• SAFETY DATA SHEET

Version 6.25
Revision Date 03/02/2026
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SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : VOLATILE ORGANIC COMPOUNDS - WP

Product Number : QC1086
Brand : Sigma-Aldrich

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

Identified uses : Research and development as defined in 40 C.F.R. § 751.403. See section 15 for more information.

Uses advised against : For R&D use only. Not for pharmaceutical, household or other uses.
After February 3, 2025, this chemical substance (as defined in TSCA section 3(2))/product cannot be distributed in commerce to retailers. After January 28, 2026, this chemical substance (as defined in TSCA section 3(2))/product is and can only be distributed in commerce or processed with a concentration of methylene chloride equal to or greater than 0.1% by weight for the following purposes: (1) Processing as a reactant; (2) Processing for incorporation into a formulation, mixture, or reaction product; (3) Processing for repackaging; (4) Processing for recycling; (5) Industrial or commercial use as a laboratory chemical; (6) Industrial or commercial use as a bonding agent for solvent welding; (7) Industrial and commercial use as a paint and coating remover from safety critical, corrosion-sensitive components of aircraft and spacecraft; (8) Industrial and commercial use as a processing aid; (9) Industrial and commercial use for plastic and rubber products manufacturing; (10) Industrial and commercial use as a solvent that becomes part of a formulation or mixture, where that formulation or mixture will be used inside a manufacturing process, and the solvent (methylene chloride) will be reclaimed; (11) Industrial and commercial use in the refinishing for wooden furniture, decorative pieces, and architectural fixtures of artistic, cultural or historic value until May 8, 2029; (12) Industrial and commercial use in adhesives and sealants in aircraft, space vehicle, and turbine applications for structural and safety critical non-structural applications until May 8, 2029; (13) Disposal; and (14) Export.
The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to

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comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone	:	+1 314 771-5765
Fax	:	+1 800 325-5052

1.4 Emergency telephone number

Emergency Phone #	:	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards for the product as supplied

Flammable liquids	:	Category 2
Acute toxicity (Oral)	:	Category 3
Acute toxicity (Inhalation)	:	Category 3
Acute toxicity (Dermal)	:	Category 3
Specific target organ toxicity - single exposure	:	Category 1 (Eyes, Central nervous system)
Short-term (acute) aquatic hazard	:	Category 3
Long-term (chronic) aquatic hazard	:	Category 3

Other hazards

None known.

GHS label elements

Hazard pictograms :



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Signal word	:	Danger
Hazard statements	:	H225 Highly flammable liquid and vapour. H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled. H370 Causes damage to organs (Eyes, Central nervous system). H412 Harmful to aquatic life with long lasting effects.
Precautionary statements	:	**Prevention:** 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. P260 Do not breathe mist or vapours. P264 Wash skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P271 Use only outdoors or in a well-ventilated area. P273 Avoid release to the environment. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. **Response:** P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth. P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower. P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor. P361 + P364 Take off immediately all contaminated clothing and wash it before reuse. P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish. **Storage:** P403 + P233 Store in a well-ventilated place. Keep container tightly closed. P403 + P235 Store in a well-ventilated place. Keep cool. P405 Store locked up. **Disposal:** P501 Dispose of contents/ container to an approved waste disposal plant.

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

CAS-No. : Not Assigned

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
Methanol	67-56-1*	>= 80 - <= 100	TSC
(E)-1,3-Dichloropropene	10061-02-6*	>= 0 - <= 0.1	TSC
(Z)-1,3-Dichloropropene	10061-01-5*	>= 0 - <= 0.1	TSC
Acrylaldehyde	107-02-8*	>= 0 - <= 0.1	TSC

* Indicates that the identifier is a CAS No.
TSC- the actual concentration or concentration range is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice : First aiders need to protect themselves.
Show this safety data sheet to the doctor in attendance.

If inhaled : After inhalation: fresh air. Immediately call in physician.
If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact : In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact : After eye contact: rinse out with plenty of water. Call in ophthalmologist.
Remove contact lenses.

If swallowed : After swallowing: fresh air. Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage). Call a doctor immediately (mention methanol ingestion). Only in exceptional cases, if no medical care is available within one hour, induce vomiting (only in fully conscious persons) and make victim drink ethanol again (approx. 0.3 ml of a 40% alcoholic beverage/kg body weight/hour).

