

**Section-1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION
AND OF THE COMPANY/UNDERTAKING**

1.1 Identification of the substance/preparation:

Commercial name: TRI ETHYLENE GLYCOL (TEG)
Chemical name: TRI ETHYLENE GLYCOL (TEG) C6-H14-O4
Synonyms: Trigen, 2, 2'-(ethylenedioxy)diethanol, Trigol.

1.2 Use of the substance /preparation:

Solvent to dissolve nitrocellulose and various gums and resins, Unsaturated polyester resin Co- monomer, Cleaning agent in Polyester Industry, Dehydration of Natural gas, Plasticizers, Intermediate, Freezing point depression in Heat Transfer fluids.

Following uses of TEG are not supported:

1. Any usage where TEG remains as non-reacted component of a formulation for direct (internal/external) contact with humans / animals.
2. As component of Heat transfer fluids in closed loop heating applications for high temperature service

1.3 MANUFACTURER & SUPPLIER: Reliance Industries Limited

Emergency Coordination Centre contact details:

Hazira Mfg. Division Village Mora, Dist Surat, Gujarat, India	SSM Office	+91 2613535050/+912613535056 +912616635050/+912616635056
Dahej Mfg. Division Po Dahej 392130 Taluka: Vagra Dist: Bharuch, Gujrat, India	SSM Office	+91 2641 616021 /+91 2641 616022

SSM: Site Shift Manager, Mfg.: Manufacturing

Section 2 – HAZARD IDENTIFICATION

2.1 Classification of the substance/preparation: Hazard class and category code.

GHS Category:

Health	Environmental	Physical
Acute Toxicity Category: NA	Aquatic Toxicity – Category- NA	Flammable – Category NA

NA: Not available

GHS Category table for reference:

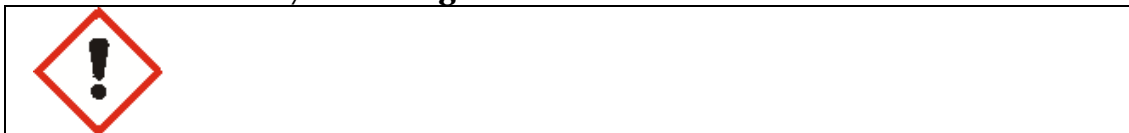
Study/hazard statement	Category 1	Category 2	Category 3	Category 4	Category 5
Acute Oral LD50	≤ 5 mg/kg Fatal if swallowed	> 5 ≤ 50 mg/kg Fatal if swallowed	> 50 ≤ 300 mg/kg Toxic if swallowed	> 300 ≤ 2000 mg/kg Harmful if swallowed	> 2000 ≤ 5000 mg/kg May be harmful if swallowed
Acute Dermal LD50	≤ 50 mg/kg Fatal in contact with skin	> 50 ≤ 200 mg/kg Fatal in contact with skin	> 200 ≤ 1000 mg/kg Toxic in contact with skin	> 1000 ≤ 2000 mg/kg Harmful in contact with skin	> 2000 ≤ 5000 mg/kg May be harmful in contact with skin
Acute Inhalation Dust LC50 Gases LC50 Vapours LC50	≤ 0.05 mg/L ≤ 100 ppm/V ≤ 0.5 mg/L Fatal if inhaled	> 0.05 ≤ 0.5 mg/L > 100 ≤ 500 ppm/V > 0.5 ≤ 2.0 mg/L Fatal if inhaled	> 0.5 ≤ 1.0 mg/L > 500 ≤ 2500 ppm/V > 2.0 ≤ 10 mg/L Toxic if inhaled	> 1.0 ≤ 5 mg/L > 2500 ≤ 20000 ppm/V > 10 ≤ 20 mg/L Harmful if inhaled	See footnote below this table
Flammable liquids	Flash point < 23 degrees C and initial boiling point ≤ 35 degrees C. Extremely flammable liquid and vapour	Flash point < 23 degrees C and initial boiling point > 35 degrees C. Highly flammable liquid and vapour	Flash point ≥ 23 degrees C ≤ 60 degrees C. Flammable liquid and vapour	Flash point > 60 degrees C ≤ 93 degrees C. Combustible liquid	Not Applicable

