RCT

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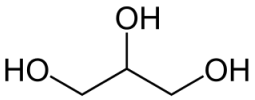
Safety Data Sheet

Glycerol (Glycerin)



I IDENTIFICATION

Synonyms	**1,2,3-trihydroxypropane, 1,2,3-propanetriol, glycerin(e), glycyl alcohol**
CAS #	**56-81-5**
Europe EC#	**200-289-5**
Material Use	**manufacture of resins, gums, inks, pharmaceuticals; humectant, etc.**

EMERGENCY INFORMATION		
In the U.S.A.	***Call CHEMTREC***	***(800) 424-9300***
In Canada	***Call CANUTEC (collect)***	***(613) 996-6666***

II HAZARD IDENTIFICATION

GHS Class (Category) ***NOT HAZARDOUS***

Signal Words ***NONE***

Hazard Statements *NONE*

III COMPOSITION

	CAS NUMBER	%	TLV ppm / mg/m^3	LD_{50} (*mg/kg*) ORAL	LD_{50} (mg/kg) SKIN	LC_{50} ppm INHALATION
1,2,3-Trihydroxypropane	56-81-5	>99%	2.7 / 10	4090	>10,000	150

IV FIRST AID

SKIN: Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered. Seek medical help promptly if there is persistent itching or redness in the affected area.

EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.

INHALATION: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If victim's breathing stops, administer artificial respiration and seek medical aid promptly.

INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

NOTE: Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is far greater than the risk of poisoning through absorption of this non-toxic product. The stomach should only be emptied under medical supervision, after the installation of an airway to protect the lungs.

V FLAMMABILITY & FIRE-FIGHTING

Flash Point	199°C / 390°F (closed cup)
Autoignition Temperature	370°C / 698°F[1], 429°C / 804°F[1] – *decomposes at 290°C / 554°F; autoignition of decomp. products*
Flammable Limits	not known
Combustion Products	carbon monoxide, nitrogen oxides, smoke, acrolein, part oxidised hydrocarbon fragments
Firefighting Precautions	alcohol foam best, dry chemical, water fog; water jet causes frothing; firefighters to wear SCBA
Static Discharge	cannot accumulate a static charge

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VI ACCIDENTAL RELEASE MEASURES

Leak Precaution	dyke to control spillage and prevent environmental contamination
Handling Spill	recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep, shovel & store in closed containers for disposal

VII HANDLING & STORAGE

Glycerol absorbs moisture from air. Store and use in a dry environment, away from oxidising agents. Never cut, drill, weld or grind on this container, empty or full. *Always replace drum, pail or IBC cap prior to moving the container!*

Avoid generating or breathing product mist. If product mist forms in use, install adequate ventilation to clear workplace air. Avoid prolonged contact with skin & wash work clothes frequently. An eye bath should be available near the workplace.

NOTE: Glycerol is very sweet. Keep away from children & animals!

VIII EXPOSURE CONTROL & PERSONAL PROTECTION

ACGIH PEL-TWA	10mg/m^3 (*total dust*), 5mg/m^3 (*respirable fraction)*	ACGIH STEL	not listed
OSHA PEL-T-TWA	15mg/m^3 (*total dust*), 5mg/m^3 (*respirable fraction)*	OSHA STEL	not listed
Ventilation	no special mechanical ventilation required		
Hands	no special protective gloves required – *butyl & neoprene are impervious; other types also protect*		
Eyes	safety glasses with side shields – *always protect eyes!*		
Clothing	no special protective clothing required		

