

1 Identification

Product identifier

Product name: Styrene

Stock number: 41337

CAS Number:
100-42-5

EC number:
202-851-5

Index number:
601-026-00-0

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

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar
 Thermo Fisher Scientific Chemicals, Inc.
 30 Bond Street
 Ward Hill, MA 01835-8099
 Tel: 800-343-0660
 Fax: 800-322-4757
 Email: tech@alfa.com
 www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)



GHS02 Flame

Flam. Liq. 3 H226 Flammable liquid and vapour.



GHS07

Acute Tox. 4 H332 Harmful if inhaled.

Skin Irrit. 2 H315 Causes skin irritation.

Eye Irrit. 2A H319 Causes serious eye irritation.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS02 GHS07

Signal word

Warning

Hazard statements

H226 Flammable liquid and vapour.

H332 Harmful if inhaled.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

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

P403+P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

B2 - Flammable liquid

D2A - Very toxic material causing other toxic effects



Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 2 Health (acute effects) = 2

FIRE 3 Flammability = 3

REACTIVITY 1 Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

100-42-5 Styrene

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4 First-aid measures

Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed No further relevant information available.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.

Methods and material for containment and cleaning up:

Keep away from ignition sources.

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

Prevention of secondary hazards: Keep away from ignition sources.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Prevent formation of aerosols.

Information about protection against explosions and fires:

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

Keep ignition sources away.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: Store away from oxidizing agents.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

Styrene, monomer

ppm

ACGIH TLV 20; 40-STEEL; Not classifiable as a human

carcinogen

Australia TWA 50; 100-STEEL

Austria MAK 20

Denmark TWA 25 (skin)

Finland TWA 20; 100-STEEL

France VME 50

Germany MAK 20

Hungary 12-STEEL (carcinogen)

Japan OEL 50 (2B carcinogen)

Korea TLV 20; 40-STEEL

Netherlands MAC-TGG 25

Poland TWA 12; 48-STEEL

Sweden NGV 20; 50-KTV (skin)

Switzerland MAK-W 50; 100-KZG-W

United Kingdom TWA 100; 250-STEEL

USA PEL 100

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USA

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100-42-5 Styrene (100.0%)

PEL (USA)	Long-term value: 100 ppm Ceiling limit value: 200; 600* ppm *5-min peak in any 3 hrs
REL (USA)	Short-term value: 425 mg/m ³ , 100 ppm Long-term value: 215 mg/m ³ , 50 ppm
TLV (USA)	Short-term value: 170 mg/m ³ , 40 ppm Long-term value: 85 mg/m ³ , 20 ppm BEI
EL (Canada)	Short-term value: 75 ppm Long-term value: 50 ppm IARC 2B
EV (Canada)	Short-term value: 100 ppm Long-term value: 35 ppm

Ingredients with biological limit values:

100-42-5 Styrene (100.0%)

BEI (USA)	400 mg/g creatinine Medium: urine Time: end of shift Parameter: Mandelic acid plus phenylglyoxylic acid (nonspecific)
	0.2 mg/L Medium: venous blood Time: end of shift Parameter: Styrene (semi-quantitative)

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Penetration time of glove material (in minutes) Not determined

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form:	Liquid
Color:	Colorless
Odor:	Not determined
Odor threshold:	Not determined.

pH-value: Not determined.

Change in condition

Melting point/Melting range:	-31 °C (-24 °F)
Boiling point/Boiling range:	145-146 °C (293-295 °F)
Sublimation temperature / start:	Not determined

Flash point:	32 °C (90 °F)
Flammability (solid, gaseous)	Not determined.
Ignition temperature:	489 °C (912 °F)
Decomposition temperature:	Not determined
Auto igniting:	Not determined.

Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures is possible.

Explosion limits:

Lower:	1.1 Vol %
Upper:	6.1 Vol %
Vapor pressure at 15 °C (59 °F):	5.7 hPa (4 mm Hg)
Density at 20 °C (68 °F):	0.909 g/cm ³ (7.586 lbs/gal)
Relative density	Not determined.
Vapor density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with	
Water:	Not miscible or difficult to mix
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
dynamic:	Not determined.
kinematic:	Not determined.
Other information	No further relevant information available.

10 Stability and reactivity

Reactivity No information known.

Chemical stability Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions No dangerous reactions known

Conditions to avoid No further relevant information available.

Incompatible materials: Oxidizing agents

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USA

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Hazardous decomposition products: Carbon monoxide and carbon dioxide

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11 Toxicological information

Information on toxicological effects

Acute toxicity: Harmful if inhaled.

LD/LC50 values that are relevant for classification:

Oral	LD50	2650 mg/kg (rat)
Inhalative	LC50/4H	11800 mg/m3/4H (rat)

Skin irritation or corrosion: Causes skin irritation.

Eye irritation or corrosion: Causes serious eye irritation.

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: No effects known.

Carcinogenicity:

IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.

ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

Reproductive toxicity: No effects known.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

Aspiration hazard: No effects known.

Other information (about experimental toxicology):

Tumorigenic effects have been observed on tests with laboratory animals.

Reproductive effects have been observed on tests with laboratory animals.

Mutagenic effects have been observed on tests with bacteria.

Mutagenic effects have been observed on tests with human lymphocytes.

Mutagenic effects have been observed with human hela cells.

Mutagenic effects have been observed with humans.

