



Silver Fern Chemical, Inc.
SAFETY DATA SHEET
Triethanolamine 99%

USA – According to the OSHA Hazard Communications Standard (HCS) (HAZCOM 2012).

SECTION 1: IDENTIFICATION

Product name: Triethanolamine 99%

Other means of identification: TEA 99%

Recommended use: for industrial use.

Manufacturer or supplier identification

Silver Fern Chemical, Inc.
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SECTION 2: HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200): not a hazardous substance or mixture.

Other hazards: no data available.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: alkanolamine

Substance or mixture: this product is a substance.

Component	CAS Number	Concentration (WT%)
Triethanolamine	102-71-6	> 99.0%
Diethanolamine	111-42-2	≤ 0.5%

SECTION 4: FIRST AID MEASURES

General advice: first aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to section 8 for specific personal protective equipment.

Inhalation: move person to fresh air and keep comfortable for breathing; consult a physician.

Skin contact: remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation or rash occurs. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

Eye contact: flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.

Most important symptoms/effects, acute & delayed: aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed: notes to physician: If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

Suitable: use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable: none known.

Special hazards arising from the substance or mixture

Hazardous combustion products: carbon oxides, nitrogen oxides (NOx).

Unusual fire and explosion hazards: exposure to combustion products may be a hazard to health.

Advice for firefighters

Firefighting procedures: use water spray to cool unopened containers. Evacuate area. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Remove undamaged containers from fire area if it is safe to do so.

Special protective equipment for firefighters: wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: do NOT use absorbent materials such as cellulose-based absorbents, sawdust or ground corn cobs. Soak up with inert absorbent material. Absorb with inert materials such as Clay-based absorbents, dirt or sand. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. See sections: 7, 8, 11, 12 and 13.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling: precautions for safe handling: Take care to prevent spills, waste and minimize release to the environment. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. Handle in accordance with good industrial hygiene and safety practice. CONTAINERS MAY BE HAZARDOUS WHEN EMPTY. Since emptied containers retain product residue follow all SDS and label warnings even after container is emptied. Use only with adequate ventilation. See section 8.

Conditions for safe storage: Keep in properly labelled containers. Do not store with strong acids, strong bases, combustible liquids or strong oxidizing agents. Store in accordance with all applicable regulations. Avoid freezing.

Unsuitable materials for containers: aluminum, copper, copper alloys, galvanized containers, zinc.

Storage stability

Storage temperature: 30 - 43 °C (86 - 109 °F).

Storage period (shelf life)

Drum: 24 months.

Bulk: 6 months.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Component	Regulation	Type of Listing	Value
Triethanolamine	ACGIH	TWA	5 mg/m ³
		Further information: absorbed via skin.	
Diethanolamine	ACGIH	TWA (inhalable fraction and vapor)	1 mg/m ³
	Further information: A3: confirmed animal carcinogen with unknown relevance to humans. Skin: danger of cutaneous absorption.		

Engineering controls: use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye: use safety glasses (with side shields).

Hand protection: use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: polyethylene, ethyl vinyl alcohol laminate (EVAL). Examples of acceptable glove barrier materials include: chlorinated polyethylene, nitrile/butadiene rubber (nitrile or NBR), polyvinyl alcohol (PVA). NOTICE: the selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: when prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full-body suit will depend on the task.

Respiratory protection: respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: organic vapor cartridge with a particulate pre-filter.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color)	liquid, colorless to yellow
Odor	ammoniacal
Odor threshold	no data available
pH	no data available
Freezing point	68.9°F (20.5°C)
Boiling point	637.0°F (336.1°C)
Flash point	354°F (179°C), closed cup
Evaporation rate (butyl acetate = 1)	0.01
Flammability (solid, gas)	not expected to form explosive dust-air mixtures
Flammability (liquids)	not expected to be a static-accumulating flammable liquid
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapor pressure	< 0.0002 mmHg at 68°F (20°C)
Relative vapor density (air = 1)	5
Relative density	1.126 at 68°F (20°C)
Water solubility	> 1,000 g/l at 68°F (20°C), completely miscible
Partition coefficient n-octanol/water	no data available
Autoignition temperature	615°F (324°C)
Decomposition temperature	no data available
Viscosity, dynamic	934 mPa.s at 68°F (20°C)
Viscosity, kinematic	no data available
Explosive properties	no
Oxidizing properties	No

The physical data presented above are typical values and should not be construed as a specification.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: not classified as a reactivity hazard.

Chemical stability: stable under normal conditions.

Possibility of hazardous reactions: can react with strong oxidizing agents.

Conditions to avoid: none known.

Incompatible materials: heating above 140°F (60°C) in the presence of aluminum can result in corrosion and generation of flammable hydrogen gas. Avoid contact with acids, halogenated hydrocarbons, nitrites, strong oxidizers, combustible liquids. Avoid contact with metals such as aluminum, copper, galvanized metals, zinc.

Hazardous decomposition products: decomposition products depend upon temperature, air supply and the presence of other materials.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological information for components are described in this section. The diethanolamine concentration of the product is below GHS classification thresholds.

Likely routes of exposure: ingestion, inhalation, skin contact, eye contact.

Acute toxicity (represents short term exposures with immediate effects): as a product LD50 (oral, skin) and LC50 (inhalation) have not been determined. Acute oral toxicity is expected to be very low. Prolonged skin contact is unlikely to result in absorptions of harmful amounts. At room temperature, exposure to vapor is minimal due to low volatility; single exposure is not likely to be hazardous. Information for Components:

Triethanolamine

Route	Specimen	Result
Oral	Rat	LD50, 6,400 mg/kg
Dermal	Rabbit	LD50, >2,000mg/kg
Inhalation	No data	No data

Diethanolamine

Route	Specimen	Result
Oral	Rat	LD50, 1,600 mg/kg
Dermal	Rabbit	LD50, >8,200 mg/kg
Inhalation	Rat	LC50, 4 hour, dust/mist, 3.35 mg/l

Skin corrosion/irritation: brief contact is essentially nonirritating to skin. Repeated exposure may cause irritation, even a burn. Information for components:

Triethanolamine. Brief contact is essentially nonirritating to skin. Repeated exposure may cause irritation, even a burn.

Diethanolamine. Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage. May cause more severe response if skin is abraded (scratched or cut).

Serious eye damage/irritation: may cause slight eye irritation. Corneal injury is unlikely. Information for components:

Triethanolamine. May cause slight eye irritation. Corneal injury is unlikely.

Diethanolamine. May cause severe eye irritation. May cause severe corneal injury. Effects may be slow to heal.

Skin sensitization: skin contact may cause an allergic skin reaction in a small proportion of individuals. Did not cause allergic skin reactions when tested in guinea pigs. Information for components:

Triethanolamine. Skin contact may cause an allergic skin reaction in a small proportion of individuals. Did not cause allergic skin reactions when tested in guinea pigs.

Diethanolamine. Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory sensitization: no data available for product or components.

Carcinogenicity. Based on information for components:

Triethanolamine. Findings from a chronic skin painting study by NTP include liver tumors in mice. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. Is not classified as a human carcinogen.

Diethanolamine. Findings from a chronic diethanolamine skin painting study by NTP include liver and kidney tumors in mice; no tumors were observed in rats. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. A number of factors may have influenced the results and are being considered in their interpretation. IARC, Group 2B: Possibly carcinogenic to humans. ACGIH, A3: Confirmed animal carcinogen with unknown relevance to humans.

Teratogenicity. Based on information for components:

Triethanolamine. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. However, the relevance of this to humans is unknown. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

Diethanolamine. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive toxicity. Based on information for components:

Triethanolamine. No relevant data found.

Diethanolamine. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Repeated excessive exposures to high amounts may cause effects on testes and fertility in males.

Mutagenicity. Based on information for components:

Triethanolamine. In vitro genetic toxicity studies were negative.

Diethanolamine. In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Specific target organ toxicity (single exposure): evaluation of available data suggests that this material and its components are not STOT-SE toxicants.

Specific target organ toxicity (repeated exposure): based on available data, repeated exposures are not anticipated to cause significant adverse effects. Information for components:

Triethanolamine. Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Diethanolamine. Results from repeated exposure tests on diethanolamine in laboratory animals include anemia (rats) and effects on kidney (rats and mice) and liver (mice). Heart and nervous system effects were also observed in animals given exaggerated doses of diethanolamine. Changes in other organs, causes of which are nonspecific, were judged secondary to the poor health of the animals due to the extremely high doses of diethanolamine given.

Specific target organ systemic toxicity (single exposure): evaluation of available data suggests that this material and components are not STOT-SE toxicants.

Chronic toxicity (represents longer term exposures with repeated dose resulting in chronic/delayed effects): no data available.

Aspiration toxicity: based on physical properties, the product or components are not likely to be an aspiration hazard.

SECTION 12: ECOLOGICAL INFORMATION

Information for components are described in this section. The diethanolamine concentration of the product is below GHS classification thresholds.

Ecotoxicity

Triethanolamine

Acute toxicity to fish. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested). May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms. LC50, Pimephales promelas (fathead minnow), flow-through test, 96 hour, 11,800 mg/l, OECD Test Guideline 203 or equivalent.

Acute toxicity to aquatic invertebrates. EC50, Ceriodaphnia dubia (water flea), static test, 48 hour, 609.9 mg/l, OECD Test Guideline 202 or equivalent.

Acute toxicity to algae/aquatic plants. ErC50, alga Scenedesmus sp., static test, 72 hour, growth rate inhibition, 512 mg/l, OECD Test Guideline 201 or equivalent, Test substance: neutralized product.

Toxicity to bacteria. EC50, activated sludge, 3 hour, > 1,000 mg/l, OECD 209 Test.

Chronic toxicity to aquatic invertebrates. NOEC, Daphnia magna (water flea), semi-static test, 21 days, number of offspring, 16 mg/l.

Diethanolamine

Acute toxicity to fish. Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested). May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms. LC50, Pimephales promelas (fathead minnow), static test, 96 hour, 1,460 mg/l, OECD Test Guideline 203 or equivalent.

Acute toxicity to aquatic invertebrates. EC50, Daphnia magna (Water flea), static test, 48 hour, 55 mg/l, OECD Test Guideline 202 or equivalent.

Acute toxicity to algae/aquatic plants. ErC50, Pseudokirchneriella subcapitata (green algae), 96 hour, growth rate inhibition, 2.2 mg/l, OECD Test Guideline 201 or equivalent. NOEC, Pseudokirchneriella subcapitata (green algae), 72 hour, growth rate inhibition, 0.6 mg/l, OECD Test Guideline 201 or equivalent.

Toxicity to bacteria. EC50, respiration inhibition, 3 hour, > 1,000 mg/l, activated sludge test (OECD 209).

Chronic toxicity to aquatic invertebrates. NOEC, Daphnia magna (water flea), semi-static test, 21 days, 0.78 mg/l.

Persistence and degradability: components are readily biodegradable and pass OECD test(s) for ready biodegradability.

Bioaccumulative potential: bioconcentration potential is low ($BCF < 100$ or $\text{Log Pow} < 3$) for all components.

Mobility in soil: potential for mobility in soil is very high (K_{oc} between 0 and 50) for all components.

Other adverse effects: none known.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal methods: do not dump into any sewers, on the ground, or into any body of water. All disposal practices must be in compliance with all federal, state/provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. FOR UNUSED AND UNCONTAMINATED PRODUCT, always send to a licensed disposer per applicable regulations. Consult the local waste disposal expert for the appropriate waste disposal method. Recover or recycle, if possible. Otherwise, send it to a licensed disposer.

Contaminated packaging: empty containers retain product residues. Follow label warnings even after container is emptied. Improper disposal or reuse of this container may be dangerous and illegal. Refer to applicable federal, state and local regulations.

SECTION 14: TRANSPORTATION INFORMATION

US Department of Transportation (DOT)

Less than reportable quantity (less than 20,000 pounds of product): not regulated.

Greater than or equal to reportable quantity ($\geq 20,000$ pounds of product):

UN number	3082
Proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (Diethanolamine)
Hazard class	9
Packing group	III
Reportable quantity	Diethanolamine, 100 pounds (20,000 pounds of product)

International Maritime Dangerous Goods (IMDG): not regulated for transport. Consult IMO regulations before transporting ocean bulk. Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code.

International Air transportation Associations (IATA): not regulated for transport.

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312: no SARA hazards.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313: this material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

CERCLA Hazardous Substance List (40 CFR 302.4): listed

ETHANOL, 2,2'-IMINOBIS- (CAS 111-42-2)

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

ETHANOL, 2,2'-IMINOBIS- (CAS 111-42-2)

Pennsylvania Worker and Community Right-To-Know Act: the following chemicals are listed because of the additional requirements of Pennsylvania law:

triethanolamine, CASRN 102-71-6

California Prop. 65: WARNING this product can expose you to chemicals including Diethanolamine and Ethanol, 2,2'- (nitrosoimino)bis-, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

United States TSCA Inventory (TSCA): all components of this product are active and in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	yes
Canada	Domestic Substances List (DSL)	yes
Canada	Non-Domestic Substances List (NDSL)	no
China	Inventory of Existing Chemical Substances in China (IECSC)	yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	yes
Japan	Inventory of Existing and New Chemical Substances (ENCS)	yes
Korea	Existing Chemicals List (ECL)	yes
New Zealand	New Zealand Inventory	yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PIGGS)	yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

SECTION 16: OTHER INFORMATION

Version and date of revision: 20240222, February 22, 2024

Date of issue: June 9, 2014

NFPA classification: Health 1, Fire Hazard 1, Instability 0

NFPA rating scale (0 = minimal hazard; 4 = severe hazard)

HMIS classification: not available

HMIS rating scale (0 = minimal hazard; 4 = severe hazard)

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Table of Abbreviations & Acronyms

%WT	percent by weight
ACGIH	American Conference of Governmental Industrial Hygienists
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
AICS	Australian Inventory of Chemical Substances
BCF	bioconcentration factor
BOD	biological oxygen demand
bw	body weight
bw/day	body weight/day
CAA	Clean Air Act
CAS	Chemical Abstract Service
CASRN	Chemical Abstract Service Registry Number
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COD	chemical oxygen demand
cSt	centistoke
CWA	Clean Water Act
DOC	dissolved organic carbon
DOT	Department of Transportation
ECx	effect concentration associated with x% response (e.g. EC50)
EINECS	European INventory of Existing Commercial chemical Substances
ELINCS	European List of Notified Chemical Substances
ENCS	Existing and New Chemical Substances Inventory (Japan)
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
g/cm ³	grams per cubic centimeter
g/g	grams (chemical) per gram (urine)
GLP	good laboratory practice
hPa	hectopascal (1 hPa = 100 Pa)
HMIS	Hazardous Material Information System
IARC	International Agency for Research of Cancer
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IDHL	immediately dangerous to health or life
IECSC	Inventory of Existing Chemical Substances in China
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
KECL	Korea Existing Chemicals List
kg/m ³	kilograms per cubic meter
Koc	partition coefficient
kPa	kilopascal

LC50	50% lethal concentration. Concentration of a chemical in air or a chemical in water which causes the death of 50% (one half) of a group of test animals.
LD50	50% lethal dose. Chemical amount, given at once, which causes the death of 50% (one half) of a group of test animals.
LL	Lethal Loading
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
mg/m ³	milligrams per cubic meter
mm ² /s	millimeter squared per second
mPa-s	millipascal-second
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NLP	No-Longer Polymers
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
NZIoC	New Zealand Inventory of Chemicals
OECD	Organization for Economic Co-operation and Development
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limits
PICCS	Philippine Inventory of Chemicals and Chemical Substances
PPG	pounds per gallon
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RQ	reportable quantity
S*	skin notation
SARA	Superfund Amendments and Reauthorization Act
SDS	safety data sheet
STEL	short term exposure limits
STOT	specific target organ toxicity
TCLo	lowest concentration resulting in a toxic effect
TCSI	Taiwan Chemical Substance Inventory
TDG	Transportation of Dangerous Goods (Canada)
TLV	threshold limit values
TSCA	Toxic Substance Control Act
TWA	time weight average
UVCB	substance of unknown or variable composition, complex reaction products or biological material
VOC	volatile organic compound
WEEL	workplace environmental exposure levels