Most important : The most important known symptoms and effects are

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symptoms and effects, both acute and delayed		described in the labelling (see section 2.2) and/or in section 11
Protection of first-aiders	:	For personal protection see section 8.
Notes to physician	:	No data available

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Foam Carbon dioxide (CO2) Dry powder
Unsuitable extinguishing media	:	For this substance/mixture no limitations of extinguishing agents are given.
Specific hazards during fire fighting	:	Combustible. Pay attention to flashback. Vapours are heavier than air and may spread along floors. Development of hazardous combustion gases or vapours possible in the event of fire. Forms explosive mixtures with air at ambient temperatures.
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	No data available
Further information	:	Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective	:	Stay in danger area only with self-contained breathing

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equipment for fire-fighters	apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert. Advice for emergency responders: For personal protection see section 8.
Environmental precautions	:	Do not let product enter drains. Risk of explosion.
Methods and materials for containment and cleaning up	:	Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

Advice on protection against fire and explosion	:	Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.
Advice on safe handling	:	Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.
Further information on storage conditions	:	Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorised persons.
Storage class	:	3, Flammable liquids
Recommended storage temperature	:	Recommended storage temperature see product label.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Methanol	67-56-1	TWA	200 ppm	ACGIH
		STEL	250 ppm	ACGIH
		ST	250 ppm 325 mg/m3	NIOSH REL
		TWA	200 ppm 260 mg/m3	NIOSH REL
		TWA	200 ppm 260 mg/m3	OSHA Z-1
(E)-1,3-Dichloropropene	10061-02-6	TWA	2 ppm	US WEEL
		STEL	5 ppm	US WEEL
(Z)-1,3-Dichloropropene	10061-01-5	TWA	2 ppm	US WEEL
		STEL	5 ppm	US WEEL
Acrylaldehyde	107-02-8	C	0.05 ppm	ACGIH
		TWA	0.1 ppm 0.25 mg/m3	NIOSH REL
		ST	0.3 ppm 0.8 mg/m3	NIOSH REL
		TWA	0.1 ppm 0.25 mg/m3	OSHA Z-1

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Methanol	67-56-1	Methanol	Urine	End of shift (As soon as possible after exposure ceases)	15 mg/l	ACGIH BEI

Engineering measures : No data available

Personal protective equipment

Respiratory protection : required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying

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standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type ABEK

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Remarks : required

Eye protection : Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Safety glasses

Skin and body protection : Flame retardant antistatic protective clothing.

Hygiene measures : Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : No data available

Odor : No data available

Odor Threshold : No data available
pH : No data available

Melting point : No data available

Boiling point/boiling range : No data available

Flash point : 49.5 °F / 9.7 °C
(10 hPa)
Method: closed cup

Evaporation rate : No data available

Flammability (solid, gas) : No data available

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Flammability (liquids)	:	No data available
Burning rate	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapour density	:	No data available
Relative density	:	No data available
Density	:	No data available
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Flow time	:	No data available
Explosive properties	:	Not classified as explosive.
Oxidizing properties	:	none
Particle characteristics Particle size	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Vapours may form explosive mixture with air.
Chemical stability	:	The product is chemically stable under standard ambient conditions (room temperature) .
Possibility of hazardous	:	No data available

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reactions

Conditions to avoid	:	Warming.
Incompatible materials	:	Acid chlorides Acid anhydrides Oxidizing agents Alkali metals Reducing agents Acids
Hazardous decomposition products	:	In the event of fire: see section 5

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Mixture causes damage to organs. - Eyes, Central nervous system

Specific target organ toxicity - repeated exposure
No data available

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Aspiration hazard
No data available

11.2 Additional Information

Endocrine disrupting properties

Components:

Tetrachlorethylene:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Methyl alcohol may be fatal or cause blindness if swallowed., Effects due to ingestion may include:, Headache, Dizziness, Drowsiness, metabolic acidosis, Coma, Seizures.
Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Components

Methanol

Acute toxicity
Acute toxicity estimate Oral - 100.1 mg/kg
(Expert judgement)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Symptoms: Nausea, Vomiting
Acute toxicity estimate Inhalation - 4 h - 3.1 mg/l - vapour
(Expert judgement)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Symptoms: Irritation symptoms in the respiratory tract.
Acute toxicity estimate Dermal - 300.1 mg/kg
(Expert judgement)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
Remarks: (ECHA)
Remarks: Drying-out effect resulting in rough and chapped skin.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

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Remarks: (ECHA)

Respiratory or skin sensitization
Sensitisation test: - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Based on available data the classification criteria are not met.
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Result: negative
Method: OECD Test Guideline 474
Species: Mouse - male and female - Bone marrow
Result: negative

Carcinogenicity
Did not show carcinogenic effects in animal experiments.

