Styrene

Version 4.1 Revision Date 2016-06-07

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

Product information

Product Name : Styrene
Material : 1037612, 1037607, 1037608, 1037609

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
Styrene	100-42-5 202-851-5 601-026-00-0	Chevron Phillips Chemicals International NV 01-2119457861-32-0005

Relevant Identified Uses Supported : Manufacture
Continuous Mass Polymerisation of Polystyrene (HIPS and GPPS)
Batch Suspension Polymerisation of Polystyrene (HIPS and GPPS)
Production of Styrenic Copolymers

Company : Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

SDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email:sds@cpchem.com

Emergency telephone:

Health:
866.442.9628 (North America)

1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: +800 CHEMCALL (+800 2436 2255) China:+86-21-22157316
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department	:	Product Safety and Toxicology Group
E-mail address	:	SDS@CPChem.com
Website	:	www.CPChem.com

SECTION 2: Hazards identification

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 3	H226: Flammable liquid and vapor.
Acute toxicity, Category 4	H332: Harmful if inhaled.
Skin irritation, Category 2	H315: Causes skin irritation.
Eye irritation, Category 2	H319: Causes serious eye irritation.
Reproductive toxicity, Category 2	H361d: Suspected of damaging the unborn child.
Specific target organ systemic toxicity - single exposure, Category 3, Respiratory system	H335: May cause respiratory irritation.
Specific target organ systemic toxicity - repeated exposure, Category 1	H372: Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
Chronic aquatic toxicity, Category 3	H412: Harmful to aquatic life with long lasting effects.

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word : Danger

Hazard Statements	: H226	Flammable liquid and vapor.
	H304	May be fatal if swallowed and enters airways.
	H315	Causes skin irritation.
	H319	Causes serious eye irritation.
	H332	Harmful if inhaled.
	H335	May cause respiratory irritation.
	H361d	Suspected of damaging the unborn child.
	H372	Causes damage to organs through prolonged or repeated exposure.
	H412	Harmful to aquatic life with long lasting

effects.

Precautionary Statements : **Prevention:**

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/fume/gas/mist/vapor/spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:	
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Hazardous ingredients which must be listed on the label:
- 100-42-5 Styrene

SECTION 3: Composition/information on ingredients

Synonyms : Inhibited Styrene
Phenylethylene
Benzene, Ethenyl
Styrol
Cinnamene
Vinylbenzene
Styrolene
Styrene Monomer

Molecular formula : C8H8

Mixtures

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
Styrene	100-42-5 202-851-5 601-026-00-0	Flam. Liq. 3; H226 Acute Tox. 4; H332 Skin Irrit. 2; H315 Eye Irrit. 2; H319 Repr. 2; H361d STOT SE 3; H335 Aquatic Chronic 3; H412 STOT RE 1; H372 Asp. Tox. 1; H304 Aquatic Chronic 3; H412	100

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

SECTION 4: First aid measures

General advice	:	Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.
If inhaled	:	Move to fresh air. If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.
In case of skin contact	:	If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses. Keep eye wide open while rinsing. Protect unharmed eye. If eye irritation persists, consult a specialist.
If swallowed	:	Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point	:	31 °C (88 °F) Method: closed cup
Autoignition temperature	:	490 °C (914 °F)
Suitable extinguishing media	:	Dry chemical. Carbon dioxide (CO2). Alcohol-resistant foam.
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Standard procedure for chemical fires. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire and explosion protection	:	Normal measures for preventive fire protection. Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	No data available.

SECTION 6: Accidental release measures

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7: Handling and storage

Handling

Advice on safe handling	:	Inspect tank vents periodically. Styrene vapors may polymerize in vents or flame arrestors of storage tanks. Check temperature, inhibitor and polymer content at least once a week during warm weather. Increase monitoring frequency if stored at greater than 70 F for longer than 30 days. Minimize storage time. Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary, but may not by themselves be sufficient. Review all operations, which have the potential to generating and accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106 "Flammable and Combustible Liquids"; National Fire Protection Association (NFPA 77), "Recommended Practice on Static Electricity"; and/or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising Out of Static, Lightning, and stray Currents". For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection. Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers	:	No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

Further information on storage conditions : Take precautionary measures against static discharges.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

SK

Zložka	Podstata	Hodnota	Kontrolné parametre	Poznámka
Styrene	SK OEL	NPEL priemerný	20 ppm, 90 mg/m3	
	SK OEL	NPEL krátkodobý	50 ppm, 200 mg/m3	

SI

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba
Styrene	SI OEL	MV	20 ppm, 86 mg/m3	BAT, Y,

BAT Biološka mejna vrednost - določena je biološka mejna vrednost, ki pomeni opozorilno raven nevarne kemične snovi in njenih metabolitov v tkivih, telesnih tekočinah ali izdihanem zraku, ne glede na to, ali je nevarna kemična snov vnesena v organizem z vdihavanjem, zaužitjem ali skozi kožo.
Y Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in BAT vrednosti.

