

# SAFETY DATA SHEET

according to the OSHA  
Hazard Communication Standard

Version 6.20  
Revision Date 07/10/2026  
Print Date 07/11/2026

## SECTION 1. IDENTIFICATION

### 1.1 Product identifiers

Product name : 3,3',5,5'-Tetramethylbenzidine (TMB) Liquid Substrate System

Product Number : T8665  
Brand : Sigma

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

Identified uses : Laboratory chemicals, Synthesis of substances

Restrictions on use : Not Available

### 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 3

Acute toxicity (Oral) : Category 3

Acute toxicity : Category 3

(Inhalation)

Acute toxicity (Dermal) : Category 3

Eye irritation : Category 2A

Carcinogenicity : Category 2

Specific target organ toxicity - single exposure : Category 1 (Eyes, Central nervous system)

### Other hazards

None known.

### GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H226 Flammable liquid and vapour.  
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled.  
H319 Causes serious eye irritation.  
H351 Suspected of causing cancer.  
H370 Causes damage to organs (Eyes, Central nervous system).

Precautionary statements : **Prevention:**  
P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.  
P233 Keep container tightly closed.  
P240 Ground/bond container and receiving equipment.  
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.  
P242 Use only non-sparking tools.  
P243 Take precautionary measures against static discharge.  
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.  
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.

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

P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician.

P337 + P313 If eye irritation persists: Get medical advice/ attention.

P362 Take off contaminated clothing and wash 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*          | >= 50 - < 70          | -            |
| dimethyl sulphoxide                                    | 67-68-5*          | >= 30 - < 50          | -            |
| acetone                                                | 67-64-1*          | >= 10 - < 20          | -            |
| 3,3',5,5'-Tetramethylbenzidine dihydrochloride hydrate | 207738-08-7*      | >= 0.1 - < 1          | -            |

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\* Indicates that the identifier is a CAS No.  
Actual concentration is withheld as a trade secret

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## SECTION 4. FIRST AID MEASURES

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General advice                                              | : First aiders need to protect themselves.<br>Show this safety data sheet to the doctor in attendance.                                                                                                                                                                                                                                                                                                       |
| If inhaled                                                  | : After inhalation: fresh air. Immediately call in physician.<br>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.<br>Call a physician immediately.                                                                                                                                                                                                                                                                   |
| In case of eye contact                                      | : After eye contact: rinse out with plenty of water.<br>Call in ophthalmologist.<br>Remove contact lenses.                                                                                                                                                                                                                                                                                                   |
| If swallowed                                                | : After swallowing: fresh air. Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage).<br>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 symptoms and effects, both acute and delayed | : The most important known symptoms and effects are 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                                                                                                                                                                                                                                                                                                                                                                                          |

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## SECTION 5. FIREFIGHTING MEASURES

|                                |                                                                                |
|--------------------------------|--------------------------------------------------------------------------------|
| Suitable extinguishing media   | : Foam<br>Carbon dioxide (CO <sub>2</sub> )<br>Dry powder                      |
| Unsuitable extinguishing media | : For this substance/mixture no limitations of extinguishing agents are given. |

Specific hazards during fire fighting : Combustible.

Vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapours possible in the event of fire.

Hazardous combustion products : Carbon oxides

Sulphur oxides

Sodium oxides

Specific extinguishing methods : No data available

Further information : Remove container from danger zone and cool with water.  
Suppress (knock down) gases/vapours/mists with a water spray jet.  
Prevent fire extinguishing water from contaminating surface water or the ground water system.

Special protective equipment for fire-fighters : Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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## 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.<br>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).<br>Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area. |

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## 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.<br>Take precautionary measures against static discharge.                                                                            |
| Advice on safe handling                         | : Work under hood. Do not inhale substance/mixture.<br>Avoid generation of vapours/aerosols.                                                                                                            |
| Further information on storage conditions       | : Keep container tightly closed in a dry and well-ventilated place.<br>Keep away from heat and sources of ignition.<br>Keep locked up or in an area accessible only to qualified or authorised persons. |
| Storage class                                   | : 3, Flammable liquids                                                                                                                                                                                  |
| Recommended storage temperature                 | : 36 - 46 °F / 2 - 8 °C                                                                                                                                                                                 |
| Further information on storage stability        | : Light sensitive.                                                                                                                                                                                      |

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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<br>325 mg/m <sup>3</sup>               | NIOSH REL |
|            |         | TWA                           | 200 ppm<br>260 mg/m <sup>3</sup>               | NIOSH REL |