Note: Gases concentration are expressed in parts per million per volume (ppmV).
 NOTE 1: Category 5 is for mixtures which are of relatively low acute toxicity but which under certain circumstances may pose a hazard to vulnerable populations. These mixtures are anticipated to have an oral or dermal LD50 value in the range of 2000-5000 mg/kg bodyweight or equivalent dose for other routes of exposure. In light of animal welfare considerations, testing in animals in Category 5 ranges is discouraged and should only be considered when there is a strong likelihood that results of such testing would have a direct relevance for protecting human health.
 NOTE 2: These values are designed to be used in the calculation of the ATE for classification of a mixture based on its ingredients and do not represent test results. The values are conservatively set at the lower end of the range of Categories 1 and 2, and at a point approximately 1/10th from the lower end of the range for Categories 3 – 5.

GHS Category table for reference: Continued

Study/hazard statement	Category 1	Category 2	Category 3
Eye Irritation	Effects on the cornea, iris or conjunctiva that are not expected to reverse or that have not fully reversed within 21 days. Causes severe eye damage.	2A: Effects on the cornea, iris or conjunctiva that fully reverse within 21 days. Causes severe eye irritation. 2B : Effects on the cornea, iris or conjunctiva that fully reverse within 7 days. Causes eye irritation.	Not applicable
Skin Irritation	Destruction of skin tissue, with sub categorization based on exposure of up to 3 minutes (A), 1 hour (B), or 4 hours (C). Causes severe skin burns and eye damage.	Mean value of ≥2.3 > 4.0 for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed); inflammation that persists to end of the (normally 14-day) observation period. Causes skin irritation.	Mean value of ≥1.5 < 2.3 for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed). Causes mild skin irritation.
Environment: Acute Toxicity Category	96 hr LC50 (fish) ≤ 1 mg/L 48 hr EC50 (crustacea) ≤ 1 mg/L, 72/96 hr ErC50 (aquatic plants) ≤ 1 mg/L Very toxic to aquatic life	96 hr LC50 (fish) >1 ≤ 10 mg/L 48 hr EC50 (crustacea) >1 ≤ 10 mg/L 72/96 hr ErC50 (aquatic plants) >1 ≤ 10 mg/L Toxic to aquatic life	96 hr LC50 (fish) >10 ≤ 100 mg/L 48 hr EC50 (crustacea) >10 ≤ 100 mg/L 72/96 hr ErC50 (aquatic plants) >10 ≤ 100 mg/L Harmful to aquatic life
Flammable Aerosol	Extremely flammable aerosol	Flammable aerosol	Not Applicable
Flammable solids	Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire and (b) burning time < 45 seconds or burning rate > 2.2 mm/second Using the burning rate test, metal powders that have burning time ≤ 5 minutes Flammable solid	Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire for at least 4 minutes and (b) burning time < 45 seconds or burning rate > 2.2 mm/second Using the burning rate test, metal powders that have burning time > 5 ≤ 10 minutes Flammable solid	Not Applicable
Flammable gases	Gases, which at 20 degrees C and a standard pressure of 101.3 kPA: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Extremely flammable gas	Gases, other than those of category 1, which, at 20 degrees C and a standard pressure of 101.3 kPA, have a flammable range while mixed in air. Flammable gas	Not Applicable

GHS Label: GHS07: Warning.



Signal word: Warning. Due to DEG content.

Details of statements:

Hazard Statements	H 302: Harmful if swallowed. H361: Suspected of damaging fertility or the unborn child H372: Causes damage to organs through prolonged or repeated exposure.
Precautionary Statement Prevention	P102: Keep out of reach of children. P103: Read label before use. P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P260: Do not breathe dust/fume/gas/mist/vapors/spray. P264: Wash ... thoroughly after handling. P270: Do not eat, drink or smoke when using this product. P281: Use personal protective equipment as required. P264: Wash exposed <i>parts of the body</i> thoroughly after handling. P270: Do not eat, drink or smoke when using this product.
Precautionary Statement Response	P101: If medical advice is needed, have product container or label at hand. P308+P313: IF exposed or concerned: Get medical advice/attention. P314: Get medical advice/attention if you feel unwell. P301+P312: IF SWALLOWED. Call a POISON CENTER or doctor/physician if you feel unwell. P330 Rinse mouth.
Precautionary Statement Storage	No storage statements
Precautionary Statement Disposal	Follow local regulation

Hazard ratings:

NFPA HAZARD CODES	RATINGS SYSTEM
HEALTH: 1	0 = No Hazard
FLAMMABILITY: 1	1 = Slight Hazard
INSTABILITY: 0	2 = Moderate Hazard
	3 = Serious Hazard
	4 = Severe Hazard

Data Reference: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

2.2 Information pertaining to particular dangers for human:

Irritating if inhaled. Irritating to eyes, skin and respiratory organs.