SE

Beståndsdelar	Grundval	Värde	Kontrollparametrar	Anmärkning
Styrene	SE AFS	NGV	10 ppm, 43 mg/m3	B, H, M,
	SE AFS	KTV	20 ppm, 86 mg/m3	B, H, M,

B Exponering för vissa kemiska ämnen nära befintligt yrkeshygieniskt gränsvärde och samtidig exponering för buller nära insatsvärdet 80 dB kan orsaka hörselskada.
H Ämnet kan lätt upptas genom huden.
M Medicinsk kontroll kan krävas för hantering av ämnet. Se vidare föreskrifterna om medicinska kontroller i arbetslivet. För vissa ämnen gäller kraven på medicinsk kontroll endast när ämnet används som härdplastkomponent. Se föreskrifterna om härdplaster.

PT

Componentes	Bases	Valor	Parâmetros de controlo	Nota
Styrene	PT OEL	VLE-MP	20 ppm,	A4, IBE, irritação do TRS, afeção do SNC,
	PT OEL	VLE_CD	40 ppm,	A4, IBE, irritação do TRS, afeção do SNC,

A4 Agente não classificável como carcinogénico no Homem.
afeção do SNC afeção do sistema nervoso central
IBE Identifica substâncias para as quais existem índices de exposição biológicos. Estes podem ser de dois tipos: IBE A referentes a pesticidas inibidores da acetilcolinesterase e IBE M indutores de metahemoglobina.
irritação do TRS irritação do trato respiratório superior

PL

Składniki	Podstawa	Wartość	Parametry dotyczące kontroli	Uwaga
Styrene	PL NDS	NDS	50 mg/m3	
	PL NDS	NDSch	100 mg/m3	

NO

Komponenter	Grunnlag	Verdi	Kontrollparametere	Nota
Styrene	FOR-2011-12-06-1358	TWA	25 ppm, 105 mg/m3	M,

M Kjemikalier som skal betraktes som mutagene

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
Styrene	LV OEL	AER 8 st	10 mg/m3	
	LV OEL	AER īslaicīgā	30 mg/m3	

LT

Komponentai	Pagrindas, bazė	Vertė	Kontrolės parametrai	Pastaba
Styrene	LT OEL	IPRD	20 ppm, 90 mg/m3	O,
	LT OEL	TPRD	50 ppm, 200 mg/m3	O,

O Oksiduojanti

IE

Ingredients	Basis	Value	Control parameters	Note
Styrene	IE OEL	OELV - 8 hrs (TWA)	20 ppm, 85 mg/m3	
	IE OEL	OELV - 15 min (STEL)	40 ppm, 170 mg/m3	

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
Styrene	HU OEL	AK-érték	50 mg/m3	i,
	HU OEL	CK-érték	50 mg/m3	i,

i Ingerlő anyag (izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat)

GR

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
Styrene	GR OEL	TWA	100 ppm, 425 mg/m3	
	GR OEL	STEL	250 ppm, 1.050 mg/m3	

GB

Ingredients	Basis	Value	Control parameters	Note
Styrene	GB EH40	TWA	100 ppm, 430 mg/m3	
	GB EH40	STEL	250 ppm, 1.080 mg/m3	

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
Styrene	FR VLE	VME	50 ppm, 215 mg/m3	normal,

normal Valeurs limites indicatives

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Huomautus
Styrene	FI OEL	HTP-arvot 8h	20 ppm, 86 mg/m3	melu,
	FI OEL	HTP-arvot 15 min	100 ppm, 430 mg/m3	melu,

melu Melu: aineille, joiden tiedetään voimistavan melun haitallisia kuulovaikutuksia.