Reproductive toxicity
Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure
Causes damage to organs. - Eyes, Central nervous system
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Acute oral toxicity - Nausea, Vomiting
Acute inhalation toxicity - Irritation symptoms in the respiratory tract.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

(E)-1,3-Dichloropropene

Acute toxicity
Acute toxicity estimate Oral - 100.1 mg/kg
(Expert judgement)
Remarks: The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene
Acute toxicity estimate Inhalation - 4 h - 11 mg/l - vapour
(Expert judgement)
Remarks: The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene
Acute toxicity estimate Dermal - 300 mg/kg
(Expert judgement)
Remarks: The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene

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Skin corrosion/irritation
Remarks: Causes skin irritation.
The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene

Serious eye damage/eye irritation
Remarks: Causes serious eye irritation.
The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene

Respiratory or skin sensitization
May cause allergic skin reaction. The value is given in analogy to the following substances:

Germ cell mutagenicity
No data available

Carcinogenicity
Suspected of causing cancer.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.
Remarks: The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
Aspiration may cause pulmonary oedema and pneumonitis.

(Z)-1,3-Dichloropropene

Acute toxicity
LD50 Oral - Rat - male and female - 85 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - female - 4 h - 3.39 mg/l - vapour
(OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - 794 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Remarks: Causes skin irritation.
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 10 s
Remarks: (ECHA)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitization
Maximisation Test - Guinea pig

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Result: positive
(OECD Test Guideline 406)
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: Positive results were obtained in some in vitro tests.
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Result: negative

Carcinogenicity
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
Aspiration may cause pulmonary oedema and pneumonitis.

Acrylaldehyde

Acute toxicity
LD50 Oral - Mouse - male - 13.9 mg/kg
(OECD Test Guideline 401)
LD50 Oral - Rat - 26 mg/kg
LC50 Inhalation - Hamster - male and female - 4 h - 0.058 mg/l - vapour
Remarks: (ECHA)
Inhalation: Corrosive to respiratory system.
Acute toxicity estimate Dermal - 300 mg/kg
(Expert judgement)
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: Causes skin burns.
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation
Remarks: Causes serious eye damage.

Respiratory or skin sensitization
No data available

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Germ cell mutagenicity
Test Type: Ames test
Test system: S. typhimurium
Result: negative
Remarks: (ECHA)
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Result: negative
Remarks: (ECHA)
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Result: negative
Remarks: (ECHA)
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Result: negative
Remarks: (ECHA)
Species: Rat - male - Bone marrow
Result: negative
Remarks: (ECHA)

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Corrosive to the respiratory tract.

Remarks: No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Methanol:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill)): 15,400.0 mg/l End point: mortality Exposure time: 96 h Test Type: flow-through test Analytical monitoring: yes Method: US-EPA

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Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 18,260 mg/l End point: Immobilization Exposure time: 96 h Test Type: semi-static test Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): ca. 22,000.0 mg/l Exposure time: 96 h Test Type: static test Method: OECD Test Guideline 201
Toxicity to fish (Chronic toxicity)	:	NOEC (Oryzias latipes (Orange-red killifish)): 7,900 mg/l Exposure time: 200 h Remarks: (External MSDS)
Toxicity to microorganisms	:	IC50 (activated sludge): > 1,000 mg/l Exposure time: 3 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 209

(E)-1,3-Dichloropropene:

M-Factor (Acute aquatic toxicity)	:	10

Ecotoxicology Assessment

Acute aquatic toxicity	:	Very toxic to aquatic life. The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene
Chronic aquatic toxicity	:	Very toxic to aquatic life with long lasting effects. The value is given in analogy to the following substances: (Z)-1,3-Dichloropropene

