

SIBUR-KSTOVO LLC

SAFETY DATA SHEET

According to 1907/2006/EC (REACH), 1272/2008 (CLP) & 453/2010

LIQUID PYROLYSIS PRODUCTS, C9 FRACTION

VERSION: 2.1

DATE CREATED: 08/02/2011

DATE UPDATED: -

Regulation: EC No 1272/2008

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

1.1 Product identifier

NAME OF SUBSTANCE: Distillates (petroleum), steam-cracked, C8-12 fraction
SYNONYMS: Distillates (petroleum), cracked, ethylene manuf. by-product, C9-10 fraction
TRADE NAMES: LPP (liquid pyrolysis products, fraction C9), LPP-C9
Index No (CLP) 649-411-00-2
CAS #: 68477-54-3
EC #: 270-737-2
REGISTRATION #: 01-2119492289-23-0002

1.2 Relevant identified uses of the substance

See Annex 1

Most common technical function of substance:

Intermediates

Fuels and fuel additives

Uses advised against

The use of the substance should be limited to those specified in Annex 1.

SUPPLIER:

Company name: SIBUR-KSTOVO LLC
Address: Osharskaya str. 63, 603600 Nizhny Novgorod, GSP-247, Russian Federation
Contact Telephone: +7 (8313) 27-56-41; 27-53-23
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Emergency Telephone: +7 (8313) 27-52-98 (office hours only, GMT+3)

Emergency phone in the country of delivery: 112 (Please note that emergency numbers may vary depending upon the country of delivery though 112 remains valid as universal number)

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ONLY REPRESENTATIVE:

Company name: Gazprom Marketing and Trading France
Address: 68 avenue des Champs-Élysées, Paris, 75008, France
Contact phone: +33 1 42 99 73 50
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Email address: yury.severinchik@gazprom-mt.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 CLASSIFICATION

Distillates (petroleum), steam-cracked, C8-12 fraction

CLASSIFICATION AND LABELLING ACCORDING TO DSD / DPD

Base Classification

Physical/Chemical Hazards:

R10 Flammable.

Health Hazards:

Xn; R65 Harmful; Harmful: may cause lung damage if swallowed

Xi; R36 Irritant; Irritating to eyes.

Xi; R38 Irritant; Irritating to skin

Carc. Cat. 2; R45 May cause cancer

Muta. Cat. 2; R46 May cause heritable genetic damage

Environmental hazards:

N; R51/53 Dangerous for the environment; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Additional classification

Health Hazards:

R20: Harmful by inhalation

R37: Irritating to respiratory system

CLASSIFICATION AND LABELLING ACCORDING TO EU CLP 2008:

Base Classification

Physical/Chemical Hazards:

Flam. Liquid 3 (Hazard statement: H226: Flammable liquid and vapour).

Health Hazards:

Skin: Skin Irritation 2. H315: Causes skin irritation.

Serious damage/eye irritation: Eye Irrit. 2 H319. Causes serious eye irritation

Aspiration hazard: Asp. Tox. 1 H304. May be fatal if swallowed and enters airways

Germ cell mutagenicity: Muta. 1B H340. May cause genetic defects

Carcinogenicity: Carc. 1B H350. May cause cancer

Environmental hazards:

Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects

Additional classification

Health Hazards:

Acute Toxicity – Inhalation: Acute Tox. 3: H331: Toxic if inhaled

Specific target organ toxicity – single. STOT Single. Exp. 3 H335. May cause respiratory irritation.

2.2 LABELLING

EU LABELLING

Indication of danger:

T - toxic

N - dangerous for the environment



T



N

Symbol: T; N

CLP LABELLING

Signal word: Danger

Hazard pictogram:



GHS02: flame



GHS08: health hazard



GHS07: exclamation mark



GHS09: environment

Additional classification



GHS06: skull and crossbones

The Full Text for all S, P-Phrases is displayed in Section 15.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

LPP-C9 is a complex combination of hydrocarbons obtained by distillation of residual oils from the steam-cracked of petroleum or natural gas. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C10 and boiling in the range of 150°C to 210°C (302°F to 410°F).

