

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Description: Nafion D-520 dispersion, 5% w/w in water and 1-propanol
Cat No. : 42118

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

Details of the supplier of the safety data sheet

Importer

Fisher Scientific Korea
D5,D6, Incheon Airport Logistics Complex
150, Gonghangdong-Ro 296 Beon-Gil
Jung-Gu, Incheon
Tel: +82-1661-9555
Fax: +82-2-2023-0603

Supplier

Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099

E-mail address Chem.KR@thermofisher.com

Emergency Telephone Number

Emergency telephone: Medical: +(82) 070-7686-0086 or + 1-703-741-5970
CHEMTREC: 080 822 1374 (Local), CHEMTREC: 1-800-424-9300 or + 1-703-527-3887
Korea: 00-308-13-2549 (24 hours a day, 7 days a week)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture

Physical hazards

Flammable liquids

Category 3

Health hazards

Serious Eye Damage/Eye Irritation
Specific target organ toxicity - (single exposure)

Category 1
Category 3

Environmental hazards

Based on available data, the classification criteria are not met

Label Elements

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Signal Word

Danger

Hazard Statements

H226 - Flammable liquid and vapor

H318 - Causes serious eye damage

H336 - May cause drowsiness or dizziness

Precautionary Statements

Prevention

P271 - Use only outdoors or in a well-ventilated area

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

P233 - Keep container tightly closed

P240 - Ground and bond container and receiving equipment

P241 - Use explosion-proof electrical/ ventilating/ lighting equipment

P242 - Use non-sparking tools

P243 - Take action to prevent static discharges

P280 - Wear protective gloves/protective clothing/eye protection/face protection

P261 - Avoid breathing dust/fume/gas/mist/vapors/spray

Response

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P310 - Immediately call a POISON CENTER or doctor

P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing

P312 - Call a POISON CENTER or doctor if you feel unwell

Storage

P403 + P235 - Store in a well-ventilated place. Keep cool

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

P405 - Store locked up

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

Other Hazards

Toxic to terrestrial vertebrates

This product does not contain any known or suspected endocrine disruptors

NFPA

Health
2

Flammability
2

Instability
0

Physical hazards
-

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Component	Common Name	CAS No	Index No	Weight %
n-Propyl alcohol	n-Propyl Alcohol; Propyl alcohol; n-Propanol	71-23-8	KE-29362	40 - 50
Water	Aqua	7732-18-5	KE-35400	40 - 50
Ethanesulfonic acid,	No information	31175-20-9	2009-3-4151	2.5 - <5

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2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	available			
Ethyl alcohol	Ethanol; Methylcarbinol	64-17-5	KE-13217	2.5 - <5

SECTION 4: FIRST AID MEASURES

Description of first aid measures

General Advice

If symptoms persist, call a physician.

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Ingestion

Clean mouth with water and drink afterwards plenty of water.

Inhalation

Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Self-Protection of the First Aider

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Most important symptoms and effects, both acute and delayed

Difficulty in breathing. Causes eye burns. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media

Carbon dioxide (CO₂). Powder. Water spray. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. Water mist may be used to cool closed containers.

Extinguishing media which must not be used for safety reasons

No information available.

Special hazards arising from the substance or mixture

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products

Sulfur oxides, Hydrogen fluoride, Carbon monoxide (CO), Carbon dioxide (CO₂).

Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

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SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental precautions

Do not flush into surface water or sanitary sewer system. See Section 12 for additional Ecological Information.

Methods and Material for Containment and Cleaning Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

Reference to Other Sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges.

Conditions for Safe Storage, Including any Incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat, sparks and flame.

Specific End Uses

Use in laboratories.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Component	CAS No	Korea	ACGIH TLV	OSHA PEL
n-Propyl alcohol	71-23-8	STEL: 250 ppm TWA: 200 ppm Skin	TWA: 100 ppm	(Vacated) TWA: 200 ppm (Vacated) TWA: 500 mg/m ³ (Vacated) STEL: 250 ppm (Vacated) STEL: 625 mg/m ³ TWA: 200 ppm TWA: 500 mg/m ³
Water	7732-18-5	Not listed	Not listed	Not listed
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not listed	Not listed	Not listed
Ethyl alcohol	64-17-5	TWA: 1000 ppm	STEL: 1000 ppm	(Vacated) TWA: 1000 ppm (Vacated) TWA: 1900 mg/m ³ TWA: 1000 ppm TWA: 1900 mg/m ³

Component	CAS No	European Union	The United Kingdom	Germany
n-Propyl alcohol	71-23-8	Not listed	STEL: 250 ppm 15 min STEL: 625 mg/m ³ 15 min	Not listed