(Z)-1,3-Dichloropropene:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 1.6 mg/l End point: mortality Exposure time: 96 h Test Type: semi-static test Analytical monitoring: yes Method: Regulation (EC) No. 440/2008, Annex, C.1 GLP: yes
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia magna (Water flea)): 1.4 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test

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Analytical monitoring: yes
Method: Regulation (EC) No. 440/2008, Annex, C.2
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Scenedesmus capricornutum (fresh water algae)): 3.1 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: Regulation (EC) No. 440/2008, Annex, C.3
GLP: yes

M-Factor (Acute aquatic toxicity) : 10

Toxicity to microorganisms : EC50 (activated sludge): 279 mg/l
Exposure time: 10 min
Test Type: static test
GLP: yes
Remarks: (ECHA)

Ecotoxicology Assessment

Acute aquatic toxicity : Very toxic to aquatic life.

Chronic aquatic toxicity : Very toxic to aquatic life with long lasting effects.

Acrylaldehyde:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 0.019 mg/l
End point: mortality
Exposure time: 96 h
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0.03 mg/l
End point: mortality
Exposure time: 48 h
Remarks: (ECOTOX Database)

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 0.061 mg/l
Exposure time: 72 h
Test Type: static test
Remarks: (ECHA)

M-Factor (Acute aquatic toxicity) : 10

Toxicity to fish (Chronic : NOEC (Pimephales promelas (fathead minnow)):

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toxicity)		0.011 mg/l Exposure time: 60 d Test Type: flow-through test Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.017 mg/l Exposure time: 64 d Test Type: flow-through test Analytical monitoring: yes Remarks: (ECHA)
Toxicity to microorganisms	:	EC50 (activated sludge): ca. 400 mg/l Exposure time: 30 min Remarks: (ECHA)

Ecotoxicology Assessment

Chronic aquatic toxicity	:	Very toxic to aquatic life with long lasting effects.

Persistence and degradability

Components:

Methanol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 99 % Exposure time: 30 d Method: OECD Test Guideline 301D
Biochemical Oxygen Demand (BOD)	:	600 - 1,120 mg/g Incubation time: 5 d Remarks: (IUCLID)
Chemical Oxygen Demand (COD)	:	1,420 mg/g Remarks: (IUCLID)
ThOD	:	1,500 mg/g Remarks: (Lit.)
BOD/ThOD	:	76 % Remarks: Closed Bottle test (IUCLID)
Stability in water	:	Hydrolysis: 83 - 91 % at 19 °C(72 h) Remarks: Hydrolyses on contact with water. Hydrolyses readily. Degradation half life: 2.2 yr Remarks: reaction with hydroxyl radicals (IUCLID)
Photodegradation	:	Degradation (direct photolysis): 50 % Degradation

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half life: 17.2 d

(Z)-1,3-Dichloropropene:

Biodegradability : aerobic
Result: Not readily biodegradable.
Biodegradation: 4.9 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
GLP: yes

Acrylaldehyde:

Biodegradability : aerobic
Result: Readily biodegradable.
Biodegradation: 100 %
Exposure time: 7 d
Remarks: (ECHA)

Bioaccumulative potential

Components:

Methanol:

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 1.0
Exposure time: 72 d
Temperature: 68 °F / 20 °C
Concentration: 5 mg/l

Partition coefficient: n-octanol/water : log Pow: -0.77 (77 °F / 25 °C)
Method: (experimental)
Remarks: (HSDB)
Bioaccumulation is not expected.

(Z)-1,3-Dichloropropene:

Partition coefficient: n-octanol/water : Pow: 1.82 (68 °F / 20 °C)
pH: 5.83 - 7.78
Method: OECD Test Guideline 107
GLP: yes
Remarks: Bioaccumulation is not expected.

Acrylaldehyde:

Bioaccumulation : Species: Lepomis macrochirus
Bioconcentration factor (BCF): 344
Exposure time: 28 d
Concentration: 13.1 µg/l

Partition coefficient: n-octanol/water : log Pow: -0.01
Remarks: Bioaccumulation is not expected.

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Mobility in soil

Components:

Methanol:

Stability in soil : Remarks: Will not adsorb on soil.

Other adverse effects

Product:

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Components:

Methanol:

Results of PBT and vPvB assessment : Not persistent, bioaccumulative, and toxic (PBT).