Name	EC-No	CAS-No	Content, %	Classification 67/548 and EEC/EU CLP 2008
LPP-C9	305-586-4	94733-07-0	100	R10;Xn:R68;Xi:R36,38;N:51/53+Xn:R20;Xi:R37 H226;H315;H319;H304;H340;H350;H411+ H331,335
Including substances affecting general product classification and labeling:				
benzene	200-753-7	71-43-2	0.135-0.40	F:R11;CMR1&2:R45/46;T:R48/23/24/25;Xn:R65; Xi:R38,67
toluene	203-625-9	108-88-3	0.35-0.60	F:R11;Car3:R63;Xn:R48/20, R65; Xi:R38,67
3a,4,7,7a-tetrahydro-4,7-methanoindene (dicyclopentadiene):				
	201-052-9	77-73-6	19.0-22.0	F:R11;Xn:R20/22;Xi:R36/37/38;N:R51/53
naphthalene	202-049-5	91-20-3	0.45-0.83	Car3:R40;Xn:22, R65; N:R50/53
isoprene	201-143-3	78-79-5	1.15-2.4	F+:R12, CMR2/3;R45/68, R52/53
styrene	202-851-5	100-42-5	20.0-22.0	F:R10, Xn;R20, Xi;R36/38
p-xylene	203-396-5	106-42-3	1.6-3.1	F:R10; Xi;R38
o-xylene	202-422-2	95-47-6	2.7-3.5	F:R10; Xi;R38
m-xylene	203-576-3	108-38-3	2.6-4.8	F:R10; Xi;R38
ethylbenzene	202-849-4	100-41-4	1.6-6.1	F:R11; Xn;R20

SECTION 4. FIRST-AID MEASURES

PRODUCT-SPECIFIC HAZARDS

Flammable liquid and vapour.

Causes skin and eye irritation.

Risk of serious damage to the lungs if swallowed (by subsequent aspiration).

Other hazards (depending on concentrations of benzene, naphthalene, toluene, xylenes, ethylbenzene and styrene):

May cause cancer and genetic defects.

May cause respiratory irritation

Harmful if ingested.

Vapours may cause drowsiness or dizziness.

Suspected of damaging fertility or the unborn child.

GENERAL ADVICE

Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures.

Take care to self-protect by avoiding becoming contaminated.

Use adequate respiratory protection.

Move contaminated patient(s) out of the dangerous area.

Take off all contaminated clothing and shoes.

Seek medical assistance - show the material safety data sheet or label if possible.

INHALATION

Move to fresh air.

Do not leave the victim unattended.

Keep patient warm and at rest.

Seek immediate medical attention.

If breathing is difficult, give oxygen if possible or assisted ventilation, (do not use mouth to mouth).

If unconscious place in recovery position.

In the event of cardiac arrest, (no pulse), apply cardiopulmonary resuscitation.

SKIN CONTACT

Take off all contaminated clothing and shoes.

Immediately flush affected area with plenty of soap and water – continue for at least 15 minutes.

If there are signs of irritation or other symptoms seek medical attention.

EYE CONTACT

Remove any contact lenses.

Flush eyes with water thoroughly and continuously for at least 15 minutes.

Keep eye wide open while rinsing.

Protect unharmed eye.

If there are signs of irritation or other symptoms seek medical attention.

If eye irritation, pain, swelling, lachrimation or photophobia persists, the patient should be seen in a specialist health care facility.

INGESTION

Do NOT induce vomiting, if vomiting does occur, have victim lean forward to reduce risk of aspiration. Get medical attention immediately.

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Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.

ADVICE TO PHYSICIAN

Causes eye irritation. This irritation can result in redness and swelling of the eyes.

Causes irritation to the skin. This irritation can result in redness and swelling of the skin. Repeated contact with the skin may cause it to become dry and cracked.

May cause respiratory irritation. If inhalation occurs, signs and symptoms may include sore throat, headache, nausea, coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and may cause transient central nervous system (CNS) depression.

In case of ingestion, Ipecac-induced emesis is not recommended.

Consider use of charcoal as a slurry (240mL water/30 g charcoal). Usual dose: 25 to 100 g in adults. If a potentially fatal dose has been ingested the stomach should be emptied by gastric lavage under qualified medical supervision with the airway protected by endotracheal intubation.

SECTION 5. FIRE-FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA

LARGE FIRE: Use water spray, water fog or foam. DO NOT use direct water jet.

SMALL FIRE: Dry powder or carbon dioxide (CO₂) extinguisher, dry sand or fire fighting foam.