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			TWA: 200 ppm 8 hr TWA: 500 mg/m ³ 8 hr Skin	
Water	7732-18-5	Not listed	Not listed	Not listed
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not listed	Not listed	Not listed
Ethyl alcohol	64-17-5	Not listed	TWA: 1000 ppm TWA; 1920 mg/m ³ TWA WEL - STEL: 3000 ppm STEL: 5760 mg/m ³ STEL	200 ppm TWA MAK; 380 mg/m ³ TWA MAK

ACGIH - Biological Exposure Indices

Component	CAS No	ACGIH - Biological Exposure Indices
n-Propyl alcohol	71-23-8	Not listed
Water	7732-18-5	Not listed
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not listed
Ethyl alcohol	64-17-5	Not listed

Exposure Controls

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection

Goggles

Hand Protection

Protective gloves

Skin and body protection

Long sleeved clothing

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Personal protective equipment

Respiratory Protection

Use only those certified by the Korea Occupational Safety and Health Administration.

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators

Recommended Filter type:

Particulates filter conforming to EN 143

To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

When RPE is used a face piece Fit Test should be conducted

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls

Prevent product from entering drains Do not allow material to contaminate ground water system

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance (Physical State, Color, etc.) Cloudy white Liquid dispersion

Odor No information available

Odor Threshold No data available

pH No information available

Melting Point/Range No data available

Softening Point No data available

Boiling Point/Range No information available

Flash Point 24 °C / 75.2 °F

Method - No information available

Evaporation Rate No data available

Flammability (solid,gas) Not applicable Liquid

Explosion Limits No data available

Vapor Pressure 23 hPa @ 20 °C

Vapor Density No data available

Specific Gravity / Density 0.93 g/cm³ (Air = 1.0)

Bulk Density Not applicable @ 20 °C

Water Solubility Miscible Liquid

Solubility in other solvents No information available

Partition Coefficient (n-octanol/water)

Component	CAS No	log Pow
n-Propyl alcohol	71-23-8	0.2
Water	7732-18-5	No data available
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available
Ethyl alcohol	64-17-5	-0.32

Autoignition Temperature No data available

Decomposition Temperature No data available

Viscosity No data available

Explosive Properties explosive air/vapour mixtures possible

Oxidizing Properties No information available

Molecular Formula Not applicable for mixtures

Molecular Weight Not applicable for mixtures

SECTION 10: STABILITY AND REACTIVITY

Reactivity

None known, based on information available

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Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Hazardous Polymerization No information available.
Hazardous Reactions None under normal processing.

Conditions to Avoid

Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials

Acids. Oxidizing agent.

Hazardous Decomposition Products

Sulfur oxides. Hydrogen fluoride. Carbon monoxide (CO). Carbon dioxide (CO₂).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

Information on expected route of exposure

Inhalation Inhalation of vapors in high concentration may cause irritation of respiratory system.
Ingestion May be harmful if swallowed.
Eyes Avoid contact with eyes. Corrosive to the eyes and may cause severe damage including blindness.
Skin Avoid contact with skin. Skin Corrosion/Irritation.

Information on Health Hazards

(a) acute toxicity;

Oral Based on available data, the classification criteria are not met
Dermal Based on available data, the classification criteria are not met
Inhalation Based on available data, the classification criteria are not met

Toxicology data for the components

Component	CAS No	LD50 Oral	LD50 Dermal	LC50 Inhalation
n-Propyl alcohol	71-23-8	LD50 = 1870 mg/kg (Rat)	LD50 = 4049 mg/kg (Rabbit)	LC50 > 33.8 mg/L (Rat) 4 h
Water	7732-18-5	-	-	-
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available	No data available	No data available
Ethyl alcohol	64-17-5	LD50 = 10470 mg/kg OECD 401 (Rat) 3450 mg/kg (Mouse)	No data available	LC50 = 117-125 mg/l (4h) OECD 403 (rat) 20000 ppm/10H (rat)

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; Category 1

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(d) respiratory or skin sensitization;

Respiratory

No data available

Skin

No data available

Component	CAS No	Test method	Test species	Study result
n-Propyl alcohol	71-23-8	No data available	No data available	No data available
Water	7732-18-5	No data available	No data available	No data available
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available	No data available	No data available
Ethyl alcohol	64-17-5	Mouse Ear Swelling Test (MEST)	mouse	non-sensitising
		----- OECD Test Guideline 429 Local Lymph Node Assay	----- mouse	----- non-sensitising

(e) germ cell mutagenicity;

No data available

Component	CAS No	Test method	Test species	Study result
n-Propyl alcohol	71-23-8	No data available	No data available	No data available
Water	7732-18-5	No data available	No data available	No data available
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available	No data available	No data available
Ethyl alcohol	64-17-5	AMES test OECD Test Guideline 471	in vitro Bacteria	negative
		----- Gene cell mutation OECD Test Guideline 476	----- in vitro Mammalian	----- negative