Additional ecological information : Avoid release to the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 1230
Proper shipping name	:	Methanol solution
Class	:	3
Subsidiary risk	:	6.1
Packing group	:	II
Labels	:	Class 3 - Flammable liquids, Division 6.1 - Toxic substances
Packing instruction (cargo aircraft)	:	364
Packing instruction	:	352

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(passenger aircraft)

IMDG-Code

UN number	:	UN 1230
Proper shipping name	:	METHANOL SOLUTION
Class	:	3
Subsidiary risk	:	6.1
Packing group	:	II
Labels	:	3 (6.1)
EmS Code	:	F-E, S-D
Marine pollutant	:	no

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR Road

UN/ID/NA number	:	UN 1230
Proper shipping name	:	Methanol SOLUTION
Class	:	3
Packing group	:	II
Labels	:	Class 3 - Flammable liquids
ERG Code	:	131
Marine pollutant	:	no
Poison Inhalation Hazard	:	No

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Vinyl chloride	75-01-4	1	2000
Hexachlorobuta-1,3-diene	87-68-3	1	2000
1,2-Dibromo-3-chloropropane	96-12-8	1	2000
1,2-dibromoethane	106-93-4	1	2000
Acrylaldehyde	107-02-8	1	2000
Vinyl chloride	75-01-4	1	1 (D043)
benzene	71-43-2	10	10 (D018)
ethylbenzene	100-41-4	100	100 (F003)
Xylene	1330-20-7	100	100 (F003)
Trichlorofluoromethane	75-69-4	10	10 (F002)
1,1,1-Trichloroethane	71-55-6	10	10 (F002)

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Tetrachlorethylene	127-18-4	10	10 (F002)
Hexachlorobuta-1,3-diene	87-68-3	1	1 (D033)
1,2-Dichloroethane	107-06-2	100	100 (D028)
chlorobenzene	108-90-7	100	100 (D021)
1,1,1-Trichloroethane	71-55-6	10	10 (F001)
Carbon tetrachloride	56-23-5	10	10 (F001)
Tetrachlorethylene	127-18-4	10	10 (F001)
Carbon tetrachloride	56-23-5	10	10 (D019)
Chloroform	67-66-3	10	10 (D022)
1,1-Dichloroethene	75-35-4	100	100 (D029)
Tetrachlorethylene	127-18-4	100	100 (D039)
trichloroethylene	79-01-6	100	100 (D040)
Carbon Disulfide	75-15-0	100	100 (F005)
Ethyl Methyl Ketone	78-93-3	100	100 (F005)
Ethyl Methyl Ketone	78-93-3	5000	5000 (D035)

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Acrylaldehyde	107-02-8	1	2000

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Methanol 67-56-1 >= 90 - <= 100 %

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):

Methanol 67-56-1 >= 90 - <= 100 %

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

Methanol 67-56-1 >= 90 - <= 100 %

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

Toluene	108-88-3	>= 0 - < 0.1 %
benzene	71-43-2	>= 0 - < 0.1 %
ethylbenzene	100-41-4	>= 0 - < 0.1 %
Chloroethane	75-00-3	>= 0 - < 0.1 %

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styrene	100-42-5	>= 0 - < 0.1 %
1,2-Dichloroethane	107-06-2	>= 0 - < 0.1 %
chlorobenzene	108-90-7	>= 0 - < 0.1 %
1,2-Dichloropropane	78-87-5	>= 0 - < 0.1 %
Carbon tetrachloride	56-23-5	>= 0 - < 0.1 %
Chloroform	67-66-3	>= 0 - < 0.1 %
1,1-Dichloroethene	75-35-4	>= 0 - < 0.1 %
1,3-Dichloropropane	142-28-9	>= 0 - < 0.1 %
1,2-dibromoethane	106-93-4	>= 0 - < 0.1 %
trichloroethylene	79-01-6	>= 0 - < 0.1 %
vinyl acetate	108-05-4	>= 0 - < 0.1 %
Xylene	1330-20-7	>= 0 - < 0.1 %
Carbon Disulfide	75-15-0	>= 0 - < 0.1 %
Acrylaldehyde	107-02-8	>= 0 - < 0.1 %
acrylonitrile	107-13-1	>= 0 - < 0.1 %