ES

Componentes	Base	Valor	Parámetros de control	Nota
Styrene	ES VLA	VLA-ED	20 ppm, 86 mg/m3	ae, VLB®,
	ES VLA	VLA-EC	40 ppm, 172 mg/m3	ae, VLB®,

ae Alterador endocrino. Hay una serie de sustancias utilizadas en la industria, la agricultura y los bienes de consumo de las que se sospecha que interfieren con los sistemas endocrinos de los seres humanos y de los animales y que son causantes de perjuicios para la salud como el cáncer, alteraciones del comportamiento y anomalías en la reproducción. Tales sustancias se denominan 'alteradores endocrinos'. [Aplicación de la estrategia comunitaria en materia de alteradores endocrinos-sustancias de las que se sospecha interfieren en los sistemas hormonales de seres humanos y animales-COM (1999) 706. Comisión de las Comunidades Europeas, COM (2001) 262 final, Bruselas 14.06.2001]. En el caso del ser humano, algunas vías posibles de exposición a alteradores endocrinos son la exposición directa en el lugar de trabajo o a través de productos de consumo como alimentos, ciertos plásticos, pinturas, detergentes y cosméticos, o indirecta a través del medio ambiente (aire, agua y suelo). [Estrategia comunitaria en materia de alteradores endocrinos (sustancias de las que se sospecha interfieren en los sistemas hormonales de seres humanos y animales). Comisión de las Comunidades Europeas, COM (1999) 706 final, Bruselas 17.12.1999]. Los valores límite asignados a estos agentes no se han establecido para prevenir los posibles efectos de alteración endocrina, lo cual justifica una vigilancia adecuada de la salud.

VLB® Agente químico que tiene Valor Límite Biológico específico en este documento.

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
Styrene	EE OEL	Piirnorm	20 ppm, 90 mg/m3	A,
	EE OEL	Lühiajalise kokkupuute piirnorm	50 ppm, 200 mg/m3	A,

A Naha kaudu kergesti absorbeeruvad ained

DK

Komponenter	Basis	Værdi	Kontrolparametre	Note
Styrene	DK OEL	L	25 ppm, 105 mg/m3	H, K, L,

H Betyder, at stoffet kan optages gennem huden.
K Betyder, at stoffet er optaget på listen over stoffer, der anses for at være kræftfremkaldende.
L Markerer, at grænseværdien er en loftværdi, som ikke på noget tidspunkt må overskrides.

DE

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Styrene	DE TRGS 900	AGW	20 ppm, 86 mg/m3	DFG, Y,

DFG Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission)
Y Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden

CZ

Složky	Základ	Hodnota	Kontrolní parametry	Poznámka
Styrene	CZ OEL	PEL	100 mg/m3	I,
	CZ OEL	NPK-P	400 mg/m3	I,

I dráždí sliznice (oči, dýchací cesty) resp. kůži

CH

Inhaltsstoffe	Grundlage	Wert	Zu überwachende	Bemerkung

			Parameter	
Styrene	CH SUVA	MAK-Wert	20 ppm, 85 mg/m3	OL, NIOSH, OSHA, DFG, HSE, SSc,
	CH SUVA	KZGW	40 ppm, 170 mg/m3	OL, NIOSH, OSHA, DFG, HSE, SSc,

DFG Deutsche Forschungsgemeinschaft
HSE Health and Safety Executive (Occupational Medicine and Hygiene Laboratory)
NIOSH National Institute for Occupational Safety and Health
OL lärmverstärkende Ototoxizität
OSHA Occupational Safety and Health Administration
SSc Eine Schädigung der Leibesfrucht braucht bei Einhaltung des MAK-Wertes nicht befürchtet zu werden.

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
Styrene	BE OEL	TGG 8 hr	25 ppm, 108 mg/m3	D,
	BE OEL	TGG 15 min	50 ppm, 216 mg/m3	D,

D Opname van het agens via de huid, de slijmvliezen of de ogen vormt een belangrijk deel van de totale blootstelling. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.

AT

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Styrene	AT OEL	TMW	20 ppm, 85 mg/m3	
	AT OEL	KZW	80 ppm, 340 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Acute effects, Systemic effects
Value: 289 mg/m3

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Acute effects, Local effects
Value: 306 mg/m3

DNEL : End Use: Workers
Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 406 mg/kg

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 85 mg/m3

PNEC : Fresh water
Value: 0,028 mg/l

PNEC : Marine water
Value: 0,0028 mg/l

PNEC : Fresh water sediment
Value: 0,614 mg/kg

PNEC : Marine sediment
Value: 0,0614 mg/kg

PNEC : Soil
Value: 0,2 mg/kg

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits.

Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection	:	Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
Hand protection	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Eye protection	:	Tightly fitting safety goggles. Eye wash bottle with pure water.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Physical state	:	Liquid
Color	:	Colorless
Odor	:	Sweet

Safety data

Flash point	:	31 °C (88 °F) Method: closed cup
Lower explosion limit	:	0,9 %(V)
Upper explosion limit	:	6,8 %(V)

Oxidizing properties	:	no
Autoignition temperature	:	490 °C (914 °F)
Molecular formula	:	C8H8
Molecular weight	:	104,16 g/mol
pH	:	Not applicable
Freezing point	:	-30,63 °C (-23,13 °F)
Pour point		No data available
Boiling point/boiling range	:	145,15 °C (293,27 °F)
Vapor pressure	:	4,50 MMHG at 20 °C (68 °F)
Relative density	:	0,91 at 20 °C (68 °F)
Water solubility	:	0.029 wt.% styrene in water @ 20 ºC (68ºF)
Partition coefficient: n-octanol/water	:	log Pow: 2,96 at 25 °C (77 °F)
Viscosity, dynamic	:	0,763 cP
Relative vapor density	:	3,6 (Air = 1.0)
Evaporation rate	:	No data available
Percent volatile	:	> 99 %

Other information

Conductivity	:	< 50 pSm

SECTION 10: Stability and reactivity

Reactivity	:	No decomposition if stored and applied as directed.
Chemical stability	:	The product is normally supplied in a stabilized form. If the permissible storage period and/or storage temperature is noticeably exceeded, the product may polymerize with heat evolution. No decomposition if stored and applied as directed.

Possibility of hazardous reactions

Conditions to avoid	:	heat, light, catalysts, halogens or any other chemicals. Heat, flames and sparks.
Materials to avoid	:	Corrosive to copper and copper bearing alloys.
Hazardous decomposition products	:	No data available
Other data	:	No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

Styrene	:	LD50: > 5.000 mg/kg Species: Rat Sex: male and female

Acute inhalation toxicity

Styrene	:	LD50: 11,8 mg/l Exposure time: 4 h Species: Rat Test atmosphere: vapor

Acute dermal toxicity

Styrene	:	LD50: > 2.000 mg/kg Species: Rat Sex: male and female

Styrene
Skin irritation : May cause skin irritation in susceptible persons.

Styrene
Eye irritation : Irritating to eyes.

Sensitization

Styrene	:	Classification: Does not cause skin sensitization. largely based on human evidence.

Repeated dose toxicity

Styrene	:	Species: Mouse, Male and female Sex: Male and female Application Route: Oral Dose: 0. 150, 300 mg/kg Exposure time: 78 wk Number of exposures: 5 d/wk NOEL: 150 mg/kg Lowest observable effect level: 300 mg/kg

Species: Rat, male
Sex: male
Application Route: Inhalation
Dose: 0. 500, 650, 850, 1000 ppm
Exposure time: 4 wk
Number of exposures: 6 h/d, 5 d/wk
NOEL: 500 ppm
Target Organs: Ototoxicity

Styrene
Aspiration toxicity : May be fatal if swallowed and enters airways.

CMR effects

Styrene : Carcinogenicity: This substance has been reported to cause tumors in certain animal species.
Mutagenicity: In vitro tests showed mutagenic effects which were not observed with in vivo test.
Teratogenicity: Did not show teratogenic effects in animal experiments.
Reproductive toxicity: No toxicity to reproduction

Styrene
Further information : Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish

Styrene : LC50: 4,02 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)
flow-through test Test substance: yes
Toxic to fish.

Toxicity to daphnia and other aquatic invertebrates

Styrene : EC50: 4,7 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
flow-through test

Toxicity to algae

Styrene : EC50: 4,9 mg/l
Exposure time: 72 h
Species: Selenastrum capricornutum (algae)

Toxicity to bacteria

Styrene : EC10: 0,28 mg/l
Exposure time: 96 h
Growth rate
Species: Skeletonema costatum (Marine Algae)

Test substance: yes

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

Styrene	:	NOEC: 1,01 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) semi-static test Test substance: yes Method: OECD Test Guideline 211

Elimination information (persistence and degradability)

Bioaccumulation

Styrene	:	Does not significantly accumulate in organisms.
Biodegradability	:	According to the results of tests of biodegradability this product is considered as being readily biodegradable.

Ecotoxicology Assessment

Acute aquatic toxicity
Styrene : Toxic to aquatic life.

Chronic aquatic toxicity
Styrene : Harmful to aquatic life with long lasting effects.