(f) carcinogenicity;

No data available

Component	CAS No	Test method	Test species / Duration	Study result
n-Propyl alcohol	71-23-8	No data available	No data available	No data available
Water	7732-18-5	No data available	No data available	No data available
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available	No data available	No data available
Ethyl alcohol	64-17-5	No data available	No data available	No data available

There are no known carcinogenic chemicals in this product

Component	CAS No	IARC	NTP	ACGIH	OSHA	UK
n-Propyl alcohol	71-23-8	Not listed	Not listed	Not listed	Not listed	Not listed
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not listed	Not listed	Not listed	Not listed	Not listed
Ethyl alcohol	64-17-5	Not listed	Known	A3	Not listed	Not listed

IARC (International Agency for

IARC (International Agency for Research on Cancer)

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Research on Cancer) Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program) Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists) A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

(g) reproductive toxicity; No data available

Component	CAS No	Test method	Test species / Duration	Study result
n-Propyl alcohol	71-23-8	No data available	No data available	No data available
Water	7732-18-5	No data available	No data available	No data available
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available	No data available	No data available
Ethyl alcohol	64-17-5	OECD Test Guideline 416	Oral / mouse 2 Generation	NOAEL = 13.8 g/kg/day
		OECD Test Guideline 414	Inhalation / Rat	NOAEC = 16000 ppm

(h) STOT-single exposure; Category 3
Results / Target organs Central nervous system (CNS).

(i) STOT-repeated exposure; No data available

Target Organs None known.

(j) aspiration hazard; No data available

Other Adverse Effects

Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Component	CAS No	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity effects

Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

Component	CAS No	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
n-Propyl alcohol	71-23-8	Pimephales promelas: LC50=4480 mg/L	EC50: 3339 - 3977 mg/L, 48h Static (Daphnia magna)	No data available	EC50 = 17700 mg/L 5 min EC50 = 45000 mg/L

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		96h	EC50: = 3642 mg/L, 48h (Daphnia magna)		5 h EC50 = 8686 mg/L 15 min EC50 = 980 mg/L 12 h
Water	7732-18-5	No data available	No data available	No data available	No data available
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	No data available	No data available	No data available	No data available
Ethyl alcohol	64-17-5	Fathead minnow (Pimephales promelas) LC50 = 14200 mg/l/96h	EC50 = 9268 mg/L/48h EC50 = 10800 mg/L/24h	EC50 (72h) = 275 mg/l (Chlorella vulgaris)	Photobacterium phosphoreum:EC50 = 34634 mg/L/30 min Photobacterium phosphoreum:EC50 = 35470 mg/L/5 min

Persistence and degradability

Persistence

Miscible with water, Persistence is unlikely, based on information available.

Component	Degradability
Ethyl alcohol 64-17-5 (2.5 - <5)	OECD 301E = 94%

Bioaccumulative potential

Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
n-Propyl alcohol	0.2	No data available
Ethyl alcohol	-0.32	No data available

Mobility in soil

The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils.

Ozone Depletion Potential

Component	CAS No	Ozone Depletion Potential
n-Propyl alcohol	71-23-8	Not listed
Water	7732-18-5	Not listed
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not listed
Ethyl alcohol	64-17-5	Not listed

Other adverse effects

No information available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues/Unused Products

Waste is classified as hazardous. Dispose in accordance with the Wastes Control Act (폐기물관리법).

Contaminated Packaging

Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

Other Information

Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Can be landfilled or incinerated, when in compliance with local regulations.

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Road and Rail Transport

UN-No UN1987
 Proper Shipping Name ALCOHOLS, N.O.S.
 Technical Shipping Name 1-propanol, ethanol
 Hazard Class 3
 Packing Group III

IATA

UN-No UN1987
 Proper Shipping Name ALCOHOLS, N.O.S.
 Technical Shipping Name 1-propanol, ethanol
 Hazard Class 3
 Packing Group III

IMDG/IMO

UN-No UN1987
 Proper Shipping Name ALCOHOLS, N.O.S.
 Technical Shipping Name 1-propanol, ethanol
 Hazard Class 3
 Packing Group III
 Marine Pollutant No hazards identified

Special Precautions for User No special precautions required

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

Legend: X - Listed '-' - Not Listed

International Inventories

Component	CAS No	KECL	TSCA	EINECS	IECSC	DSL	NDSL	PICCS	ENCS	ISHL	AICS
n-Propyl alcohol	71-23-8	KE-29362	X	200-746-9	X	X	-	X	X	X	X
Water	7732-18-5	KE-35400	X	231-791-2	X	X	-	X	X		X
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	2009-3-4151	X	-	X	-	X	-	X		-
Ethyl alcohol	64-17-5	KE-13217	X	200-578-6	X	X	-	X	X	X	X