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|                     |         |      |                                      |           |
|---------------------|---------|------|--------------------------------------|-----------|
|                     |         | TWA  | 200 ppm<br>260 mg/m <sup>3</sup>     | OSHA Z-1  |
| dimethyl sulphoxide | 67-68-5 | TWA  | 250 ppm                              | US WEEL   |
| acetone             | 67-64-1 | TWA  | 250 ppm                              | ACGIH     |
|                     |         | STEL | 500 ppm                              | ACGIH     |
|                     |         | TWA  | 250 ppm<br>590 mg/m <sup>3</sup>     | NIOSH REL |
|                     |         | TWA  | 1,000 ppm<br>2,400 mg/m <sup>3</sup> | 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<br>(As soon as possible after exposure ceases) | 15 mg/l                   | ACGIH BEI |
| acetone    | 67-64-1 | Acetone            | Urine               | End of shift<br>(As soon as possible after exposure ceases) | 25 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 standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type ABEK

The entrepreneur has to ensure that maintenance, cleaning and

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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.

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## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : light yellow, to, blue green

Odour : No data available

Odour Threshold : No data available  
pH : 5.5 - 6.5

Melting point : No data available

Boiling point/boiling range : No data available

Flash point : 129.9 °F / 54.4 °C  
Method: closed cup

Evaporation rate : No data available

Flammability (solid, gas) : No data available

Flammability (liquids) : No data available

Burning rate : No data available

Upper explosion limit /  
Upper flammability limit : No data available

|                                                     |                                |
|-----------------------------------------------------|--------------------------------|
| Lower explosion limit /<br>Lower flammability limit | : No data available            |
| Vapour 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-<br>octanol/water          | : No data available            |
| Autoignition temperature                            | : No data available            |
| Decomposition<br>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<br>Particle size           | : No data available            |

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## SECTION 10. STABILITY AND REACTIVITY

|                                    |                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------|
| Reactivity                         | : Vapour/air-mixtures are explosive at intense warming.                                   |
| Chemical stability                 | : The product is chemically stable under standard ambient conditions (room temperature) . |
| Possibility of hazardous reactions | : No data available                                                                       |
| Conditions to avoid                | : Heating.                                                                                |
| Incompatible materials             | : acids<br>Acid chlorides<br>Acid anhydrides                                              |

Oxidizing agents  
Alkali metals  
Reducing agents

Hazardous decomposition : In the event of fire: see section 5  
products

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## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Mixture

##### Acute toxicity

Oral: No data available

Inhalation: No data available

Acute toxicity estimate Inhalation - 4 h - 3 mg/l - vapour(Calculation method)

Symptoms: Possible symptoms:, mucosal irritations

Dermal: No data available

Acute toxicity estimate Dermal - 593.98 mg/kg  
(Calculation method)

##### Skin corrosion/irritation

No data available

##### Serious eye damage/eye irritation

Remarks: Mixture causes serious eye irritation.

##### 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

No data available

##### Specific target organ toxicity - repeated exposure

No data available

##### Aspiration hazard

No data available

## 11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Eyes - Eye disease - 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

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

**dimethyl sulphoxide**

**Acute toxicity**

LD50 Oral - Rat - male and female - 28,300 mg/kg

(OECD Test Guideline 401)

LC0 Inhalation - Rat - male and female - 4 h - > 5.33 mg/l - dust/mist

(OECD Test Guideline 403)

LD50 Dermal - Rat - male and female - 40,000 mg/kg

Remarks: (ECHA)

**Skin corrosion/irritation**

Skin - Rabbit

Result: slight irritation - 4 h

(OECD Test Guideline 404)

**Serious eye damage/eye irritation**

Eyes - Rabbit

Result: slight irritation - 24 h

(OECD Test Guideline 405)

**Respiratory or skin sensitization**

Maximisation Test - Guinea pig

Result: negative

(OECD Test Guideline 406)

Local lymph node assay (LLNA) - Mouse

Result: negative  
(OECD Test Guideline 429)

**Germ cell mutagenicity**

Test Type: Ames test  
Test system: Salmonella typhimurium  
Result: negative  
Test Type: sister chromatid exchange assay  
Test system: Chinese hamster ovary cells  
Result: negative  
Test Type: Mutagenicity (mammal cell test): chromosome aberration.  
Test system: Chinese hamster ovary cells  
Result: negative  
Method: OECD Test Guideline 474  
Species: Rat - male and female  
Result: negative

**Carcinogenicity**

No data available

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

**Aspiration hazard**

No data available

**acetone**

**Acute toxicity**

LD50 Oral - Rat - female - 5,800 mg/kg  
Remarks: (ECHA)  
Symptoms: Stomach/intestinal disorders, Risk of aspiration upon vomiting.,  
Pulmonary failure possible after aspiration of vomit.  
LC50 Inhalation - Rat - 4 h - 76 mg/l - vapour  
Remarks: Unconsciousness  
Drowsiness  
Dizziness  
(External MSDS)  
LD50 Dermal - Rabbit - 20,000 mg/kg  
Remarks: (IUCLID)

**Skin corrosion/irritation**

Skin - Rabbit  
Result: Mild skin irritation - 24 h  
(Draize Test)  
Remarks: (RTECS)

**Serious eye damage/eye irritation**

Eyes - Rabbit  
Result: Eye irritation - 24 h

(Draize Test)  
Remarks: (RTECS)

**Respiratory or skin sensitization**

Maximisation Test - Guinea pig  
Result: negative  
Remarks: (ECHA)  
Chronic exposure may cause dermatitis.

