

SAFETY DATA SHEET

Version 6.6 Revision Date 03/02/2024 Print Date 07/14/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : TRI Reagent®

Product Number : T3934 Brand : Sigma

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

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption

(40 CFR Section 720.36). It is the recipient's responsibility to 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

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-

527-3887 CHEMTREC (International) 24

Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 4), H227 Acute toxicity, Oral (Category 3), H301 Acute toxicity, Inhalation (Category 3), H331 Acute toxicity, Dermal (Category 3), H311 Skin corrosion (Category 1B), H314

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Serious eye damage (Category 1), H318

Germ cell mutagenicity (Category 2), H341

Specific target organ toxicity - repeated exposure (Category 2), Nervous system, Kidney, Liver, Skin, H373

Short-term (acute) aquatic hazard (Category 2), H401 Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram	
Signal Word	Danger
Hazard Statements H227 H301 + H311 + H331 H314 H341 H373	Combustible liquid. Toxic if swallowed, in contact with skin or if inhaled. Causes severe skin burns and eye damage. Suspected of causing genetic defects. May cause damage to organs (Nervous system, Kidney, Liver, Skin) through prolonged or repeated exposure. Toxic to aquatic life with long lasting effects.
Precautionary Statements	
P201 P202	Obtain special instructions before use. Do not handle until all safety precautions have been read and
P210	understood. Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P260	Do not breathe mist or vapors.
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
P301 + P310 + P330	protection. IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: 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.
P391	Collect spillage.
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.

P501 Dispose of contents/ container to an approved waste disposal

plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Contact with acids liberates very toxic gas.

Vesicant., Rapidly absorbed through skin., Contact with acids liberates toxic gas.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Synonyms : TRI Reagent™ RNA Isolation Reagent

Component		Classification	Concentration				
Phenol							
CAS-No. EC-No. Index-No. Registration number	108-95-2 203-632-7 604-001-00-2 01-2119471329-32- XXXX	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Muta. 2; STOT RE 2; Aquatic Acute 2; Aquatic Chronic 2; H301, H331, H311, H314, H318, H341, H373, H401, H411 Concentration limits: >= 3 %: Skin Corr. 1B, H314; 1 - < 3 %: Skin Irrit. 2, H315; 1 - < 3 %: Eye Irrit. 2, H319;	>= 50 - < 70 %				
guanidinium, thioc	guanidinium, thiocyanate (1:1)						
CAS-No.	593-84-0	Acute Tox. 4; Skin Corr.	>= 30 - < 50				
EC-No.	209-812-1	1C; Eye Dam. 1; Aquatic	%				
Index-No.	615-030-00-5	Acute 3; Aquatic Chronic					
Registration	01-2120735072-65-	3; H302, H332, H312,					
number	XXXX	H314, H318, H402, H412					

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

First aiders need to protect themselves. Show this material 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.

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In case of skin contact

After contact with skin: rinse out with polyethylene glycol 400 or a mixture of polyethylene glycol 300/ethanol 2:1 and wash with plenty of water. If neither is available wash with plenty of water. Immediately take off contaminated clothing. Call a physician immediately.

In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed

If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

4.2 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

4.3 Indication of any immediate medical attention and special treatment needed No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Nitrogen oxides (NOx)

Sulfur oxides

Combustible.

Vapors are heavier than air and may spread along floors.

Forms explosive mixtures with air on intense heating.

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

5.3 Advice for firefighters

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

5.4 Further information

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



SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, 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. For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 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.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

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

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Do not store near acids.