Results of PBT assessment
Styrene : This substance is not considered to be very persistent and very bioaccumulating (vPvB)., This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Toxic to aquatic life., Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product.

Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN2055, STYRENE MONOMER, STABILIZED, 3, III, RQ (STYRENE)

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN2055, STYRENE MONOMER, STABILIZED, 3, III, (31 °C)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2055, STYRENE MONOMER, STABILIZED, 3, III

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2055, STYRENE MONOMER, STABILIZED, 3, III, (D/E)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN2055, STYRENE MONOMER, STABILIZED, 3, III

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2055, STYRENE MONOMER, STABILIZED, 3, III

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

National legislation

Chemical Safety Assessment

Ingredients	:	styrene	A Chemical Safety Assessment has been carried out for this substance.	202-851-5
Major Accident Hazard Legislation	:	96/82/EC Flammable.	Update: 2003	

6
Quantity 1: 5.000 t
Quantity 2: 50.000 t

Water contaminating class (Germany) : WGK 2 water endangering
List with water hazardous substances (Class 1 till 3) in VwVwS

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America TSCA	:	On the inventory, or in compliance with the inventory
Canada DSL	:	On the inventory, or in compliance with the inventory
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	On the inventory, or in compliance with the inventory
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

Further information

Legacy SDS Number : CPC00089

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty	PEL	Permissible Exposure Limit

	Chemicals Association		
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H361d	Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

Annex

1. Short title of Exposure Scenario: **Manufacture**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU8:** Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1:** Manufacture of substances
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC1: Manufacture of substances

Technical conditions and measures / Organizational measures

Remarks	:	Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Product characteristics

Remarks	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used

Remarks	:	No limit

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks	:	Assumes a good basic standard of occupational hygiene is

implemented.

Technical conditions and measures
Transfer via enclosed lines.

Organizational measures to prevent /limit releases, dispersion and exposure
No other specific measures identified.

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Handle substance within a closed system.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Use a sampling system designed to control exposure

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics

Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Ensure material transfers are under containment or extract ventilation.

Organizational measures to prevent /limit releases, dispersion and exposure
Avoid carrying out activities involving exposure for more than 1 hour

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC1, CS3	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	0,01 ppm	0,00
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,00
PROC2, CS3, CS38	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00

			Worker – long-term – systemic Combined routes		0,50
PROC8a, CS2	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,03
			Worker – long-term – systemic Combined routes		0,53
PROC8b, CS3, CS5	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,02
			Worker – long-term – systemic Combined routes		0,52
PROC8b, CS69	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	1,50 ppm	0,08
			Worker – dermal, long-term – systemic	0,69 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,08
PROC8b, CS3	ECETOC TRA Modified		Worker – inhalation, long-term – systemic	7,00 ppm	0,35
			Worker – dermal, long-term – systemic	6,68 mg/kg/d	0,02
			Worker – long-term – systemic Combined routes		0,37
PROC15, CS36	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50

PROC1: Use in closed process, no likelihood of exposure
CS3: Material transfers

PROC2: Use in closed, continuous process with occasional controlled exposure
CS3: Material transfers
CS38: Use in contained systems

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS2: Process sampling

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers
CS5: Equipment maintenance

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS69: Additivation and stabilization

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers

PROC15: Use as laboratory reagent
CS36: Laboratory activities

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: **Continuous Mass Polymerisation of Polystyrene (HIPS and GPPS)**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU12:** Industrial Manufacturing (all), Manufacture of plastics products, including compounding and conversion
Process category	:	**PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC14:** Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting; **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC6c:** Industrial use of monomers for manufacture of thermoplastics
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC6c: Industrial use of monomers for manufacture of thermoplastics

Technical conditions and measures / Organizational measures

Remarks : Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics

Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Handle substance within a closed system.

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Use a sampling system designed to control exposure

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures

Clear transfer lines prior to de-coupling.