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

Toluene	108-88-3	>= 0 - < 0.1 %
benzene	71-43-2	>= 0 - < 0.1 %
ethylbenzene	100-41-4	>= 0 - < 0.1 %
styrene	100-42-5	>= 0 - < 0.1 %
1,2-Dichloroethane	107-06-2	>= 0 - < 0.1 %
chlorobenzene	108-90-7	>= 0 - < 0.1 %
Carbon tetrachloride	56-23-5	>= 0 - < 0.1 %
Chloroform	67-66-3	>= 0 - < 0.1 %
1,1-Dichloroethene	75-35-4	>= 0 - < 0.1 %
1,2-dibromoethane	106-93-4	>= 0 - < 0.1 %
trichloroethylene	79-01-6	>= 0 - < 0.1 %
vinyl acetate	108-05-4	>= 0 - < 0.1 %
Xylene	1330-20-7	>= 0 - < 0.1 %
Carbon Disulfide	75-15-0	>= 0 - < 0.1 %
Acrylaldehyde	107-02-8	>= 0 - < 0.1 %
acrylonitrile	107-13-1	>= 0 - < 0.1 %

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

Methanol	67-56-1
Dichloromethane	75-09-2
Vinyl chloride	75-01-4
benzene	71-43-2
Bromomethane	74-83-9
Hexachlorobuta-1,3-diene	87-68-3
1,1,2-Trichloroethane	79-00-5
1,1,2,2-tetrachloroethane	79-34-5
styrene	100-42-5
(E)-1,3-Dichloropropene	10061-02-6
1,2-Dichloroethane	107-06-2
1,2-Dibromo-3-chloropropane	96-12-8
Carbon tetrachloride	56-23-5

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Chloroform	67-66-3
1,1-Dichloroethene	75-35-4
Tetrachlorethylene	127-18-4
Bromodichloromethane	75-27-4
1,2-dibromoethane	106-93-4
trichloroethylene	79-01-6
(Z)-1,3-Dichloropropene	10061-01-5
vinyl acetate	108-05-4
Carbon Disulfide	75-15-0
Acrylaldehyde	107-02-8
acrylonitrile	107-13-1

Pennsylvania Right To Know

Methanol	67-56-1
Dichloromethane	75-09-2
Vinyl chloride	75-01-4
acetone	67-64-1
Toluene	108-88-3
benzene	71-43-2
Acetonitrile	75-05-8
ethylbenzene	100-41-4
Chloroethane	75-00-3
Bromomethane	74-83-9
methyl chloride	74-87-3
Trichlorofluoromethane	75-69-4
1,2,4-trichlorobenzene	120-82-1
Hexachlorobuta-1,3-diene	87-68-3
1,1,2-Trichloroethane	79-00-5
1,1,2,2-tetrachloroethane	79-34-5
styrene	100-42-5
trans-Dichloroethylene	156-60-5
1,2-Dichloroethane	107-06-2
1,2-Dibromo-3-chloropropane	96-12-8
chlorobenzene	108-90-7
cumene	98-82-8
1,2-Dichloropropane	78-87-5
1,1,1,2-Tetrachloroethane	630-20-6
dibromomethane	74-95-3
1,1,1-Trichloroethane	71-55-6
Carbon tetrachloride	56-23-5
Chloroform	67-66-3
1,1-Dichloroethene	75-35-4
1,1-Dichloroethane	75-34-3
Tetrachlorethylene	127-18-4
Bromodichloromethane	75-27-4
1,3-Dichloropropane	142-28-9
1,2,3-trichlorobenzene	87-61-6
1,2,3-Trichloropropane	96-18-4
1,2-dibromoethane	106-93-4
trichloroethylene	79-01-6
Chlorodibromomethane	124-48-1
dichlorodifluoromethane	75-71-8

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vinyl acetate	108-05-4
Xylene	1330-20-7
Carbon Disulfide	75-15-0
Ethyl Methyl Ketone	78-93-3
Acrylaldehyde	107-02-8
acrylonitrile	107-13-1
4-methylpentan-2-one	108-10-1
2-Chloroethyl vinyl ether	110-75-8

Maine Chemicals of High Concern

Vinyl chloride	75-01-4
Toluene	108-88-3
benzene	71-43-2
styrene	100-42-5
Bromoform	75-25-2
1,2-dibromoethane	106-93-4