2.3 Information pertaining to particular dangers for the environment: NA

2.4 Other adverse effects:

Flammable and easily ignitable substance. Mixtures keep above ground and after ignition they spread fast into far distances. Ignition possible when exposed to hot surfaces, sparks, naked flames and by electrostatic discharges too.

Route of entry:

Those with history of lung diseases, or skin problems may be more susceptible to the effect of this material.

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
Yes	Yes	Yes	Yes	Yes

DATA REFERENCE: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

Health hazards:

Source	NTP listed?	IARC cancer review group?	OSHA Regulated?
Carcinogenicity	No	No	No

DATA REFERENCE: Toxic release inventory (TRI) basis of Occupational Safety and Health Administration (OSHA) carcinogen, National Toxicological program (NTP), International Agency for Research on Cancer (IARC), <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

Section 3 – COMPOSITION & INFORMATION ON INGREDIENTS

Ingredients / Hazardous	CAS No.	EC No.	Percentage
Tri Ethylene Glycol/Yes	112-27-6	203-953-2	99.30% min.
Di Ethylene Glycol/Yes	111-46-6	203-872-2	*0.35% max.
Acidity (As Acetic Acid) /Yes	64-19-7	200-580-7	0.01% max.
Mono Ethylene Glycol/Yes	107-21-1	203-473-3	*0.35% (wt.) max.

Note: Total contents of MEG+DEG=*0.35%.

Section 4 – FIRST AID MEASURES

4.1 General advice

IMMEDIATE MEDICAL ATTENTION IS REQUIRED AFTER INHALATION OR AFTER SWALLOWING.

In case of health troubles or doubts, seek medical advice immediately and show this (Material) Safety Data Sheet.

4.2 Inhalation

Move patient to fresh air. Monitor for respiratory distress. If cough or difficulty breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Administer oxygen and assist ventilation as required.

4.3 Skin contact

Remove contaminated clothing and jewelry and place them in bag. Wash exposed areas with soap and water for 10 to 15 minutes with gentle sponging to avoid skin breakdown.

4.4 Eye contact

Remove contact lenses and irrigate exposed eyes with copious amounts of room temperature 0.9% saline or water for at least 15 minutes.

4.5 Swallowing

If patient is conscious and without convulsion, immediately try to induce vomiting. Never give anything by mouth to an unconscious person, just put patient into a stabilised position. Seek medical advice immediately.

SYMPTOMS AND EFFECTS: nausea, vomiting, convulsions, irregular heartbeat.

Section 5 – FIRE FIGHTING MEASURES

5.1 Suitable extinguishing media

Water (fog or fine spray), Dry chemical, carbon dioxide, Foam. Alcohol resistant foams (ATC type) are preferred.

5.2 Extinguishing media to be avoided

Water (in direct stream mode).

5.3 Caution about specific danger in case of fire and fire-fighting procedures

Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

5.4 Special protective equipment for fire-fighters

Wear full protective fire-resistant clothing and self-contained breathing apparatus.

Section 6 – ACCIDENTAL RELEASE MEASURES

6.1 Person-related safety precautions

Isolate hazard area. Evacuate all unauthorized personnel not participating in rescue operations from the area. Avoid entry into danger area. Remove all possible sources of ignition. Stop traffic and switch off the motors of the engines. Do not smoke and do not handle with naked flame. Use explosion-proof lamps and non-sparking tools. Avoid contact with the substance. Apply recommended full protective personal equipment. When escaping from the contaminated area, wear mask with cartridge against organic vapours. In case of general average, evacuate personnel from danger area.