UNSUITABLE EXTINGUISHING MEDIA

(Do Not use) Direct water jet.

Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

COMBUSTION PRODUCTS

Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

SPECIFIC HAZARDS DURING FIRE FIGHTING

Vapour is denser than air – flashback may be possible over considerable distances.

Containers may explode under fire conditions - use water spray to cool unopened containers.

Do not allow run-off from fire fighting to enter drains or water courses – may cause explosion hazard in drains and may reignite on surface water.

FURTHER INFORMATION

Special protective equipment for fire-fighters:

Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).

PERSONAL PRECAUTIONS

Wear personal protective equipment.

Avoid breathing vapours or mist.



Ensure adequate ventilation and absence of sources of ignition.
Beware of accumulation of vapours in low areas or contained areas, where explosive concentrations may occur.

ENVIRONMENTAL PRECAUTIONS

Land spillage:

Prevent further leakage or spillage if safe to do so.
Prevent spillage from entering drains, sewer, basement or confined areas.

SPILLAGES IN WATER OR AT SEA

Prevent further leakage or spillage if safe to do so.
If the spillage contaminates rivers, lakes or drains inform respective authorities.

METHODS FOR CLEAN UP

Contain spillage.

Small spillages can be taken up by collection with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and placed in container for disposal according to local / national regulations.

WATER SPILLAGE

If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10 deg C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

FURTHER ACCIDENTAL RELEASE MEASURES

Spillages of liquid product will create a fire hazard and form an explosive atmosphere.
Ensure all equipment is non-sparking or electrically bonded.
Avoid direct contact with released material.
Stay upwind.
Keep non-involved personnel away from the area of spillage.
Ensure adequate ventilation, especially in confined areas.

SECTION 7. HANDLING AND STORAGE

ADVICE ON SAFE HANDLING

Smoking, eating and drinking should be prohibited.
Use only in well ventilated areas.
Avoid all sources of ignition.
Use proper bonding and/or grounding procedures.
This material is a static accumulator: Take precautionary measures against static discharges.
Avoid contact with heat and ignition sources and oxidizing agents.
Containers should be opened only under exhaust ventilation hood.
Do not allow splash filling of bulk volumes.
Do not use compressed air for filling, discharging or handling.
Do not pressurise, cut, weld, braze, solder, drill, or grind on containers.
Dispose of rinse water in accordance with local and national regulations.
The vapour is heavier than air, beware of accumulation in pits and confined spaces.



The product will float on water and can be reignited on surface water.
 Handle empty containers with care; vapour residue may be flammable.
 Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products are followed.
 Cleaning, inspection and maintenance of the internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.

STORAGE

No smoking.
 Store in either mild steel or stainless steel containers or vessels.
 Store in a designated cool and well-ventilated place.
 Store in the original, tightly closed, container.
 Containers which are opened must be carefully resealed and kept upright to prevent leakage.
 Keep container tightly closed and properly labelled.
 Vapour space above stored liquid may be flammable/explosive unless blanketed with inert gas.
 Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.
 Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.
 For more information please see the identified uses in Appendix I of this SDS.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

DN(M)ELs for the general population: these LPP-C9 are used as intermediates, in manufacture and hence no exposure to the general population is likely.

DN(M)ELs for workers

Exposure pattern	Route	Descriptor	DNEL / DMEL
Acute - systemic effects	Dermal	No-threshold effect and/or no dose-response information available	
Acute - systemic effects	Inhalation	No-threshold effect and/or no dose-response information available	
Acute - local effects	Dermal	No-threshold effect and/or no dose-response information available	
Acute - local effects	Inhalation	No-threshold effect and/or no dose-response information available	
Long-term - systemic effects	Dermal	DNEL (Derived No Effect Level)	0.34 mg/kg bw/day LOAEL: 14.28 mg/kg bw/day
Long-term - systemic effects	Inhalation	DMEL (Derived Minimum Effect Level)	3.25 mg/m³

Exposure pattern	Route	Descriptor	DNEL / DMEL
Long-term - local effects	Dermal	No-threshold effect and/or no dose-response information available	
Long-term - local effects	Inhalation	No-threshold effect and/or no dose-response information available	

DN(M)ELs were determined on the basis of the most hazardous impurities within Distillates (petroleum), steam-cracked, C8-12 fraction under the following evaluation conditions:

- Dicyclopentadiene: $\leq 75\%$
- Methylcyclopentadiene: $\leq 60\%$
- Benzene: $< 0.1 - 25\%$
- 1,3-butadiene: $< 0.1 - 1\%$
- Isoprene: $< 0.1 - 3\%$
- Toluene: up to 22%
- Naphthalene: up to 48%
- Styrene: up to 40%
- C8 Aromatics (xylene, ethylbenzene) up to 25%

Marker substance	Indicative concentration (%)	Inhalation		Dermal	
		DN(M)EL mg/m ³	Relative hazard potential (max % ÷ DN(M)EL)	DN(M)EL mg/kg bw/d	Relative hazard potential (max % ÷ DN(M)EL)
dicyclopentadiene / methylcyclopentadiene	$\leq 75\%$	2.3	32.6	0.34	220
benzene	< 0.1 to 25	3.25	7.69	23.4	1.07
1,3-butadiene	< 0.1 to 1	2.21	0.45	<i>na</i>	<i>na</i>
isoprene	< 0.1 to 3	8.4	0.36	23.7	0.13
toluene	Up to 22	192	0.11	384	0.06
naphthalene	Up to 48	50	0.96	72	0.67
styrene	Up to 40	85	0.47	406	0.10
xylenes	Up to 25	221	0.11	3182	< 0.01
ethylbenzene	Up to 25	77	0.32	180	0.14

Environmental Exposure (Concentration (PEC)) sees Annex 2.

PROTECTIVE EQUIPMENT

Protective gloves, safety goggles, breathing apparatus and protective clothing. See Annex 1

RESPIRATORY EQUIPMENT

Wear breathing apparatus when workplace conditions require. See Annex 1

HAND PROTECTION

Wear appropriate protective gloves to prevent skin exposure. See Annex 1



EYE PROTECTION

Wear approved safety goggles. See Annex 1

HYGIENE MEASURES

Wash at the end of each work shift and before eating, drinking, smoking or using the toilet. See Annex 1.

SKIN PROTECTION

Wear protective clothing and boots. See Annex 1

For more information please see the identified uses in Appendix I of this SDS.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Liquid Colourless or yellow to dark brown
Odour:	Aromatic – gasoline like
Odour threshold	Not available
pH:	Not available
Molecular weight	Not available
Freezing point:	Not available
Melting point:	< -30°C to 45°C
Boiling point / range:	118 to 200° C
Autoignition temperature	409°C to 505°C
Flash point	36.5-37° C
Flammability:	Not available
Explosive properties(EXPLOSION LIMITS):	1.3 – 6.0 %
Oxidising properties:	Not applicable
Vapour pressure:	200 - 2757 Pa at 19 - 20°C; 111.9 - 4100 Pa at 25 °C; 410 - 7900 Pa at 34 °C; 200 - 1230 Pa at 50 °C
Relative density (at 20 °C):	0.890 – 0.945g/cm ³ at 20 °C
Solubility:	Not available
Water solubility:	62 – 108 mg/l at 20 °C
Log partition coefficient (n-octanol/water):	2.8 to >6.5
Viscosity:	1.81 mm ² /s at 20°C 1.33 mm ² /s at 40°C
Vapour density:	Not available
Evaporation rate (n-butyl acetate = 1):	Not available
Other information:	None
Hygroscopic:	
Coefficient of thermal expansion:	



SECTION 10. STABILITY AND REACTIVITY

STABILITY

Stable at room temperature in closed containers under normal storage and handling conditions. Product can slowly polymerise.

MATERIALS TO AVOID

Oxidizing agents, strong acids, aluminium chloride.

CONDITIONS TO AVOID

Ignition sources, excess heat, incompatible materials.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

	<u>Conclusion / Remarks</u>
Skin irritation or corrosion	
Assessment of available human and animal data,	Irritating.
Assessment of the acid or alkaline reserve In vitro studies	Not justified.
In vivo skin irritation	Irritating.
Eye irritation	
Assessment of available human and animal data,	Irritating.
Assessment of the acid or alkaline reserve In vitro study	Not justified.
In vivo eye irritation	Irritating.
Skin sensitisation	
Assessment of available human , animal and alternative data	Not sensitizing.
In vivo study	Not sensitizing.
Mutagenicity	
In vitro studies	Not genotoxic except for streams containing benzene or 1,3-butadiene at $\geq 0.1\%$, or isoprene at $\geq 1.0\%$. The components have been shown to be mutagenic.
In vivo studies	
Acute toxicity	
By oral route	Oral: No classification required for streams containing $< 25\%$ naphthalene or dicyclopentadiene. Category members containing $\geq 25\%$ naphthalene or dicyclopentadiene are considered to be harmful.
By inhalation	Inhalation: No classification required for streams containing $< 3\%$ dicyclopentadiene. Category



By dermal route	members containing $\geq 3\%$ dicyclopentadiene are considered to be harmful, and $\geq 25\%$ are considered to be toxic. Dermal: Low toxicity following single exposure – no classification required.
Repeated dose toxicity	
Short term and sub-chronic toxicity	No classification required for streams containing $< 1\%$ benzene, and $< 10\%$ toluene. Category members containing $\geq 1\%$ but $< 10\%$ benzene or $\geq 10\%$ toluene are considered to be harmful. Category members containing $\geq 10\%$ benzene are classified as toxic.
Reproductive toxicity	
Fertility Pre-natal developmental tox. study	For streams that contain toluene at concentrations greater than or equal to 5% (EU/DPD) or 3% (GHS/CLP), classification is required for developmental toxicity
Toxicokinetics	No data available for members of the category.
Chronic/Other Effects	Streams containing $\geq 0.1\%$ benzene, 1,3-butadiene or isoprene are considered carcinogens. Streams containing $\geq 20\%$ dicyclopentadiene may cause respiratory irritation.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity:

Experimental data from reliable studies are available for acute aquatic ecotoxicity endpoints for some member of the category, and will be read-across to all other category members. Data are not available for sediment or soil toxicity.

Aquatic toxicity:

Short term toxicity testing on invertebrates (Daphnia; 48hr EC50):	0.76 – 2.9 mg/l
Long term toxicity testing on invertebrates (Daphnia):	Not available
Growth inhibition study aquatic plants (72hr EC50):	0.94 mg/l
Short term toxicity testing on fish (96hr LC50):	0.58 – 13.5 mg/l
Long term toxicity testing on fish:	Not available
Activated sludge respiration inhibition testing (15hr EC50):	Not available
Long term toxicity to sediment organisms	Not available
Terrestrial toxicity	
Long term toxicity to invertebrates:	Not available
Effects on soil microorganism:	Not available
Long-term toxicity to plant:	Not available
Long-term or reproductive toxicity to birds:	Not available

Mobility:

Adsorption / desorption:	Not available (UVCB)
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Persistence and degradability:



Biotic	
Ready biodegradability:	Not expected to be readily biodegradable
Simulation testing:	Not available
Abiotic:	
Hydrolysis as a function of pH:	Will not undergo hydrolysis
Identification of degradation products:	Not available
Photolysis:	Will not undergo photolysis
Atmospheric oxidation:	Expected to rapidly degrade by indirect photolysis in air
<u>Bioaccumulative potential:</u>	
Log BCF (calculated): 26 – 174. For a C15 Olefin, calculated BCF was 18000.	
<u>PBT/vPvB:</u> Does not meet criteria.	
<u>Other adverse effects:</u>	
none	

SECTION 13. DISPOSAL CONSIDERATIONS

GENERAL INFORMATION

Place into a suitable closed container for disposal.

DISPOSAL METHODS

Dispose of in accordance with local and national regulations. All equipment must be grounded. DO NOT CUT, DRILL, GRIND, WELD OR PERFORM SIMILAR OPERATIONS ON OR NEAR CONTAINERS EVEN WHEN EMPTY.

SECTION 14. TRANSPORT INFORMATION

GENERAL

The product is covered by international regulations on the transport of dangerous goods under UN DOT, hazard class 3 (flammable liquid)

	UN	ADR	RID	IMDG	ICAO
UN number	1992	1992	1992	1992	1992
Class	3	3	3	3	3
Packing group	III	III	III	III	III
Transport category		3	3		
Hazard label		3	3		

SECTION 15. REGULATORY INFORMATION

Chemical Safety Report has been performed for distillates (petroleum), steam-cracked, C8-12 fraction.

APPENDIX II TO THE eSDS: Exposure scenarios for distillates (petroleum), steam-cracked, C8-12 fraction.

S-phrases:

- S16 - keep away from sources of ignition - No smoking
- S33 - take precautionary measures against static discharges
- S36/37 - wear suitable protective clothing and gloves



S62 - if swallowed, do not induce vomiting: seek medical advice immediately and show this container or label
S45 - in case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
S53 - avoid exposure - obtain special instructions before use
S61 - avoid release to the environment. refer to special instructions/safety data sheets

Precautionary statements:

P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking.
P243: Take precautionary measures against static discharge.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331: Do NOT induce vomiting.
P273: Avoid release to the environment.
P391: Collect spillage.

Additional classification

Precautionary statements:

P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

UK REGULATORY REFERENCES

Chemicals (Hazard Information & Packaging) Regulations. The Control of Substances Hazardous to Health Regulations 1988. Health and Safety at Work Act 1974.

ENVIRONMENTAL LISTING

Control of Pollution Act 1974.

EU DIRECTIVES

System of specific information relating to Dangerous Preparations. 2001/58/EC. Dangerous Preparations Directive 1999/45/EC.

Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labeling of dangerous substances.

STATUTORY INSTRUMENTS

Notification of New Substances Regulations (NONS) 1993. The Export and Import of Dangerous Chemicals Regulations 2005 number 928.

APPROVED CODE OF PRACTICE

Classification and Labelling of Substances and Preparations Dangerous for Supply (EU 2001/59/EC). Safety Data Sheets for Substances and Preparations (REACH)

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GUIDANCE NOTES

Workplace Exposure Limits EH40. Introduction to Local Exhaust Ventilation HS(G)37. CHIP for everyone HSG(108).

NATIONAL REGULATIONS

The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. No. 1689.

Workplace Exposure Limits 2005 (EH40).

The Carriage of Dangerous Goods and use of transportable pressure equipment regulations 2004.

Control of Substances hazardous to health regulations 2002 (as amended).

NATIONAL REGULATIONS (GERMANY)

Major Accident Hazard Legislation 82/501/EWG.

SECTION 16. OTHER INFORMATION

ISSUED BY HS&E Manager

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DISCLAIMER

This information is based on our current level of knowledge. This information may be subject to revision as new knowledge and experience becomes available, and SIBUR makes no warranties and assumes no liability in connection with any use of this information. Since SIBUR cannot be aware of all aspects of your business and the impact the REACH Regulation has for your company, SIBUR strongly encourages you to get familiar with the REACH Regulation in order to comply with its requirements and timelines.

Annex 1

Relevant identified uses of the substance

Table 1. Uses by workers in industrial settings

Identified Use (IU) name	Use descriptors	Risk Management Measures
Manufacture	<p>Process category (PROC):</p> <p>PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC):</p> <p>ERC 1: Manufacture of substances ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>Sector of end use (SU):</p> <p>SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: SU 3</p>	<p>Sample via a closed loop or other system to avoid exposure [E8]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Handle substance within a predominantly closed system provided with extract ventilation [E49]. Transfer via enclosed lines [E52]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]. Store substance within a closed system [E84]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Wear suitable gloves tested to EN374 [PPE15]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]; Clear spills immediately [C&H13]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].</p>
Distribution	<p>Process category (PROC):</p> <p>PROC 1: Use in closed process, no</p>	<p>Clear spills immediately [C&H13]. Sample via a closed loop or other system to avoid exposure [E8]</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
	<p>likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 1: Manufacture of substances ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6b: Industrial use of reactive processing aids ERC 6c: Industrial use of monomers for manufacture of thermoplastics ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers ERC 7: Industrial use of substances in closed systems ERC 2: Formulation of preparations ERC 3: Formulation in</p> <p>Sector of end use (SU): SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: SU 3</p>	<p>Provide a good standard of general or controlled ventilation (not less than 3 to 5 air changes per hour) [E11]. Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Handle substance within a predominantly closed system provided with extract ventilation [E49]. Transfer via enclosed lines [E52]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]. Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28]. Wear suitable gloves tested to EN374 [PPE15]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p>
Use as an Intermediate	<p>Process category (PROC): PROC 1: Use in closed process, no</p>	<p>RMMs identified for manufacturing are also</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
	<p>likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>Sector of end use (SU): SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: SU 3</p>	<p>applicable for intermediate use.</p>
Formulation	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or</p>	<p>Clear spills immediately [C&H13]. Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Handle substance within a closed system [E47]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69].</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
	<p>preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 2: Formulation of preparations</p> <p>Sector of end use (SU): SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU 0: Other: 3</p>	<p>Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Avoid carrying out activities involving exposure for more than 15 minutes [OC26]. Avoid carrying out activities involving exposure for more than 1 hour [OC27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28] Wear suitable gloves tested to EN374 [PPE15]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]. Wear suitable coveralls to prevent exposure to the skin [PPE27].</p>
Use in Coatings	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 4: Industrial use of processing aids in processes and products, not becoming part of</p>	<p>Clear spills immediately [C&H13]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Carry out in a vented booth provided with laminar airflow [E59]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]. Use container to collect drips [E73]. Avoid manual contact with wet work pieces [E117]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Limit the substance content in the product to 25% [OC18].</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
	<p>articles</p> <p>Sector of end use (SU): SU 0: Other: SU 3 Industrial</p>	<p>Avoid carrying out activities involving exposure for more than 1 hour [OC27].or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p> <p>Avoid carrying out activities involving exposure for more than 4 hours [OC28] or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training [PPE16].</p> <p>Wear a full face respirator conforming to EN140 with Type A filter or better. [PPE24]</p> <p>Avoid carrying out activities involving exposure for more than 1 hour [OC27].or: Wear a full face respirator conforming to EN140 with Type A filter or better. [PPE24]</p>
<p>Use as a fuel industrial</p>	<p>Process category (PROC):</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 1: Use in closed process, no likelihood of exposure</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>Environmental release category (ERC):</p> <p>ERC 7: Industrial use of substances in closed systems</p> <p>Sector of end use (SU): SU 0: Other: SU 3 Industrial</p>	<p>Clear spills immediately [C&H13]. Sample via a closed loop or other system to avoid exposure [E8]</p> <p>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].</p> <p>Clear transfer lines prior to de-coupling [E39].</p> <p>Handle substance within a closed system [E47].</p> <p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Use drum pumps [E53].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Drain down and flush system prior to equipment break-in or maintenance [E55].</p> <p>Use drum pumps or carefully pour from container [E64].</p> <p>Drain down system prior to equipment break-in or maintenance [E65].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure operation is undertaken outdoors [E69].</p> <p>Store substance within a closed system [E84].</p> <p>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENV4].</p> <p>Avoid carrying out activities involving exposure for more than 1 hour [OC27].</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
		<p>Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Wear suitable gloves tested to EN374 [PPE15]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p>
Polymer Production	<p>Process category (PROC):</p> <p>PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>Environmental release category (ERC):</p> <p>ERC 4: Industrial use of processing aids in processes and products not becoming part of articles ERC 6c: Industrial use of monomers for manufacture of thermoplastics</p>	<p>Sample via a closed loop or other system to avoid exposure [E8]. Provide a good standard of general or controlled ventilation (not less than 3 to 5 air changes per hour) [E11]. Provide a good standard of general or controlled ventilation (not less than 3 to 5 air changes per hour) [E11]. or Ensure operation is undertaken outdoors [E69]. Handle substance within a closed system [E47]. Handle substance within a predominantly closed system provided with extract ventilation [E49]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]. Store substance within a closed system [E84]. Limit the substance content in the product to 5% [OC17]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28]. Wear suitable gloves tested to EN374 [PPE15]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]. Clear spills immediately [C&H13].</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
	<p>Sector of end use (SU): SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU 0: Other: 3</p>	<p>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].</p>
<p>Polymer Processing</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring</p> <p>Environmental release category (ERC): ERC 4: Industrial use of processing aids in processes and products not becoming part of articles</p> <p>Sector of end use (SU): SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU 0: Other: 3</p>	<p>Clear spills immediately [C&H13]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. or Ensure operation is undertaken outdoors [E69]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Drain down system prior to equipment break-in or maintenance [E65]. Provide extract ventilation to material transfer points and other openings [E82]. Limit the substance content in the product to 5% [OC17]. Limit the substance content in the product to 25% [OC18]. Avoid carrying out activities involving exposure for more than 1 hour [OC27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Wear suitable gloves tested to EN374 [PPE15]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].</p>
<p>Rubber Production and Processing</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure</p>	<p>Clear spills immediately [C&H13]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</p>



Identified Use (IU) name	Use descriptors	Risk Management Measures
	<p>PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 7: Industrial spraying PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers ERC 1: Manufacture of substances ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>Sector of end use (SU): SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU 0: Other: 3</p>	<p>[E11]. Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Handle substance within a predominantly closed system provided with extract ventilation [E49]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENV4]. Limit the substance content in the product to 5% [OC17]. Avoid carrying out activities involving exposure for more than 4 hours [OC28] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].</p>



Table 2. Uses by professional workers

Identified Use (IU) name	Use descriptors	Risk Management Measures
Use as a fuel professional	<p>Process category (PROC):</p> <p>PROC 1: Use in closed process, no likelihood of exposure</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>Environmental release category (ERC):</p> <p>ERC 9a: Wide dispersive indoor use of substances in closed systems</p> <p>ERC 9b: Wide dispersive outdoor use of substances in closed systems</p> <p>Sector of end use (SU): 22</p>	<p>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].</p> <p>Clear transfer lines prior to de-coupling [E39].</p> <p>Handle substance within a closed system [E47].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Drain down and flush system prior to equipment break-in or maintenance [E55].</p> <p>Use drum pumps or carefully pour from container [E64].</p> <p>Drain down system prior to equipment break-in or maintenance [E65].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].</p> <p>Limit the substance content in the product to 5% [OC17].</p> <p>Avoid carrying out activities involving exposure for more than 1 hour [OC27].</p> <p>Avoid carrying out activities involving exposure for more than 4 hours [OC28]</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].</p> <p>Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].</p>



Annex 2

Environmental Exposure (Concentration (PEC))

	local output- Manufacture	local output- Use as Inter	local output- Distribution	local output- Formulation	local output- Use as a fuels	local output- Use as a fuels	local output- Use as a fuels	local output- Uses in coatings	local output- Polymer production	local output- Polymer processing	local output- Rubber production
Environmental Exposure											
PEC effluent (mg/L)	1.0E-01	1.3E-01	1.3E-02	1.3E-01	1.1E-02	5.3E-05	2.6E-05	6.4E-01	6.4E-02	1.0E-22	3.2E-01
PEC air (mg/m ³)	2.7E-03	1.6E-03	4.0E-04	2.8E-03	1.0E-03	2.0E-04	2.0E-04	1.0E-03	2.7E-04	3.8E-03	2.3E-03
PEC freshwater (mg/L)	2.6E-03	1.3E-02	1.3E-03	1.3E-02	1.1E-03	1.2E-04	1.2E-04	6.4E-02	6.4E-03	1.1E-04	3.2E-02
PEC marine (mg/L)	1.0E-03	1.3E-03	1.3E-04	1.3E-03	1.1E-04	5.3E-07	7.3E-07	6.4E-03	6.4E-04	4.7E-07	3.2E-03
PEC freshwater sediment (mg/kg ww)	1.1E-02	5.4E-02	5.4E-03	5.4E-02	4.5E-03	5.8E-04	5.7E-04	2.7E-01	2.7E-02	5.6E-04	1.3E-01
PEC marine sediment (mg/kg ww)	4.3E-03	5.4E-03	5.4E-04	5.4E-03	4.5E-04	5.4E-06	4.3E-06	2.7E-02	2.7E-03	3.2E-06	1.3E-02
PEC agricultural soil (mg/kg ww)	2.3E-05	1.5E-05	8.1E-06	2.4E-05	8.3E-06	6.9E-06	8.2E-06	1.0E-05	7.2E-06	3.1E-05	2.0E-05
PEC groundwater (mg/L)	9.3E-06	6.4E-06	1.2E-06	9.9E-06	3.1E-06	3.1E-07	1.5E-07	5.6E-06	1.1E-06	1.1E-05	8.2E-06
PEC oral freshwater fish (mg/kg ww)	2.0E-02	9.6E-02	3.5E-03	9.6E-02	9.0E-03	1.1E-03	1.1E-03	1.6E-01	1.6E-02	4.2E-04	8.0E-02
PEC oral marine top predator (mg/kg ww)	3.9E-03	2.0E-02	6.3E-04	2.0E-02	1.6E-03	8.1E-04	8.5E-05	3.3E-02	3.3E-03	3.8E-05	1.7E-02