Storage class

Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated



SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis	
Phenol	108-95-2	TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)	
	Remarks	Not classifiable as a human carcinogen Danger of cutaneous absorption			
		TWA	5 ppm	USA. NIOSH Recommended	
			19 mg/m3	Exposure Limits	
		Potential for dermal absorption			
		С	15.6 ppm	USA. NIOSH Recommended	
			60 mg/m3	Exposure Limits	
		Potential for dermal absorption			
		TWA	5 ppm	USA. Occupational Exposure	
			19 mg/m3	Limits (OSHA) - Table Z-1	
				Limits for Air Contaminants	
		Skin designation			
		PEL	5 ppm 19 mg/m3	California permissible exposure limits for chemical	
				contaminants (Title 8, Article 107)	
		Skin			

Biological occupational exposure limits

biological occupational exposure inines							
Component	CAS-No.	Parameters	Value	Biological specimen	Basis		
Phenol	108-95-2	Phenol	250mg/g creatinin e	Urine	ACGIH - Biological Exposure Indices (BEI)		
	Remarks	End of shift (As soon as possible after exposure ceases)					

8.2 Exposure controls

Appropriate engineering controls

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

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

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Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nitrile rubber

Break through time: 120 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail

sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

protective clothing

Respiratory protection

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. 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.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid Color: red

b) Odor
c) Odor Threshold
d) pH
e) Melting
No data available
No data available
No data available

point/freezing point

) Initial boiling point No data available

and boiling range

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Millipore SigMa g) Flash point 79 °C (174 °F) - closed cup

h) Evaporation rate No data availablei) Flammability (solid, No data available gas)

j) Upper/lower No data available flammability or

k) Vapor pressure 0.47 hPa

explosive limits

I) Vapor density No data availablem) Density No data availableRelative density No data available

n) Water solubility soluble

o) Partition coefficient: No data available n-octanol/water

p) Autoignition temperature

715 °C (1319 °F)

q) Decomposition No data available temperature

r) Viscosity No data available

s) Explosive properties Not classified as explosive.

t) Oxidizing properties none

9.2 Other safety information

Solubility in other Dimethyl sulfoxide. (DMSO) - soluble

solvents

SECTION 10: Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Generates dangerous gases or fumes in contact with: Acids

10.4 Conditions to avoid

Exposure to light. Strong heating.

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10.5 Incompatible materials

Strong oxidizing agents, Strong bases, Strong acids

10.6 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

Acute toxicity estimate Oral - 181.79 mg/kg

(Calculation method)

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of

perforation of the esophagus and the stomach.

Acute toxicity estimate Inhalation - 4 h - 0.8562 mg/l - dust/mist(Calculation method)

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Acute toxicity estimate Dermal - 970.61 mg/kg

(Calculation method)

Skin corrosion/irritation

Remarks: Mixture causes burns.

Serious eye damage/eye irritation

Remarks: Mixture causes serious eye damage.

Risk of blindness!

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

Evidence of genetic defects.

Carcinogenicity

IARC: No ingredient 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 ingredient 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

Mixture may cause damage to organs through prolonged or repeated exposure.

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- Nervous system, Kidney, Liver, Skin

Aspiration hazard

No data available

11.2 Additional Information

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Circulatory collapse, tachypnea, paralysis, Convulsions, Coma., necrosis of mouth and G.I. Tract, Jaundice, respiratory failure, cardiac arrest

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Components

Phenol

Acute toxicity

Acute toxicity estimate Oral - 100.1 mg/kg

(Expert judgment)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 2.1/2.2)

3.1/3.2)

Acute toxicity estimate Inhalation - 4 h - 0.51 mg/l - dust/mist

(Expert judgment)

Symptoms: Irritation, Lung edema

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table

3.1/3.2)

LD50 Dermal - Rat - female - 660 mg/kg

(OECD Test Guideline 402)

No data available

Skin corrosion/irritation

Skin - In vitro study Result: Causes burns. (OECD Test Guideline 431)

Serious eye damage/eye irritation

Eyes - Rabbit Result: Corrosive

(OECD Test Guideline 405)

Remarks: Causes serious eye damage.

Risk of blindness!

Respiratory or skin sensitization

Sensitisation test: - Guinea pig

Result: negative Remarks: (IUCLID)



Germ cell mutagenicity

Suspected of causing genetic defects.