Vermont Chemicals of High Concern

Dichloromethane	75-09-2
Vinyl chloride	75-01-4
Toluene	108-88-3
benzene	71-43-2
ethylbenzene	100-41-4
Hexachlorobuta-1,3-diene	87-68-3
1,1,2,2-tetrachloroethane	79-34-5
styrene	100-42-5
Tetrachlorethylene	127-18-4
Bromoform	75-25-2
Carbon Disulfide	75-15-0
Ethyl Methyl Ketone	78-93-3
acrylonitrile	107-13-1

Washington Chemicals of High Concern

Dichloromethane	75-09-2
Vinyl chloride	75-01-4
Toluene	108-88-3
benzene	71-43-2
ethylbenzene	100-41-4
Hexachlorobuta-1,3-diene	87-68-3
1,1,2,2-tetrachloroethane	79-34-5
styrene	100-42-5
Tetrachlorethylene	127-18-4
Bromoform	75-25-2
Carbon Disulfide	75-15-0
Ethyl Methyl Ketone	78-93-3
acrylonitrile	107-13-1

California Prop. 65

WARNING: This product can expose you to chemicals including 4-methylpentan-2-one, acrylonitrile, vinyl acetate, trichloroethylene, 1,2-dibromoethane, 1,2,3-Trichloropropane, Bromodichloromethane, Tetrachlorethylene, 1,1-Dichloroethane, 1,1-Dichloroethene, Chloroform, Carbon tetrachloride, 1,1,1-Trichloroethane, 1,1,1,2-Tetrachloroethane, 1,2-Dichloropropane, cumene, 1,2-Dibromo-3-chloropropane, 1,2-Dichloroethane, styrene,

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1,1,2,2-tetrachloroethane, 1,1,2-Trichloroethane, Hexachlorobuta-1,3-diene, Chloroethane, ethylbenzene, benzene, Vinyl chloride, Dichloromethane, which is/are known to the State of California to cause cancer, and
Methanol, Toluene, benzene, Bromomethane, methyl chloride, 1,2-Dibromo-3-chloropropane, Chloroform, 1,2-dibromoethane, trichloroethylene, Carbon Disulfide, 4-methylpentan-2-one, Methyl butyl ketone, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

International Regulations

Stockholm Convention (Persistent Organic Pollutants)	:	Hexachlorobuta-1,3-diene

The components of this product are reported in the following inventories:

US TSCA	:	Product contains substance(s) not listed on TSCA inventory.

TSCA list

The following substance(s) is/are subject to a Significant New Use Rule:

trichloroethylene	79-01-6	See 40 CFR § 721.10851; Final Rule
Methyl butyl ketone	591-78-6	See 40 CFR § 721.4925; Final Rule

After February 3, 2025, this chemical substance (as defined in TSCA section 3(2))/product cannot be distributed in commerce to retailers. After January 28, 2026, this chemical substance (as defined in TSCA section 3(2))/product is and can only be distributed in commerce or processed with a concentration of methylene chloride equal to or greater than 0.1% by weight for the following purposes: (1) Processing as a reactant; (2) Processing for incorporation into a formulation, mixture, or reaction product; (3) Processing for repackaging; (4) Processing for recycling; (5) Industrial or commercial use as a laboratory chemical; (6) Industrial or commercial use as a bonding agent for solvent welding; (7) Industrial and commercial use as a paint and coating remover from safety critical, corrosion-sensitive components of aircraft and spacecraft; (8) Industrial and commercial use as a processing aid; (9) Industrial and commercial use for plastic and rubber products manufacturing; (10) Industrial and commercial use as a solvent that becomes part of a formulation or mixture, where that formulation or mixture will be used inside a manufacturing process, and the solvent (methylene chloride) will be reclaimed; (11) Industrial and commercial use in the refinishing for wooden furniture, decorative pieces, and architectural fixtures of artistic, cultural or historic value until May 8, 2029; (12) Industrial and commercial use in adhesives and sealants in aircraft, space vehicle, and turbine applications for structural and safety critical non-structural applications until May 8, 2029; (13) Disposal; and (14) Export.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16. OTHER INFORMATION

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
ACGIH / STEL	:	Short-term exposure limit
ACGIH / C	:	Ceiling limit
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST	:	STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA
US WEEL / STEL	:	Short-Term TWA

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and

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Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
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