Skin Corrosion/Irritation: Not classified.
Rabbit, skin: 20 mg (24 h) moderate

Serious Eye damage/Eye Irritation: Not classified.

Respiratory Sensitization: Not classified.

Skin Sensitization: Not classified.

Germ Cell Mutagenicity: Not classified.

Carcinogenicity: This material contains a chemical part of a family of compounds structurally related to perfluorooctanoic acid; it is classified as Category 2.

Listed as a Carcinogen/Potential Carcinogen __X__ Yes _____ No

IARC lists of perfluorooctanoic acid (PFOA, isomers and salts) in Group 2B (probably carcinogenic to humans).

NTP has a draft technical report on the toxicology and carcinogenesis studies of perfluorooctanoic acid (CAS No. 335-67-1) administered in feed to sprague dawley rats, indicating clear evidence of carcinogenic activity of PFOA in male rats.

Reproductive Toxicity: The US Agency for Toxic Substances and Disease Registry reports recent research that shows developing fetuses can be exposed when per-and polyfluoroalkyl substances (PFAS) in maternal blood crosses the placenta and reaches umbilical cord. Lower infant weights have also been reported. It is classified as Category 2.

Specific Target Organ Toxicity, Single Exposure: Category 1, Causes damage to central nervous system.

Specific Target Organ Toxicity, Repeated Exposure: Category 2; components of this material can accumulate in body tissues.

Aspiration Hazard: Not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:
Fish, Bluegill (Lepomis macrochirus), LC50: 13 500 mg/L to 17 600 mg/L (96 h) flow-through Fish,
Fathead minnow (Pimephales promelas), LC50: 28 200 mg/ L (96 h) flow-through
Fish, Fathead minnow (Pimephales promelas), LC50: >100 mg/L (96 h) static

Persistence and Degradability: No data available.

Bioaccumulative Potential: <10 species: fish.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1230, Methanol, Hazard Class 3, 6.1, Packing Group II.

15. REGULATORY INFORMATION

U.S. Regulations: Not regulated

CERCLA Sections 102a/103 (40 CFR 302.4): 5000 lbs (2270 kg) final RQ.

SARA Title III Section 302 (40 CFR 355.30): This material is not regulated.

SARA Title III Section 304 (40 CFR 355.40): This material is not regulated.

SARA Title III Section 313 (40 CFR 372.65): 1.0 % de minimis concentrations.

OSHA Process Safety (29 CFR 1910.119): This material is not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	Yes.
FIRE:	Yes.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

California Proposition 65: Methanol, Perfluorooctane sulfonate (PFOS), and Perfluorooctanoic acid (PFOA) are listed as chemicals known to the State of California to cause reproductive harm (developmental).

U.S. TSCA Inventory: Methanol and diethylene glycol butyl ether listed.

TSCA 12(b), Export Notification: This material is not listed.

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

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Sources:

United States Environmental Protection Agency, *Per- and Polyfluoroalkyl Substances (PFAS)*; available at https://www.epa.gov/pfas (accessed Apr 2023).

United States Department of Health and Human Services, National Toxicology Program, *Per- and Polyfluoroalkyl Substances (PFAS)*; available at https://ntp.niehs.nih.gov/whatwestudy/topics/pfas/index.html?utm_source=direct&utm_medium=prod&utm_campaign=ntpgolinks&utm_term=pfas (accessed Apr 2023).

United States National Institute of Environmental Health Sciences, *Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*; available at https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm (accessed Apr 2023).

United States, Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), *Toxicological Profile for Perfluoroalkyls*, available at https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237 (accessed Apr 2023).

United States National Library of Medicine, PubChem Database, Diethylene Glycol Butyl Ether, CAS Number 112-34-5; available at https://pubchem.ncbi.nlm.nih.gov/compound/8177 (accessed Apr 2023).

United States National Library of Medicine, PubChem Database, *Water, CAS Number 7732-18-5*; available at https://pubchem.ncbi.nlm.nih.gov/compound/962 (accessed Apr 2023).

United States National Library of Medicine, PubChem Database, *Methanol, CAS Number 67-56-1*; available at https://pubchem.ncbi.nlm.nih.gov/compound/887 (accessed Apr 2023).

ChemADVISOR, Inc., *SDS Methyl Alcohol*, 09 December 2015.

The International Agency for Research on Cancer (IARC); *Perfluorooctanoic Acid*, available at https://monographs.iarc.fr/wp-content/uploads/2018/06/mono110-01.pdf (accessed Apr 2023).

Vendor, Safety Data Sheet, 28 May 2015.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NIOSH	National Institute for Occupational Safety and Health	TSCA	Toxic Substances Control Act
NIST	National Institute of Standards and Technology	TWA	Time Weighted Average
n.o.s.	Not Otherwise Specified	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

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