**Germ cell mutagenicity**

Test Type: Mutagenicity (mammal cell test): chromosome aberration.  
Test system: Chinese hamster ovary cells  
Result: negative  
Test Type: Ames test  
Test system: Salmonella typhimurium  
Result: negative  
Test Type: In vitro mammalian cell gene mutation test  
Test system: Mouse lymphoma test  
Result: negative

**Carcinogenicity**

No data available

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

Inhalation - May cause drowsiness or dizziness. - Narcotic effects  
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)  
Acute oral toxicity - Stomach/intestinal disorders, Risk of aspiration upon vomiting., Pulmonary failure possible after aspiration of vomit.

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**3,3',5,5'-Tetramethylbenzidine dihydrochloride hydrate**

**Acute toxicity**

LD50 Oral - Rat - 404 mg/kg  
Remarks: The value is given in analogy to the following substances: o-Tolidine  
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**

Suspected of causing cancer.

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

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**SECTION 12. ECOLOGICAL INFORMATION****Ecotoxicity****Components:****Methanol:**

|                                                     |                                                                                                                                                                                               |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Toxicity to fish                                    | : LC50 ( <i>Lepomis macrochirus</i> (Bluegill)): 15,400.0 mg/l<br>End point: mortality<br>Exposure time: 96 h<br>Test Type: flow-through test<br>Analytical monitoring: yes<br>Method: US-EPA |
| Toxicity to daphnia and other aquatic invertebrates | : EC50 ( <i>Daphnia magna</i> (Water flea)): 18,260 mg/l<br>End point: Immobilization<br>Exposure time: 96 h<br>Test Type: semi-static test<br>Method: OECD Test Guideline 202                |
| Toxicity to algae/aquatic plants                    | : ErC50 ( <i>Pseudokirchneriella subcapitata</i> (green algae)): ca. 22,000.0 mg/l<br>Exposure time: 96 h<br>Test Type: static test<br>Method: OECD Test Guideline 201                        |
| Toxicity to fish (Chronic toxicity)                 | : NOEC ( <i>Oryzias latipes</i> (Orange-red killifish)): 7,900 mg/l<br>Exposure time: 200 h<br>Remarks: (External MSDS)                                                                       |
| Toxicity to microorganisms                          | : IC50 (activated sludge): > 1,000 mg/l<br>Exposure time: 3 h<br>Test Type: static test<br>Analytical monitoring: yes                                                                         |

**dimethyl sulphoxide:**

- Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 25,000 mg/l  
End point: mortality  
Exposure time: 96 h  
Test Type: static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 203  
GLP: yes
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 24,600 mg/l  
Exposure time: 48 h  
Test Type: static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 202
- Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): 17,000 mg/l  
Exposure time: 72 h  
Test Type: static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 201  
GLP: yes
- Toxicity to microorganisms : EC50 (activated sludge): 10 - 100 mg/l  
Exposure time: 30 min  
Method: ISO 8192

**acetone:**

- Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 6,210 mg/l  
End point: mortality  
Exposure time: 96 h  
Test Type: flow-through test  
Analytical monitoring: yes  
Method: OECD Test Guideline 203
- Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia pulex (Water flea)): 8,800 mg/l  
End point: mortality  
Exposure time: 48 h  
Test Type: static test  
Remarks: (ECHA)
- Toxicity to algae/aquatic plants : NOEC (M.aeruginosa): 530 mg/l  
Exposure time: 8 d  
Test Type: static test  
Method: DIN 38412  
Remarks: (maximum permissible toxic concentration) (IUCLID)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 2,212 mg/l  
End point: reproduction rate  
Exposure time: 28 d  
Test Type: flow-through test  
Remarks: (ECHA)

Toxicity to microorganisms : EC50 (activated sludge): 61.15 mg/l  
Exposure time: 30 min  
Test Type: static test  
Method: OECD Test Guideline 209

### **3,3',5,5'-Tetramethylbenzidine dihydrochloride hydrate:**

#### **Ecotoxicology Assessment**

Chronic aquatic toxicity : May cause long lasting harmful effects to aquatic life.  
Remarks: The value is given in analogy to the following substances:  
The value is given in analogy to the following substances: 3,3',5,5'-tetramethylbenzidine

#### **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  
half life: 17.2 d

**dimethyl sulphoxide:**

Biodegradability : aerobic  
Concentration: 2 mg/l  
Result: Not readily biodegradable.  
Biodegradation: 31 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301D  
GLP: yes

Stability in water : Degradation half life: 0.12 - 1.2 h (30 °C) pH: 7  
Remarks: Hydrolyses readily.