6.2 Precautions for protection of the environment

Prevent from further leaks of substance.

6.3 Recommended methods for cleaning and disposal

Soak up residues with compatible porous material and forward for disposal in closed containers. Dispose off under valid legal waste regulations.

Section 7 – HANDLING AND STORAGE

7.1 Information for safe handling

Observe all fire-fighting measures (no smoking, do not handle with naked flame and remove all possible sources of ignition). Take precautionary measures against static discharges. Wear recommended personal protective equipment and observe instructions to prevent possible contact of substance with skin and eyes and inhalation. Avoid leak to environment.

7.2 Information for storage

Storerooms should meet the requirements for the fire safety of constructions and electrical facilities and should be in conformity with valid regulations. Store in cool

well-ventilated place with effective exhaust, away from heat and all sources of ignition. Store in tightly closed container. Do not store together with oxidizing agents.

Take precautionary measures against static discharges. Avoid leak to environment.

7.3 Information for specific use

Not applicable.

Section 8 – EXPOSURE CONTROL & PERSONAL PROTECTION

8.1 Occupational Exposure Limits: NA

NA: Data not available

8.2 Occupational exposure controls

Collective protection measures: General and local ventilation, effective exhaust.

Individual protection measures: Personal protective equipment (PPE) for the protection of eyes, hands and skin corresponding with the performed labour has to be kept at disposition for the employees. In the case of continuous use of this equipment during constant work, safety breaks have to be scheduled, if the PPE-character requires this. All PPE have to be kept in disposable state and the damaged or contaminated equipment has to be replaced immediately.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

HANDS	EYES	BODY	RESPIRATORY
			

Respiratory protection: If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-face piece respirator, airline hood, or full-face piece self-contained breathing apparatus. protective mask with canister A (brown coloured, protecting against organic vapours), self-contained breathing apparatus.

Eye protection: Use chemical safety goggles and/or a full-face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Hand protection: Wear gloves of impervious material.

Body protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Protective coverall antistatic design recommended, impervious when handling big amounts (nitrile rubber), sealed leather footwear (free from synthetic adhesives)

Hygiene Measures: Wash hands, forearms and face thoroughly after handling. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8.3 Environmental exposure controls

Proceed in accordance with valid air and water legislative regulations.

Engineering measures: Use only with adequate ventilation. If user operations generate dust, fumes, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended limits. The engineering controls also need to keep vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless Syrupy liquid
Odour	Odorless
Solubility in water	Miscible
Relative Density (H ₂ O=1)	1.12
Boiling Point °C	280 - 300 °C
Melting Point °C	-7.0 °C
Relative Vapour Density (Air=1)	NA
Flash point °C	177 °C (Open cup)
Auto ignition °C	371 °C
Vapour pressure (mmHg) @ 25 °C	1.32*10 ⁻³
Explosive limits in air % by volume	Not explosive
pH	NA
Viscosity cSt @20 °C	43
Pour point	NA
Evaporation rate (water=1)	NA
Octanol/water partition coefficient log Kow	-1.98
% volatile	NA

NA: NOT AVAILABLE

Data reference: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>

Section 10 – CHEMICAL STABILITY AND REACTIVITY INFORMATION

10.1 Conditions to avoid

Prolonged exposure of containers or tank cars to heat or fire may cause the material to expand with possible container rupture

10.2 Material to avoid

Very dangerous fire hazard when exposed to oxidizers

10.3 Hazardous decomposition products

Thermal decomposition generates carbon monoxide and carbon dioxide.

Polymerization: Polymerization occurs if heated in sunlight or presence of air; reaction is exothermic.

Section 11 – TOXICOLOGICAL INFORMATION

11.1 Acute effects

Product irritates eyes and skin.

Acute toxicity data:

Parameter	Route	Species	Values	Exposure period
LD50	Oral	Rat	17000 mg/kg	Not applicable
LD50	Dermal	Rabbit	22460 mg/kg	Not Known
LC50	Inhalation	Rat	>3.9mg/l	4 h

Data reference: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>

11.2 Repeated dose toxicity

Chronic effects cause irritation

11.3 Sensitization

May cause skin irritation.

11.4 CMR effects (carcinogenetic, mutagenicity, toxicity for reproduction)

Not classified as CMR

11.5 Toxicokinetics, metabolism, distribution

Not Known.

Section 12 – ECOLOGICAL INFORMATION

12.1 Eco toxicity data:

Parameter	Route	Species	Values	Exposure period
LC50	Inhalation	Bluegill Fish	61000 ppm	96 Hours

Data reference: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>

12.2 Mobility: Expected to have high mobility in soil.

12.3 Persistence and degradability

Substance is biodegradable

12.4 Bio accumulative potential

Bioaccumulation in aquatic organism is low. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions.

12.5 Results of PBT assessment Persistence and Degradation: No information

12.6 Other adverse effects

Environmental Fate: Tri Ethylene Glycol is expected to have high mobility in soil, Volatilization from water surfaces is not expected.

Section 13– DISPOSAL CONSIDERATION

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations. This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

13.1 Recommended disposal methods for the substance / preparation

Product reuse or disposal in accordance with valid waste legislative regulations.

13.2 Recommended disposal methods for contaminated packaging

Product is transferred in flexi bags in containers or in drums or in containers

13.3 Waste management measures that control exposure of humans and environment

Proceed in accordance with valid health, air and water legislative regulations.

13.4 Waste regulation

Follow local regulation. European Union Directive 2006/12/ES on waste.

Section 14– TRANSPORT INFORMATION

International Transport Regulation:

ADR/RID (Road/Rail), IMDG (Sea) and ICAO/IATA (Air)

The product is not regulated

14.1

Proper Shipping Name: Not listed

Hazard Class: Not Listed

UN Number: Not Listed

14.2 Special transport precautionary measures
Not applicable.

Section 15 – REGULATORY INFORMATION

(M)SDS format on a 16 Section based on guidance provided in:

Indian Regulation:

Manufacture, Storage and Import of Hazardous Chemicals Rule, 1989.
The Factories Act 1948

International Regulations:

European SDS Directive
ANSI MSDS Standard
ISO 11014-1 1994
WHMIS Requirements

United States

Hazard Communication Standard

Canada

Hazardous Products Act and Controlled Products Regulations

Europe

Dangerous Substance and Preparations Directives

Australia

National Model Regulations for the Control of Workplace Hazardous Substances

The Globally Harmonized System of Classification and Labeling of Chemicals endorsed by The UN Economic and Social Council

Section 16 – OTHER INFORMATION

Training instructions

Personnel handling the product has to be acquainted demonstrably with its hazardous properties, with health and environmental protection principles related to the product and first aid principles.

Tremcard details/Reference: Refer Section 14

Local bodies involved (Applicable only with in India): Local District Authorities and Local Crisis Group

Sources of data used to compile the (Material) Safety Data Sheet

Data compilation reference: National Institute for Occupational Safety and Health guide to chemical hazards and International Chemical Safety Cards (WHO/IPCS/ILO) and <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>, <http://webnet3.oecd.org/eChemPortal/Results2.aspx?SubstanceId=169630>, . <http://www.cdc.gov/niosh/npg/npg0049.html>

(M)SDS Revision Status:

Date of Revision	Revised Sections	Supersedes
Sep. 01, 2009	Format revised	Feb. 01, 2008
Sep. 01, 2011	Section 4 (4.3)	Sep. 01, 2009
Aug. 01, 2013	Section 2 NFPA Hazard statement	Sep. 01, 2011
July 27, 2016	Format Revision	Aug. 01, 2013

October 18, 2019	Section 1.3 Contact Detail Section 2 Hazard and Precautionary Statements Section 4 First Aid Measures Section 5 Fire Fighting Measures Section 9 Physical and Chemical Properties Section 11 Toxicological Information	July 27, 2016
------------------	---	---------------

This (M)SDS is issued by the Safety and Operational Risk, Reliance Industries Limited

Contact Details: For any enquiry/comment regarding this (Material) Safety Data Sheet, kindly contact the Centre for HSE Excellence at HSE.ExcellenceCentre@ril.com

Disclaimer:

Reliance Industries Ltd, believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.

The information provided herein relates only to the specific product designated and may not be applicable where such product is used in combination with any other materials or in any process. Company will not take any warrantee if this product is used in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of RIL, expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

End of (M)SDS