Mutagenic effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:

Sense Organs and Special Senses (Olfaction) - effect, not otherwise specified.

Sense Organs and Special Senses (Eye) - effect, not otherwise specified.

Sense Organs and Special Senses (Olfaction) - olfactory nerve change

Sense Organs and Special Senses (Eye) - lacrimation.

Sense Organs and Special Senses (Eye) - conjunctive irritation.

Sense Organs and Special Senses (Ear) - changes in cochlear structure or function.

Sense Organs and Special Senses (Eye) - ptosis.

Sense Organs and Special Senses (Ear) - change in acuity.

Sense Organs and Special Senses (Ear) - effect, not otherwise specified.

Peripheral Nerve and Sensation - flaccid paralysis with appropriate anesthesia

Peripheral Nerve and Sensation - sensory change involving peripheral nerve.

Skin and Appendages - tumors.

Behavioral - changes in motor activity (specific assay).

Behavioral - somnolence (general depressed activity).

Behavioral - changes in psychophysiological tests.

Behavioral - muscle weakness.

Behavioral - antipsychotic.

Behavioral - ataxia.

Behavioral - headache.

Behavioral - fluid intake.

Behavioral - alteration of classical conditioning.

Behavioral - food intake (animal).

Lungs, Thorax, or Respiration - respiratory depression

Lungs, Thorax, or Respiration - other changes.

Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi.

Lungs, Thorax, or Respiration - acute pulmonary edema.

Lung, Thorax, or Respiration - changes in lung weight.

Lungs, Thorax, or Respiration - tumors.

Kidney, Ureter, Bladder - other changes in urine composition.

Kidney, Ureter, Bladder - other changes.

Gastrointestinal - changes in structure or function of salivary glands.

Gastrointestinal - nausea or vomiting.

Gastrointestinal - changes in structure or function of endocrine pancreas.

Nutritional and Gross Metabolic - weight loss or decreased weight gain.

Endocrine - changes in thymus weight.

Endocrine - adrenal cortex hyperplasia.

Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).

Blood - changes in leukocyte (WBC) count.

Blood - other changes.

Blood - changes in serum composition.

Blood - changes in erythrocyte (RBC) count.

Blood - leukemia.

Blood - changes in bone marrow (not otherwise specified).

Vascular - regional or general arteriolar construction

Brain and Coverings - other degenerative changes.

Brain and Coverings - changes in brain weight.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases.

Biochemical - Metabolism (Intermediary) - other proteins.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - true cholinesterase.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - monoamine oxidase.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - catalases.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - phosphatases.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases.

Biochemical - Metabolism (Intermediary) - lipids including transport.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - multiple enzyme effects.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other transferases.

Liver - other changes.

Liver - hepatitis (hepatocellular necrosis), zonal

Liver - changes in liver weight.

Liver - hepatitis (hepatocellular necrosis), diffuse

Related to Chronic Data - death.

Related to Chronic Data - changes in testicular weight.

Reproductive - Paternal Effects - spermatogenesis (including genetic material, sperm morphology, motility, and count).

Reproductive - Effects on Newborn - behavioral.

Reproductive - Effects on Newborn - viability index (e.g., # alive at day 4 per # born live).

Reproductive - Effects on Newborn - weaning or lactation index (e.g., # alive at weaning per # alive at day 4).

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Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
 Reproductive - Specific Developmental Abnormalities - urogenital system.
 Reproductive - Effects on Embryo or Fetus - fetal death.
 Reproductive - Effects on Newborn - stillbirth.
 Reproductive - Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea)
 Reproductive - Fertility - post-implantation mortality (e.g. dead/or resorbed implants per total number of implants).
 Reproductive - Effects on Newborn - growth statistics (e.g.%, reduced weight gain).
 Reproductive - Paternal Effects - testes, epididymis, sperm duct.
 Tumorigenic - equivocal tumorigenic agent by RTECS criteria.
 Tumorigenic - carcinogenic by RTECS criteria.
 Tumorigenic - neoplastic by RTECS criteria.
Subacute to chronic toxicity:
 Styrene causes lacrimation and severe eye irritation. May cause narcosis. Causes reproductive, teratogenic and carcinogenic effects in experimental animals.
 Human mutagenic effects have been reported.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.



12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes:
 Do not allow material to be released to the environment without proper governmental permits.
 Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number DOT, IMDG, IATA	UN2055
UN proper shipping name DOT IMDG, IATA	Styrene monomer, stabilized STYRENE MONOMER, STABILIZED
Transport hazard class(es) DOT	
	
Class Label Class Label IMDG, IATA	3 Flammable liquids. 3 3 (F1) Flammable liquids 3
	
Class Label	3 Flammable liquids. 3
Packing group DOT, IMDG, IATA	III
Environmental hazards:	Not applicable.
Special precautions for user	Warning: Flammable liquids
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.	
Transport/Additional information:	
DOT Marine Pollutant (DOT):	No
UN "Model Regulation":	UN2055, Styrene monomer, stabilized, 3, III

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms

 
 GHS02 GHS07

Signal word Warning
Hazard statements
 H226 Flammable liquid and vapour.
 H332 Harmful if inhaled.
 H315 Causes skin irritation.

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USA

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H319 Causes serious eye irritation.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

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

P403+P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings)

100-42-5 Styrene

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use:

For use only by technically qualified individuals.

This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)