IX PHYSICAL AND CHEMICAL PROPERTIES

NOTE: *for Flash Point, Autoignition Temp, & Flammable Limits see Part 5.*

Odour & Appearance	clear, colourless, odourless, viscous, hygroscopic liquid with a sweet taste
Odour Threshold	not known – odourless
Vapour Pressure	0.0023mmHg / 0.00031kPa (20ºC/ 68ºF)
Evaporation Rate (*Butyl Acetate = 1*)	not considered volatile
Vapour Density (air = 1)	3.2
Decomposition Temperature	290ºC / 554ºF – *may polymerize above 150ºC/300ºF*
Boiling Point	decomposes at 290ºC / 554ºF without boiling
Melting Point	18ºC / 64ºF – ***NOTE:*** *glycerol supercools readily; may not freeze until below 0ºC / 32ºF*
Specific Gravity	1.264 (20/20ºC)
Water Solubility	complete
- in other solvents	alcohols, glycols; insoluble in hydrocarbons, chlorinated hydrocarbons and ethers
Log $P_{o/w}$ (*Octanol/H_2O Partition Coefficient*)	-2.6
Viscosity	1490centipoise (20ºC/68ºC)
pH	none – *does not yield hydrogen ions in solution*
Conversion Factor	1ppm = 3.76mg/m^3
Molecular Weight	92grams per mole

X REACTIVITY

Dangerously Reactive With	strong oxidising agents (chromium trioxide, potassium chlorate, or potassium permanganate) may cause an explosion
Also Reactive With	acetic anhydride
Chemical Stability	stable, but may polymerise above 150ºC/300ºF; decomposition above 290ºC/554ºF
Decomposes in Presence of	high temperatures
Decomposition Products	toxic acrolein fumes may form on thermal decomposition
Mechanical Impact	not sensitive

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XI TOXICITY INFORMATION

i. *ACUTE EXPOSURE*

Skin Contact	softens skin; not irritating[1]
Skin Absorption	slight, no toxic effects likely by this route
Eye Contact	may be mildly irritating; "not irritating" (*2 reports*)[1], "slightly irritating" (*2 reports*)[1]
Inhalation	mist may be slightly irritating but expected to cause no damage
Ingestion	little to no effect; *very large doses – ½ litre – may damage red cells & cause bloody urine – brief effect because glycerol is very rapidly metabolised – not a route of industrial exposure*
LD_{50} (oral)	12,600 & 27,000[1], 27,200mg/kg (rat), 4090, 23,000[1] & 38,000mg/kg (mouse), 27,000mg/kg (rabbit), 7750 & 10,000-11,500mg/kg (guinea pig)[1]
LD_{50} (skin)	>10,000, 21,900 & 23,000mg/kg (rabbit), 56,880mg/kg (guinea pig)[1]
LC_{50} (inhalation)	38ppm/143mg/m^3 (rat), 2750mg/m^3 (rat – *achieved by bubbling through 200°C glycerol*)[1] (*Very low vapour pressure plus high viscosity makes exposure to glycerol by inhalation highly unlikely.*)

ii. *CHRONIC EXPOSURE*

General	little to no effect
Sensitising	not a sensitiser[1]
Carcinogen/Tumorigen	not known to be a tumorigen or a carcinogen in humans or animals[1]
Reproductive Effect	no known effect on humans or animals[1]
Mutagen	not known to be a mutagen or teratogen in humans or animals[1]
Synergistic With	not known
NOAEL (reproduction)	2000mg/kg/day (rat – *two generations*)[1]

XII ECOLOGICAL INFORMATION

Bioaccumulation	readily metabolised (biological ½-life 30-40 min); cannot bioaccumulate
Biodegradation	biodegrades readily & ***very*** rapidly in the presence of oxygen; 94% & 98% in 24hours[1]
Abiotic Degradation	reacts with atmospheric hydroxyl (OH) radicals; its estimated ½-life in air is 7 hr
Mobility in soil, water	water soluble; moves readily through soil & the water column; *rapid biodegradation limits movement*
Aquatic Toxicity	***data below indicates extremely low aquatic toxicity***
LC_{50} (Fish 96 hr)	54,000[1], 51,000-57,000mg/litre (Oncorhynchus mykiss), >10,000mg/litre (Leuciscus idus & Idus idus, 48hr) 885mg/litre (Pimephelas promelas)[1]
EC_{50} (Crustacea, 48hr)	1995mg/litre (Daphnia magna)[1], >10,000mg/litre (Daphnia magna – *24 hours*)[1]
TGK 5% (Crustacea, 48hr)	>10,000mg/litre (Chilomonas paramecium & Uronema parduczi)
EC_{50} (Algae)	46,000mg/litre (Braciomonas submarina) – *but some algae grow better with glycerol . . .*
TGK 3%* (Algae)	>10,000mg/litre (Scenedesmus quadricauda)[1], 2900mg/litre (Microcistis aeruginosa)[1]
TGK 5%* (Flagellates)	>10,000mg/litre (Chilomonas paramecium & Uronema parduczi), 3200mg/litre (Enterosyphon sulcatum)
EC_0 (Bacteria)	>10,000mg/litre (Pseudomonas putida)[1] – *not an EC_{50}, but an EC_0; no inhibition seen*
TGK 3%* (Bacteria)	>10,000mg/litre (Pseudomonas putida)

TGK is the threshold concentration for 3% or 5% decrease in optical density.

XIII DISPOSAL CONSIDERATIONS

Waste Disposal	**do not flush to sewer**; mix with flammable waste, incinerate in approved facility with flue gas monitoring & scrubbing; local regulations may permit disposal in sanitary landfill; biological treatment is an excellent option
Containers	**Drums** should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use. **Pails** must be vented and thoroughly dried prior to crushing and recycling. **IBCs** (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5 years). Steel containers must be inspected, pressure tested & recertified every 5 years. ***Warning: never cut, drill, weld or grind on or near this container, even if empty.***

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XIV TRANSPORT INFORMATION

USA 49 CFR & Canada TDG

Product Identification Number	**UN – not regulated for transport**
Shipping Name	**not regulated for transport**
Classification	**not regulated for transport**
Marine Pollution	***not a marine pollutant***
ERAP Required	***No***
Reportable Quantity (RQ)	***none***

XV REGULATIONS

Canada DSL	**on inventory**
U.S.A. TSCA	**ACTIVE**
Europe EINECS	**on inventory**

This very common substance is on most national chemical inventories.

U.S.A. Regulations:

Allowable Tolerances: Residues resulting from the use of the following substances as either an inert or an active ingredient in a pesticide chemical formulation, including antimicrobial pesticide chemicals, are exempted from the requirement of a tolerance under FFDCA section 408, if such use is in accordance with good agricultural or manufacturing practices. Glycerin is included on this list.

OSHA Standards: Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 15 mg/cu m. /Mist, total dust/ Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 5 mg/cu m. /Mist, respirable fraction/ Vacated 1989 OSHA PEL TWA 10 mg/cu m is still enforced in some states. /Mist, total/ Vacated 1989 OSHA PEL TWA 5 mg/cu m is still enforced in some states. /Mist, resp/

NIOSH Recommendations: NIOSH concluded that the documentation cited by OSHA was inadequate to support the proposed PEL (as an 8 hour TWA) of 10 mg/cu m for glycerine (mist).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 10 mg/cu m. /Glycerin mist/ Excursion Limit Recommendation: Excursions in worker exposure levels may exceed 3 times the TLV-TWA for no more than a total of 30 minutes during a work day, and under no circumstances should they exceed 5 times the TLV-TWA, provided that the TLV-TWA is not exceeded. /Glycerin mist/ 2011 Notice of Intended Changes: These substances, with their corresponding values and notations, comprise those for which (1) a limit is proposed for the first time, (2) a change in the Adopted value is proposed, (3) retention as an NIC is proposed, or (4) withdrawal of the Documentation and adopted TLV is proposed. In each case, the proposals should be considered trial values during the period they are on the NIC. These proposals were ratified by the ACGIH Board of Directors and will remain on the NIC for approximately one year following this ratification. If the Committee neither finds nor receives any substantive data that changes its scientific opinion regarding an NIC TLV, the Committee may then approve its recommendation to the ACGIH Board of Directors for adoption. If the Committee finds or receives substantive data that change its scientific opinion regarding an NIC TLV, the Committee may change its recommendation to the ACGIH Board of Directors for the matter to be either retained on or withdrawn from the NIC. Substance: Glycerin, mist (56-81-5); Withdraw adopted Documentation and TLV.