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable	Annex I - Y42

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential
n-Propyl alcohol	71-23-8	Listed	Not applicable	Not applicable

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Water	7732-18-5	Listed	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Listed	Not applicable	Not applicable

Korean National Regulations

Component	CAS No	Act on Registration and Evaluation of Chemical Substances (K-REACH)	Authorised Chemicals	Existing Substances Subject to Registration
n-Propyl alcohol	71-23-8	Annex 1 - KE-29362	Not applicable	Not applicable
Water	7732-18-5	Annex 1 - KE-35400 Exempt (Index No. 25)	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Annex 2 - 2009-3-4151	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Annex 1 - KE-13217	Not applicable	Not applicable

Component	CAS No	Chemical Control Act - Toxic Chemicals	Chemical Control Act - Prohibited Chemicals	Chemical Control Act - Use Restricted Chemicals
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

Component	CAS No	Chemical Control Act - Accident Precaution Chemicals (% in mixtures)	Chemical Control Act - Accident Precaution Chemicals - Quantity limits Storage (% in mixtures)	Chemical Control Act - Accident Precaution Chemicals - Quantity limits Manufacture/Use (% in mixtures)
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

Component	CAS No	Waste Control Law	Ministry of Environment - CMR risk	Ministry of Environment - Critically Controlled Substance
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

Component	CAS No	ISHA - Harmful Agents Subject to Work Environment Monitoring	ISHA - Prohibited substances	ISHA - Substances requiring permission
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable

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Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

Component	CAS No	ISHA - Substances subject to control	ISHA - Harmful Agents Requiring Health Examination	ISHA - Permissible Exposure Limits
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

Component	CAS No	ISHA - Subject to Process Safety Reports (minimum quantity)	ISHA - Threshold Limit Values (TLVs) Chemicals	ISHA - Special management materials
n-Propyl alcohol	71-23-8	5000 kg	STEL: 250 ppm TWA: 200 ppm Skin	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	5000 kg	TWA: 1000 ppm	Not applicable

National Fire Association - Dangerous Substances Minimum quantity requiring a permit

Component	CAS No	Class 1 - Oxidising solids	Class 2 - Flammable solid	Class 3 - Spontaneously Combustible Substances and Dangerous Substances When Wet	Class 4 - Flammable liquids	Class 5 - Self-reactive substances	Class 6 - Oxidising liquids
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable	3. Alcohol 400 L	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable	3. Alcohol 400 L	Not applicable	Not applicable

Control Parameters

Component	CAS No	Korea	ACGIH - Biological Exposure Indices
n-Propyl alcohol	71-23-8	STEL: 250 ppm TWA: 200 ppm Skin	Not listed
Water	7732-18-5	Not listed	Not listed
Ethanesulfonic acid, 2-[1-[difluoro(trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with	31175-20-9	Not listed	Not listed

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tetrafluoroethene			
Ethyl alcohol	64-17-5	TWA: 1000 ppm	Not listed

US Management Information

OSHA - Occupational Safety and Health Administration

Not applicable

Component	CAS No	Specifically Regulated Chemicals	Highly Hazardous Chemicals
n-Propyl alcohol	71-23-8	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable

CERCLA Not applicable

Component	CAS No	CERCLA Extremely Hazardous Substances RQs	Hazardous Substances RQs	SARA 313 - Threshold Values %
n-Propyl alcohol	71-23-8	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Ethanesulfonic acid, 2-[1-[difluoro[(trifluoroethenyl)oxy]methyl]-1, 2,2,2-tetrafluoroethoxy]-1,1, 2,2-tetrafluoro-, polymer with tetrafluoroethene	31175-20-9	Not applicable	Not applicable	Not applicable
Ethyl alcohol	64-17-5	Not applicable	Not applicable	Not applicable

GHS Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567

Danger.

H226 - Flammable liquid and vapor. H318 - Causes serious eye damage. H336 - May cause drowsiness or dizziness.

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P280 - Wear eye protection/ face protection. P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 - Immediately call a POISON CENTER or doctor/physician.

SECTION 16: OTHER INFORMATION

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

IECSC - Chinese Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

ENCS - Japanese Existing and New Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

RPE - Respiratory Protective Equipment

LC50 - Lethal Concentration 50%

POW - Partition coefficient Octanol:Water

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50%

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ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road

IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

OECD - Organisation for Economic Co-operation and Development

BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from Ships

ATE - Acute Toxicity Estimate

VOC - (Volatile Organic Compound)

Key literature references and sources for data

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Prepared By

Health, Safety and Environmental Department

Creation Date

15-Apr-2015

Revision Date

17-Jun-2024

Revision Number

9

Revision Summary

New emergency telephone response service provider.

MOEL's Public Notice No. 2023-9 (Standards for Classification and Labeling of Chemical Substances and Safety Data Sheets)

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet