



VERSION: 2.1
DATE CREATED: 08/12/2010

SIBUR-NEFTEKHIM JSC

SAFETY DATA SHEET

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

DIETHYLENE GLYCOL

VERSION: 2.1
DATE CREATED: 08/12/2010
DATE UPDATED: 08/02/2011
Regulation: EC No 1272/2008

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

1.1 Product identifier

NAME OF SUBSTANCE: 2,2'-oxydiethanol
SYNONYMS: 2,2'-oxybisethanol, ethylene diglycol, diethylene glycol
TRADE NAMES: diethylene glycol, DEG
Index No (CLP) 603-140-00-6
CAS #: 111-46-6
EC #: 203-872-2
REGISTRATION #: 01-2119457857-21-0022

1.2. Relevant identified uses of the substance.

See Annex 1

Most common technical function of substance:

Anti-freezing agents

Intermediates

Anti-set off and adhesive agents

Biocide substances

Colouring agents, dyes

Heat transfer agents

Laboratory chemicals

Uses advised against:

PC 29: Pharmaceuticals

1.3. Details of the supplier of the safety data sheet

SUPPLIER:

Company name: SIBUR-NEFTEKHIM JSC
Address: 63, Osharskaya str., Nizhny Novgorod, 603600, GSP-247,
Russian Federation
Contact Telephone: +7 (8313) 27-56-41; 27-53-23
Fax: +7 (8313) 27-10-30; (8312) 78-39-61
Email Address: doot@sibur.nnov.ru; info@sibur.nnov.ru
Emergency Telephone: +7 (8313) 27-59-98 (office hours only, GMT+3)

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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*)

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
Fax: +33 1 42 99 73 99
Email address: yury.severinchik@gazprom-mt.com

SECTION 2. HAZARDS IDENTIFICATION

2.1 CLASSIFICATION:

Diethylene glycol

ANNEX I OF DIRECTIVE 67/548/EEC:

Physical/Chemical Hazards:
None

Health Hazards:
Xn; R22 Harmful; Harmful if swallowed

Environmental hazards:
None

EU CLP 2008:

Physical/Chemical Hazards:
None

Health Hazards:
H302, Acute Tox. 4. Harmful if swallowed.
H373, STOT Rep. Exp. 2 (May cause damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. Affected organs: kidneys.)

Environmental hazards:
None

2.2 LABELLING

EU LABELLING

Indication of danger: Harmful



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Symbol: Xn

CLP LABELLING

Signal word: Warning

Hazard pictogram:



GHS07: exclamation mark GHS08: health hazard

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

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	EC-No	CAS-No	Content, %	Classification 67/548/EEC and EU CLP 2008
Diethylene glycol	203-872-2	111-46-6	99.5 — 100	Xn; R22; H302; H373

Specific Conc. Limits (CLP): none

The product does not contain impurities or additives that could affect product's labelling and classification according to 67/548/EEC and EU CLP 2008.

SECTION 4. FIRST-AID MEASURES

GENERAL ADVICE:

Remove contaminated clothing.

IF INHALED:

Keep patient calm, remove to fresh air, seek medical attention.

ON SKIN CONTACT:

Wash thoroughly with soap and water.

ON CONTACT WITH EYES:

Wash affected eyes for at least 15 minutes under running water with eyelids held open.

ON INGESTION:

Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.



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NOTE TO PHYSICIAN:

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

SECTION 5. FIRE-FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA:

Water spray, dry powder, alcohol-resistant foam, carbon dioxide.

SPECIAL PROTECTIVE EQUIPMENT:

Wear a self-contained breathing apparatus.

FURTHER INFORMATION:

The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Avoid contact with skin and eyes. Use personal protective clothing.

ENVIRONMENTAL PRECAUTIONS:

Do not empty into drains. Do not discharge into the subsoil/soil.

METHODS FOR CLEANING UP OR TAKING UP:

For small amounts: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr).

For large amounts: Pump off product.

SECTION 7. HANDLING AND STORAGE

HANDLING

Protection against fire and explosion:

Take precautionary measures against static discharges.

Electrical devices must meet the specified temperature class.

Temperature class: T2 (Autoignition temperature >300 °C).

STORAGE

Suitable materials for containers: aluminium, Stainless steel 1.4439, High density polyethylene (HDPE), light-impervious.

Further information on storage conditions: Keep container tightly closed and dry; store in a cool place. Protect from air. Protect from atmospheric humidity. Protect contents from the effects of light.

Storage stability:

Storage temperature: < 40 °C

The stated storage temperature should be noted.

Storage duration: 12 Months

For more information please see the relevant exposure scenario in Appendix II of this SDS

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

DN(M)ELs for workers

Exposure pattern	Route	Descriptor	DNEL / DMEL	(Corrected) Dose descriptor *)	Most sensitive endpoint
Long-term - systemic effects	Dermal	DNEL (Derived No Effect Level)	106 mg/kg bw/day	NOAEL: 4,452 mg/kg bw/day (based on AF of 42)	repeated dose toxicity
Long-term - local effects	Inhalation	DNEL (Derived No Effect Level)	60 mg/m ³	NOAEC: 120 mg/m ³ (based on AF of 2)	irritation / corrosion (eye and skin)

DN(M)ELs for the general population

Exposure pattern	Route	Descriptor	DNEL / DMEL	(Corrected) Dose descriptor *)	Most sensitive endpoint
Long-term - systemic effects	Dermal	DNEL (Derived No Effect Level)	53 mg/kg bw/day	NOAEL: 4,452 mg/kg bw/day (based on AF of 84)	repeated dose toxicity
Long-term - local effects	Inhalation	DNEL (Derived No Effect Level)	12 mg/m ³	NOAEC: 144 mg/m ³ (based on AF of 12)	irritation (respiratory tract)

PNEC water

PNEC	Assessment factor	Remarks/Justification
PNEC aqua (freshwater): 10 mg/L	10	Extrapolation method: assessment factor For the glycole category acute and chronic tests for all three trophic levels are available. No effects to aquatic organisms measured up to a concentration of 100 mg/L.
PNEC aqua (marine water): 1 mg/L	100	Extrapolation method: assessment factor For the glycole category acute and chronic freshwater tests for all three trophic levels are available. No effects to aquatic organisms measured up to a concentration of 100 mg/L.
PNEC aqua (intermittent releases): 199.5 mg/L	10	Extrapolation method: assessment factor Justification based on NOEC 1995 mg/L for substances with non-specific mode of action.

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PNEC sediment

PNEC	Assessment factor	Remarks/Justification
PNEC sediment (freshwater): 20.9 mg/kg sediment dw		Extrapolation method: partition coefficient Calculated using equilibrium partitioning method.

PNEC soil

PNEC	Assessment factor	Remarks/Justification
PNEC soil: 1.53 mg/kg soil dw		Extrapolation method: partition coefficient Calculated using equilibrium partitioning method.

PNEC sewage treatment plant

Value	Assessment factor	Remarks/Justification
PNEC STP: 10 mg/L	10	Extrapolation method: assessment factor Justification base on NOEC > 100 mg/L of respiration inhibition test.

Calculation of PNEC_{oral} (secondary poisoning)

According to chapter 4.4 Secondary Poisoning, secondary poisoning is of no concern for this substance. Therefore, no PNEC_{oral} is derived and no risk assessment on secondary poisoning is performed

PNEC oral

PNEC	Assessment factor	Remarks/Justification
		As the substance is not considered bioaccumulative, secondary poisoning is not a relevant exposure route. Hence, a respective assessment is not performed for this substance.

EXPOSURE LIMITS

None listed.



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PROTECTIVE EQUIPMENT

Protective gloves, safety goggles and protective clothing.

RESPIRATORY EQUIPMENT

Wear positive pressure self-contained breathing apparatus if warranted by workplace conditions.

HAND PROTECTION

Wear approved protective gloves.

EYE PROTECTION

Wear approved safety goggles.

HYGIENE MEASURES

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

SKIN PROTECTION

Wear protective clothing.

For more information please see the relevant exposure scenario in Appendix II of this SDS

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Results	Remarks
Physical state at 20°C and 1013 hPa	liquid Form: viscous Colour: colourless Odour: nearly odourless	
Melting / freezing point	-6.5 °C	
Boiling point	244.9 °C at 1013 hPa	
Relative density	1.18 g/cm ³ at 20 °C	
Vapour pressure	0.008 hPa at 25 °C	
Surface tension	not surface active	Based on chemical structure, no surface activity is predicted.
Water solubility	miscible in any proportion	
Partition coefficient n-octanol/water (log value)	-1.98	
Flash point	138 °C	
Flammability	Non flammable upon ignition. The substance has no pyrophoric properties and does not liberate flammable gases on contact with	Flammability derived from flash point. Based on chemical structure, no pyrophoric properties and no flammability in contact with water are

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	water.	predicted.
Explosive properties	non explosive	There are no chemical groups associated with explosive properties present in the molecule.
Self-ignition temperature	229 °C	
Oxidising properties	no oxidising properties	The Substance is incapable of reacting exothermically with combustible materials on the basis of the chemical structure.
Granulometry	not applicable	Substance is marketed or used in a non solid or granular form.
Stability in organic solvents and identity of relevant degradation products	not applicable	The stability of the substance is not considered as critical.
Dissociation constant	not applicable	The substance does not contain any ionic structure.
Viscosity	30 mPas at 25 °C	

SECTION 10. STABILITY AND REACTIVITY

STABILITY

Stable under normal temperatures and pressures. Hygroscopic (absorbs moisture from the air).

MATERIALS TO AVOID

Strong oxidizing agents, strong acids, strong bases.

CONDITIONS TO AVOID

Moisture, excess heat.

HAZARDOUS DECOMPOSITION PRODUCTS

(CO)x: Carbon monoxide, carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

Property	Results	Remarks
Acute toxicity		
oral	LD50: 19600 mg/kg bw (rat male) LD50: 16500 mg/kg bw (rat male/female) LD50: 1120 mg/kg bw	Diethylene glycol is classified according to Annex 1 to the Directive 67/548/EEC with Xn; R 22 (classification according to frequent lethal effects in human). Rodents - in contrast to human - do not appear to be responsive to the nephrotoxic effects of DEG.

inhalation	LC50 (4 h): > 4.6 mg/L air (No animals died during the 14-day observation period. The LCLo was 4.4-4.6 mg/l.) Rat/inhalation: aerosol	Classification concerning acute inhalation is not warranted.
dermal	LD50: 13300 mg/kg bw (rabbit)	For the dermal route of exposure, classification is not needed
Irritation Eye/ Skin	not irritating	
Corrosivity	The chemical showed no irritating properties	
Sensitisation: skin sensitization/ Respiratory system	not sensitising	The chemical showed no irritating properties
Repeated dose toxicity:	EU classification regarding repeated oral toxicity is not warranted; however, a potential for oxalate nephrosis and renal toxicity is classified according to GHS with STOT for repeated dose toxicity.	
Mutagenicity:	Classification concerning genetic toxicity is not warranted	
In vitro data In vivo data	negative negative	
Carcinogenicity	classification for carcinogenicity is not needed. Carcinogenicity: oral NOAEL (carcinogenicity): 750 mg/kg bw/day Carcinogenicity: inhalation is not available. Carcinogenicity: dermal is not available. Carcinogenicity: other routes is not available.	Results of studies on the chronic oral toxicity (rat, male)
Toxicity for reproduction:	No effects were found; no classification for developmental toxicity / teratogenicity is warranted.	
Effects on fertility	NOAEL (fertility): 3060 mg/kg bw/day (mouse/male/female, general effects/ oral: drinking water) NOAEL (no data): 2200 mg/kg bw/day (male/female/general effects/ oral)	

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Developmental toxicity	NOEL (developmental toxicity): 1 ml/kg/day rat /oral	
Toxicokinetics (absorption, metabolism, distribution and elimination)	Diethylene glycol is classified according to Annex 1 to the Directive 67/548/EEC with Xn; R 22 (classification according to frequent lethal effects in human). Rodents - in contrast to human - do not appear to be responsive to the nephrotoxic effects of DEG.	
<p>After ingestion diethylene glycol was rapidly and quantitatively absorbed by rats and distributed in all tissues. After a single, 12-hour application of diethylene glycol to the skin of rats in doses of 50 mg/kg body weight, about 10% of the dose was absorbed. In the acutely toxic dose range, oxalic acid was found in the urine of male rats and oxalate crystals in the kidneys. After a single high dose of diethylene glycol, no metabolism to either monoethylene glycol or oxalate was observed in rats. In long-term experiments an increase was observed in the level of oxalate excreted in the urine of male rats. This indicates that the ether bridge can, in principle, be split; however, the oxalic acid concentrations in the blood and kidneys after administration of diethylene glycol remain lower than after administration of the same amounts of ethylene glycol. After a single oral or intravenous dose of ¹⁴C-labelled diethylene glycol of 1.1 g/kg body weight, no ether cleavage products were found in the urine of male rats, only the administered substance, and after 6 and 12 hours about 20% and 32% of the dose was recovered as 2-hydroxyethoxyacetic acid. Contamination with monoethylene glycol has been suggested in other studies as the source of oxalic acid. After inhibition of alcohol dehydrogenase (ADH) with pyrazole the authors found almost exclusively diethylene glycol in urine and no 2-hydroxyethoxyacetic acid. The acute toxicity was also lowered by phrasal, which indicates that the metabolites are the cause of the nephrotoxic effects. After administration of single oral doses of ¹⁴C-diethylene glycol of 1, 5 and 10 mg/kg body weight (1.1, 5.6, 11.2 g/kg body weight) to male rats, the radioactivity in the blood was found to decrease with a half-life of about 3.5 hours; 73% - 96% of the total radioactivity was excreted with the urine. As a result of the diuretic effect, the two higher doses of diethylene glycol were excreted at a faster rate than was the low dose. The main metabolite found was 2-hydroxyethoxyacetic acid.</p> <p>It can be assumed that the nephrotoxic effects are caused by the formation of monoethylene glycol and its nephrotoxic metabolites (glyoxylic acid, glyoxale and oxalic acid), but also 2-hydroxyacetic aldehyde appears to be conceivable which is considered as the nephrotoxic metabolite of 1.4-Dioxane.</p>		
Other effects: none		

SECTION 12. ECOLOGICAL INFORMATION

Property	Value	Remarks
AQUATIC TOXICITY		
Fish:		
Short-term toxicity testing on fish. (<i>Pimephales promelas</i>)	LC50 (96 h): 75200 mg/L test mat. (nominal)	Based on key study Method: special acute fish toxicity test system by the Center for Lake Superior Environmental Studies, University of Wisconsin-Superior (Geiger DL, Brooke LT, Call DJ (1990))
Long-term toxicity to fish (<i>Pimephales promelas</i>)	NOEC (7 d): 15380 mg/L LC50 (28 d): > 1500 mg/L	Based on key study EPA 600/4-90/027. U.S. Environmental Protection Agency Method: according to ASTM E-47.01, Draft No. 3, 1980 (standard for toxicity tests with the early life stages of fish)

Aquatic invertebrates:		
Short-term toxicity to aquatic invertebrates (<i>Daphnia Magna</i>)	EC50 (24 h): > 10000 mg/L test mat. (nominal) based on: mobility	Based on key study Method: basic method for the implementation of DIN 38412/11
Long-term toxicity to aquatic invertebrates	NOEC (7 d): 8590 mg/L based on: reproduction <i>Ceriodaphnia sp</i> EC50 (7 d): 40538 mg/L EC50 (14 d): 39356 mg/L EC50 (21 d): 33911 mg/L <i>Daphnia magna</i>	Based on key study EPA 600/4-90/027. U.S. Environmental Protection Agency Method: According to ASTM E-47.01 and E 35.21, Draft No. 1 and 4, (standard for renewal life cycle toxicity tests with the Daphnid, <i>Daphnia magna</i>)
Algae and aquatic plants: With high probability the test substance is acutely not harmful to aquatic algae		
<i>Scenedesmus quadricauda</i> (algae)	TGK (8 d): 2700 mg/L	Based on key study Method: cell growth inhibition test
Toxicity to aquatic micro-organisms	EC20 (30 min): > 1995 mg/L (<i>activated sludge, domestic</i>)	Based on key study ISO 8192 (Test for Inhibition of Oxygen Consumption by Activated Sludge)
Sediment organisms: Not applicable Since the physicochemical data indicate that the substance is not very adsorptive (log Koc = 0) or bioaccumulative (log Kow = -1.98), a relevant distribution into the sediment compartment and a considerable exposure of sediment organisms is not expected.		
Toxicity to soil macro-organisms: Not applicable As direct exposure of the soil compartment is unlikely and because the substance is readily biodegradable, no tests on terrestrial organisms are performed		
Toxicity to soil micro-organisms: Not applicable As direct exposure of the soil compartment is unlikely and because the substance is readily biodegradable, no tests on terrestrial organisms are performed.		
Toxicity to terrestrial plants: Not applicable As direct exposure of the soil compartment is unlikely and because the substance is readily biodegradable, no tests on terrestrial organisms are performed		
Toxicity to birds: Not applicable The substance is not bioaccumulative. Therefore, and because of reasons of animal welfare, no study on toxicity in birds is indicated		
DEGRADATION:		
ABIOTIC DEGRADATION: After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes. No data on hydrolysis are available. However, glycols are generally regarded as stable towards hydrolysis.		
Abiotic hydrolysis	study scientifically unjustified	Ethers and glycols are generally regarded as stable towards hydrolysis
Phototransformation in air	Half-life (DT50): 17.2 h After evaporation or exposure to the air, the product will be	SRC AOP v1.91 PHOTOCHEMICAL REACTION WITH OH RADICALS

	rapidly degraded by photochemical processes	
Phototransformation in water	study scientifically unjustified	substance is readily biodegradable
Phototransformation in soil	study scientifically unjustified	substance is readily biodegradable
BIODEGRADATION: Readily biodegradable (according to OECD criteria).		
Biodegradation in water	<p>readily biodegradable</p> <p>% Degradation of test substance: 90 — 100 after 20 d (DOC removal)</p> <p>% Degradation of test substance: 90 — 100 after 10 d (DOC removal)</p> <p>% Degradation of test substance: 70 — 80 after 28 d (CO₂ evolution)</p> <p>90 — 100 after 28 d (DOC removal)</p> <p>% Degradation of test substance: 25 — 92 after 28 d (O₂ consumption)</p>	<p>OECD Guideline 301 A (new version) (Ready Biodegradability: DOC Die Away Test)</p> <p>BASF AG (1995a)</p> <p>BASF AG (1996)</p> <p>BASF AG (1995b)</p> <p>MITI (1992)</p>
Biodegradation in soil	study scientifically unjustified	substance is readily biodegradable
Fate and behaviour in the Environment:		
Adsorption/desorption screening	<p>Adsorption coefficient: Koc: 1 log Koc: 0</p> <p>Based on the physicochemical properties the substance can be expected to have a low potential for adsorption (log Pow-1.98), and the substance is readily biodegradable</p> <p>Based upon a calculated log Koc adsorption to solid soil phase is not expected</p>	<p>Study type: adsorption (soil) Calculation</p> <p>SRC PCKOCWIN v1.66</p>
Volatilisation	<p>Henry's Law constant H: 0.000206 Pa m³/mol at 25 °C</p> <p>From the water surface the substance will not evaporate into the atmosphere</p>	<p>Based on key study</p> <p>SRC HENRYWIN v3.10</p> <p>BASF AG (2007c)</p>

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Environmental distribution Percent distribution in media:	Percent distribution in media: Air (%): 0.75 Water (%): 99.25 Soil (%): 0 Sediment (%): 0	key study, estimated by calculation Calculation according to Mackay, Level I
BIOACCUMULATION: Regarding the 1-octanole/water partition coefficient, accumulation of the test substance in organisms is not to be expected		
Terrestrial bioaccumulation	study scientifically unjustified	logKow indicates no potential for bioaccumulation
Aquatic bioaccumulation <i>Leuciscus idus melanotus</i>	BCF: 100 Total uptake duration: 3 d bioaccumulation on fish in a static test with 14C-labelled chemical	key study, estimated by calculation Freitag D, Ballhorn L, Geyer H, Korte F (1985)
<u>PBT/vPvB Properties</u>	Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity it can be stated that the substance does not fulfill the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).	

WATER HAZARD CLASSIFICATION

According to the German VwVwS: WGK- 1 (low danger for water pollution)

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.

SECTION 14. TRANSPORT INFORMATION

GENERAL

The product is not covered by international regulations on the transport of dangerous goods under UN DOT.

SECTION 15. REGULATORY INFORMATION

Chemical Safety Report has been performed for diethylene glycol.

[APPENDIX II TO THE eSDS: Exposure scenarios for diethylene glycol](#)

Safety Advice:

S2 - keep out of the reach of children

S46 - if swallowed, seek medical advice immediately and show this container or label

Precautionary statements:



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P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P314 Get medical advice/attention if you feel unwell.

P264 Wash hands thoroughly after handling.

P270 Do not eat, drink or smoke when using this product

P301 +P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P330 Rinse mouth

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/protective clothing/eye protection/face protection

P363 Wash contaminated clothing before reuse.

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

P312 Call a POISON CENTER or doctor/physician if you feel unwell.

P302+352 IF ON SKIN: Wash with plenty of soap and water.

P501: Dispose of absorbed material in accordance with regulations.

P322 Specific measures

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 labelling 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).

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).



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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

Uses by workers in industrial settings

Identified Use (IU) name	Use descriptors
Manufacturing of substance	<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>Subsequent service life relevant for that use?: no</p>
Use as Intermediate	<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 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 6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>Subsequent service life relevant for that use?: no</p>
Use as Process chemical	<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 preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring 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 4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>Subsequent service life relevant for that use?: no</p>
Distribution of substance	<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 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)</p>

	<p>PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC):</p> <p>ERC 1: Manufacture of substances ERC 2: Formulation of preparations ERC 3: Formulation in materials 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</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Formulation & (re)packing of substances and mixtures</p>	<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 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 PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC):</p> <p>ERC 2: Formulation of preparations</p> <p>Subsequent service life relevant for that use?: yes</p>
<p>Production of polymers</p>	<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</p>



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	<p>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 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 6c: Industrial use of monomers for manufacture of thermoplastics</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in Paints/ Coatings (industrial)</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 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 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 articles</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in Cleaning agents (industrial)</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure</p>



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	<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 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</p> <p>Environmental release category (ERC): ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in lubricants (industrial)</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 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 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 17: Lubrication at high energy conditions and in partly open process PROC 18: Greasing at high energy conditions</p> <p>Environmental release category (ERC): ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles ERC 7: Industrial use of substances in closed systems</p> <p>Subsequent service life relevant for that use?: no</p>

<p>Use in metal-working fluids (industrial)</p>	<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 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 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 17: Lubrication at high energy conditions and in partly open process</p> <p>Environmental release category (ERC):</p> <p>ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in/as functional fluids (industrial)</p>	<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 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental release category (ERC):</p> <p>ERC 7: Industrial use of substances in closed systems</p> <p>Subsequent service life relevant for that use?: no</p>

<p>Use in laboratories (industrial and professional)</p>	<p>Process category (PROC): PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Production of Polymers, filled polymers, foams, coatings, adhesives, sealants</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 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 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring 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 ERC 3: Formulation in materials ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6c: Industrial use of monomers for manufacture of thermoplastics</p> <p>Subsequent service life relevant for that use?: no</p>

Uses by professional workers

<p>Identified Use (IU) name</p>	<p>Use descriptors</p>
<p>Use in Paints/ Coatings /Adhesives/ Sealants/ Foams/ Polymers / filled</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure</p>

<p>Polymers (professional)</p>	<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 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 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent PROC 19: Hand-mixing with intimate contact and only PPE available.</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d: Wide dispersive outdoor use of processing aids in open systems ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in Cleaning agents (professional)</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 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</p>



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	<p>PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in metal-working fluids (professional)</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 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 preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 17: Lubrication at high energy conditions and in partly open process</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in/as functional fluids (professional)</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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-</p>

	<p>dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 20: Heat and pressure transfer fluids in dispersive, professional use but closed systems</p> <p>Environmental release category (ERC): ERC 9a: Wide dispersive indoor use of substances in closed systems ERC 9b: Wide dispersive outdoor use of substances in closed systems</p> <p>Subsequent service life relevant for that use?: no</p>
Use in/as de-icing/anti-icing applications/agents (professional)	<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 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 11: Non industrial spraying</p> <p>Environmental release category (ERC): ERC 8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>
Use in laboratories (industrial and professional)	<p>Process category (PROC): PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>

Uses by consumers

Identified Use (IU) name	Use descriptors
Use in Paints/ Coatings / Surface treatment products (Consumer use)	<p>Chemical product category (PC): PC 9a: Coatings and paints, thinners, paint removes PC 15: Non-metal-surface treatment products</p>

	<p>PC 18: Ink and toners PC 23: Leather tanning, dye, finishing, impregnation and care products PC 31: Polishes and wax blends PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d: Wide dispersive outdoor use of processing aids in open systems ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p> <p>Subsequent service life relevant for that use?: no</p>
Use in Cleaning agents (Consumer use)	<p>Chemical product category (PC): PC 35: Washing and cleaning products (including solvent based products)</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>
Use in heat transfer and hydraulic fluids (Consumer)	<p>Chemical product category (PC): PC 16: Heat transfer fluids PC 17: Hydraulic fluids</p> <p>Environmental release category (ERC): ERC 9a: Wide dispersive indoor use of substances in closed systems ERC 9b: Wide dispersive outdoor use of substances in closed systems</p> <p>Subsequent service life relevant for that use?: no</p>
Use in/as de-icing/anti-icing applications/agents (Consumer use)	<p>Chemical product category (PC): PC 4: Anti-freeze and de-icing products</p> <p>Environmental release category (ERC): ERC 8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>

<p>Use in adhesives and sealants (Consumer)</p>	<p>Chemical product category (PC): PC 1: Adhesives, sealants</p> <p>Environmental release category (ERC): ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Production of rigid foam</p>	<p>Chemical product category (PC): PC 32: Polymer preparations and compounds</p> <p>Environmental release category (ERC): ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p> <p>Subsequent service life relevant for that use?: no</p>
<p>Use in Biocidal products (Consumer use)</p>	<p>Chemical product category (PC): PC 8: Biocidal products (e.g. disinfectants, pest control)</p> <p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>Subsequent service life relevant for that use?: no</p>