Atmospheric Standards: This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non-air quality health and environmental impact and energy requirements. Glycerol is produced, as an intermediate or a final product, by process units covered under this subpart.

FIFRA Requirements: Residues resulting from the use of the following substances as either an inert or an active ingredient in a pesticide chemical formulation, including antimicrobial pesticide chemicals, are exempted from the requirement of a tolerance under FFDCA section 408, if such use is in accordance with good agricultural or manufacturing practices. Glycerin is included on this list. As the federal pesticide law FIFRA directs, EPA is conducting a comprehensive review of older pesticides to consider their health and environmental effects and make decisions about their future use. Under this pesticide reregistration program, EPA examines health and safety data for pesticide active ingredients initially registered before November 1, 1984, and determines whether they are eligible for reregistration. In addition, all pesticides must meet the new safety standard of the Food Quality Protection Act of 1996. Pesticides for which EPA had not issued Registration Standards prior to the effective date of FIFRA, as amended in 1988, were divided into three lists based upon their potential for human exposure and other factors, with List B containing pesticides of greater concern and List D pesticides of less concern. Glycerol is found on List D. Case No: 4044; Case Status: No products containing the pesticide are actively registered ... The case /is characterized/ as "cancelled." Under FIFRA, pesticide producers may voluntarily cancel their registered products. EPA also may cancel pesticide registrations if registrants fail to pay required fees or make/meet certain reregistration commitments, or if EPA reaches findings of unreasonable adverse effects.; Active ingredient (AI): Glycerol; AI Status: The active ingredient is no longer contained in any registered pesticide products ... "cancelled."

FDA Requirements: Substances migrating to food from paper and paperboard products used in food packaging that are generally recognized as safe for their intended use, within the meaning of section 409 of the Act: Glycerin is included on this list. Glycerin used as a multiple purpose GRAS food substance in food for human consumption is generally recognized as safe when used in accordance with good manufacturing practice. Glycerin used as a general purpose food additive in animal drugs, feeds, and related products is generally recognized as safe when used in accordance with good manufacturing or feeding practice.

SARA 311/312

Physical Hazards

☐Explosive
☐Flammable
☐Oxidizer (liquid, solid or gas)
☐Self-reactive
☐Pyrophoric (liquid or solid)
☐Pyrophoric Gas
☐Self-heating
☐Organic peroxide
☐Corrosive to metal
☐Gas under pressure (compressed gas)
☐In contact with water emits flammable gas
☐Combustible Dust
☐Hazard Not Otherwise Not Otherwise Classified

Chemical Hazards

☐Acute toxicity (any route of exposure)
☐Skin corrosion or irritation
☐Serious eye damage or eye irritation
☐Respiratory or skin sensitization
☐Germ cell mutagenicity
☐Carcinogenicity
☐Reproductive toxicity
☐Specific target organ toxicity (single or repeated ex.)
☐Aspiration hazard
☐Simple Asphyxiant
☐Hazard Not Otherwise Classified

PLEASE ENSURE THAT THIS MSDS IS GIVEN TO, AND EXPLAINED TO PEOPLE USING THIS PRODUCT.

EMERGENCY INFORMATION: Call CHEMTREC (800) 424-9300

XVI OTHER INFORMATION

Date of Preparation **September 2002**
Date of Revision **June 2005, September 2007, September 2010, April 2013, March 2016**
February 2019 (D. Moreno) March 2022 (HS&E) January 2025 Tim Zatorski

Prepared for Rierden Chemical & Trading Company, by **Peter Bursztyn**
With data from Registry of Toxic Effects of Chemical Substances (RTECS - USA), Hazardous Substance Data Base (HSDB - USA), Cheminfo (CCOHS - Canada), OSHA website, European Chemicals Agency (EChA) dossiers & other sources (below if used), as required/available.

(1) European Chemicals Agency (EChA) dossier on Glycerol: *http://echa.europa.eu/registration-dossier/-/registered-dossier/14481/1*

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