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Chinese hamster ovary cells

Result: positive

Test Type: Mutagenicity (mammal cell test): micronucleus.

Test system: Chinese hamster ovary cells

Result: positive

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

Acute inhalation toxicity - Irritation, Lung edema

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

- Nervous system, Kidney, Liver, Skin

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard

No data available

guanidinium, thiocyanate (1:1)

Acute toxicity

LD50 Oral - Rat - female - 593 mg/kg

(OECD Test Guideline 401)

Symptoms: Possible damages:, Nausea, Vomiting

Inhalation: No data available Dermal: No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Corrosive after 1 to 4 hours of exposure - 4 h

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Remarks: Causes serious eye damage.

Respiratory or skin sensitization

No data available



Germ cell mutagenicity

Test Type: Ames test

Test system: S. typhimurium

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Human lymphocytes

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Chinese hamster fibroblasts

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Acute oral toxicity - Possible damages:, Nausea, Vomiting

Specific target organ toxicity - repeated exposure

Aspiration hazard

No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

Components

Phenol

Toxicity to fish flow-through test LC50 - Onchorhynchus clarki - 8.9 mg/l - 96

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h

(US-EPA)

Toxicity to daphnia

static test EC50 - Ceriodaphnia dubia (water flea) - 3.1 mg/l -

and other aquatic invertebrates

48 h (US-EPA)

Toxicity to algae

static test EC50 - Pseudokirchneriella subcapitata (algae) - 61.1

mg/l - 96 h (US-EPA)

Toxicity to bacteria

static test IC50 - microorganisms - 21 mg/l - 24 h

Remarks: (ECHA)

Toxicity to

semi-static test NOEC - Fish - 0.077 mg/l - 60 d

fish(Chronic toxicity) Remarks: (ECHA)

Toxicity to daphnia and other aquatic

semi-static test NOEC - Daphnia magna (Water flea) - 0.16

mg/l - 16 d invertebrates(Chronic Remarks: (ECHA)

toxicity)

guanidinium, thiocyanate (1:1)

Toxicity to fish static test LC50 - Poecilia reticulata (guppy) - ca. 89.1 mg/l -

96 h

(OECD Test Guideline 203)

Toxicity to daphnia

and other aquatic invertebrates

static test EC50 - Daphnia magna (Water flea) - 42.4 mg/l - 48

(OECD Test Guideline 202)

Toxicity to algae static test ErC50 - Desmodesmus subspicatus (green algae) -

> 130 mg/l - 72 h (DIN 38412)

static test EC50 - activated sludge - > 185 mg/l - 28 h Toxicity to bacteria

Remarks: (ECHA)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

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

DOT (US)

UN number: 2922 Class: 8 (6.1) Packing group: II

Proper shipping name: Corrosive liquids, toxic, n.o.s. (guanidinium, thiocyanate (1:1),

Reportable Quantity (RQ): 2000 lbs Poison Inhalation Hazard: No

IMDG

UN number: 2922 Class: 8 (6.1) Packing group: II EMS-No: F-A, S-B Proper shipping name: CORROSIVE LIQUID, TOXIC, N.O.S. (guanidinium, thiocyanate

(1:1), Phenol)

Marine pollutant : yes

IATA

UN number: 2922 Class: 8 (6.1) Packing group: II

Proper shipping name: Corrosive liquid, toxic, n.o.s. (quanidinium, thiocyanate (1:1),

Phenol)

SECTION 15: Regulatory information

SARA 302 Components

Phenol CAS-No. **Revision Date** 108-95-2 2007-07-01

SARA 313 Components

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

Section 313:

CAS-No. Revision Date Phenol 108-95-2 2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

CAS-No. **Revision Date** Phenol 108-95-2 2007-07-01

Pennsylvania Right To Know Components

Phenol Revision Date CAS-No. 108-95-2 2007-07-01

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SECTION 16: Other information

Further information

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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