**acetone:**

Biodegradability : aerobic  
Inoculum: activated sludge  
Result: Readily biodegradable.  
Biodegradation: 91 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301B

Biochemical Oxygen Demand (BOD) : 1,850 mg/g  
Incubation time: 5 d  
Remarks: (IUCLID)

Chemical Oxygen Demand (COD) : 2,070 mg/g  
Remarks: (IUCLID)

ThOD : 2,200 mg/g  
Remarks: (Lit.)

**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.

**dimethyl sulphoxide:**

Partition coefficient: n-octanol/water : log Pow: -1.35 (68 °F / 20 °C)  
Remarks: Bioaccumulation is not expected.

**acetone:**

Bioaccumulation : Bioconcentration factor (BCF): < 10  
Remarks: Does not bioaccumulate.

**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.

**dimethyl sulphoxide:**

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

**acetone:**

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

: Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

**3,3',5,5'-Tetramethylbenzidine dihydrochloride hydrate:**

Additional ecological information : Discharge into the environment must be avoided.

### Endocrine disrupting properties

No data available

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## 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.

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## SECTION 14. TRANSPORT INFORMATION

### International Regulations

#### IATA-DGR

UN/ID No. : UN 1992  
Proper shipping name : Flammable liquid, toxic, n.o.s. (Methanol)  
Class : 3  
Subsidiary risk : 6.1  
Packing group : III  
Labels : Class 3 - Flammable liquids, Division 6.1 - Toxic substances  
Packing instruction (cargo aircraft) : 366  
Packing instruction (passenger aircraft) : 355

#### IMDG-Code

UN number : UN 1992  
Proper shipping name : FLAMMABLE LIQUID, TOXIC, N.O.S. (Methanol)  
Class : 3  
Subsidiary risk : 6.1  
Packing group : III  
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

UN/ID/NA number : UN 1992  
Proper shipping name : Flammable liquids, toxic, n.o.s.

|                          |                                                                |
|--------------------------|----------------------------------------------------------------|
|                          | (Methanol)                                                     |
| Class                    | : 3                                                            |
| Subsidiary risk          | : 6.1                                                          |
| Packing group            | : III                                                          |
| Labels                   | : Class 3 - Flammable liquids, Division 6.1 - Toxic substances |
| 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

Listed substances in the product are at low enough levels to not be expected to exceed the RQ

### SARA 304 Extremely Hazardous Substances Reportable Quantity

Listed substances in the product are at low enough levels to not be expected to exceed the RQ

### SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

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

|                             |                                        |
|-----------------------------|----------------------------------------|
| <b>SARA 311/312 Hazards</b> | : Fire Hazard<br>Chronic Health Hazard |
|-----------------------------|----------------------------------------|

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| <b>SARA 313</b> | : The following components are subject to reporting levels established by SARA Title III, Section 313: |
|-----------------|--------------------------------------------------------------------------------------------------------|

|          |         |                |
|----------|---------|----------------|
| Methanol | 67-56-1 | >= 50 - < 70 % |
|----------|---------|----------------|

### 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 | >= 50 - < 70 % |
|----------|---------|----------------|

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 SOCM I Intermediate or Final VOC's (40 CFR 60.489):

|                     |         |                |
|---------------------|---------|----------------|
| Methanol            | 67-56-1 | >= 50 - < 70 % |
| dimethyl sulphoxide | 67-68-5 | >= 30 - < 50 % |
| acetone             | 67-64-1 | >= 10 - < 20 % |

**Clean Water Act**

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

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   |
| acetone           | 67-64-1   |
| Hydrogen Peroxide | 7722-84-1 |

**Pennsylvania Right To Know**

|                   |           |
|-------------------|-----------|
| Methanol          | 67-56-1   |
| acetone           | 67-64-1   |
| Hydrogen Peroxide | 7722-84-1 |

**Maine Chemicals of High Concern**

Product does not contain any listed chemicals

**Vermont Chemicals of High Concern**

Product does not contain any listed chemicals

**Washington Chemicals of High Concern**

Product does not contain any listed chemicals

**California Prop. 65**

**WARNING:** This product can expose you to chemicals including Methanol, 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](http://www.P65Warnings.ca.gov). **The components of this product are reported in the following inventories:**

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

**TSCA list**

No substances are subject to a Significant New Use Rule.

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                                                                 |
| 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                                                                                  |

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 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](http://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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