Organizational measures to prevent /limit releases, dispersion and exposure
Avoid carrying out activities involving exposure for more than 1 hour

2.2 Contributing scenario controlling worker exposure for: : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Limit the substance content in the product to 5 %

2.2 Contributing scenario controlling worker exposure for: PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Limit the substance content in the product to 5 %

3. Exposure estimation and reference to its source

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio

PROC2, CS3, CS54	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC8a, CS2	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,03
			Worker – long-term – systemic Combined routes		0,53
PROC8b, CS3, CS5, CS14	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,02
			Worker – long-term – systemic Combined routes		0,52
PROC14, CS88	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	3,43 mg/kg/d	0,01
			Worker – long-term – systemic Combined routes		0,51

PROC2: Use in closed, continuous process with occasional controlled exposure
CS3: Material transfers
CS54: Continuous process

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS2: Process sampling

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers
CS5: Equipment maintenance
CS14: Bulk transfers

: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS7: Small package filling

PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
CS88: Extrusion and master batching

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: **Batch Suspension Polymerisation of Polystyrene (HIPS and GPPS)**

Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use	:	**SU3, SU12:** Industrial Manufacturing (all), Manufacture of plastics products, including compounding and conversion
Process category	:	**PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC14:** Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting; **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC6c:** Industrial use of monomers for manufacture of thermoplastics
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC6c: Industrial use of monomers for manufacture of thermoplastics

Technical conditions and measures / Organizational measures

Remarks	:	Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics

Remarks	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used

Remarks	:	No limit

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks	:	Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Handle substance within a closed system.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Use a sampling system designed to control exposure

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Clear transfer lines prior to de-coupling., Limit the substance content in the product to 5 %

Organizational measures to prevent /limit releases, dispersion and exposure
Avoid carrying out activities involving exposure for more than 1 hour

2.2 Contributing scenario controlling worker exposure for: : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Limit the substance content in the product to 5 %

2.2 Contributing scenario controlling worker exposure for: PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Limit the substance content in the product to 5 %

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC2, CS3	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC3, CS3, CS55	ECETOC TRA		Worker – inhalation, long-term – systemic	17,5 ppm	0,88
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88
PROC8a, CS2	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,03
			Worker – long-term – systemic Combined routes		0,53
PROC8b, CS3, CS5, CS14	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,02
			Worker – long-term – systemic Combined routes		0,52
PROC14, CS117	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	3,43 mg/kg/d	0,01
			Worker – long-term – systemic Combined		0,51

			routes		
PROC15, CS36	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50

PROC2: Use in closed, continuous process with occasional controlled exposure
CS3: Material transfers

PROC3: Use in closed batch process (synthesis or formulation)
CS3: Material transfers
CS55: Batch process

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS2: Process sampling

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers
CS5: Equipment maintenance
CS14: Bulk transfers

: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS7: Small package filling

PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
CS117: Operation of solids filtering equipment

PROC15: Use as laboratory reagent
CS36: Laboratory activities

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: **Production of Styrenic Copolymers**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU12:** Industrial Manufacturing (all), Manufacture of plastics products, including compounding and conversion
Process category	:	**PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15: Use as laboratory reagent

Environmental release category : **ERC6c:** Industrial use of monomers for manufacture of thermoplastics

Further information :

Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC6c: Industrial use of monomers for manufacture of thermoplastics

Technical conditions and measures / Organizational measures
Remarks : Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Handle substance within a closed system.

2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Use a sampling system designed to control exposure

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Clear transfer lines prior to de-coupling., Limit the substance content in the product to 5 %

Organizational measures to prevent /limit releases, dispersion and exposure
Avoid carrying out activities involving exposure for more than 1 hour

2.2 Contributing scenario controlling worker exposure for: : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures
Limit the substance content in the product to 5 %

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used
Remarks : No limit

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

Organizational measures to prevent /limit releases, dispersion and exposure
No specific measures identified.

3. Exposure estimation and reference to its source

Workers/Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterization ratio
PROC2, CS3	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	1,37 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50
PROC3, CS55	ECETOC TRA		Worker – inhalation,	17,5 ppm	0,88

			long-term – systemic		
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,88
PROC8a, CS2	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	13,71 mg/kg/d	0,03
			Worker – long-term – systemic Combined routes		0,53
PROC8b, CS3, CS5, CS14	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	6,86 mg/kg/d	0,02
			Worker – long-term – systemic Combined routes		0,52
PROC15, CS36	ECETOC TRA		Worker – inhalation, long-term – systemic	10,00 ppm	0,50
			Worker – dermal, long-term – systemic	0,34 mg/kg/d	0,00
			Worker – long-term – systemic Combined routes		0,50

PROC2: Use in closed, continuous process with occasional controlled exposure
CS3: Material transfers

PROC3: Use in closed batch process (synthesis or formulation)
CS55: Batch process

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS2: Process sampling

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
CS3: Material transfers
CS5: Equipment maintenance
CS14: Bulk transfers

: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS7: Small package filling

PROC15: Use as laboratory reagent
CS36: Laboratory activities

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.