Vinyl Kft.
3524 Miskolc, Adler K. u. 19.
Honlap: www.vinyl.hu

Tel: 46/432-633, 560-441
Fax: 46/365-816, 560-440
E-mail: info@vinyl.hu

VINYL

SAFETY DATA SHEET

Carbon disulfide

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

Product label name Carbon disulfide
Supplier **Vinyl Kft.** 3524 Miskolc, Adler K. u. 19.
E-mail address of person responsible for safety data sheet info-sd-eu@akzonobel-chemicals.com

Emergency telephone +49 221 7496 300 (Deutschland) CARBOSULF CHEMISCHE WERKE GmbH, D-50735 Köln + 31 570679211 (Fax. +31 570679801) Akzo Nobel Chemicals, Deventer, NL	

Relevant identified uses of the substance or mixture Manufacturing of regenerated cellulose; Industrial use of products such as ph-regulators, flocculants, precipitants, neutralization agents, other unspecific; Industrial use as an intermediate; use in the manufacture of plant protection products and biocides; Formulation of laboratory chemicals; Industrial use of laboratory chemicals; Professional use of laboratory chemicals; Manufacturing of Polymer Preparations and Compounds
Date of last issue / Revision number 2010/12/21 / 1.00
REACH Registration number 01-2119543707-33-0000

2. HAZARDS IDENTIFICATION

F, R11: Highly flammable. T, R48/23: Toxic: danger of serious damage to health by prolonged exposure through inhalation. Xi, R36/38: Irritating to eyes and skin. Product is absorbed readily through the skin and may cause toxic effects. Xn, Reproductive toxicity category 3, R62-63: Possible risk of impaired fertility. Possible risk of harm to the unborn child; R20: Harmful by inhalation.

GHS classification	
Description	**Applicable**
Flammable liquid	category 2
Acute toxicity (inhalation)	category 4
Eye irritation	category 2
Skin corrosion/ irritation	category 2
Reproductive toxicity	category 2
Target organ, repeated exposure	category 1

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SAFETY DATA SHEET

Carbon disulfide

Pictogram(s) (GHS)

Signal word/Hazard statement(s) GHS	
Code	**Description**
AGHSDANG	Signal word: DANGER
H225	Highly flammable liquid and vapour
H315	Causes skin irritation
H319	Causes serious eye irritation
H332	Harmful if inhaled
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child
H372a	Causes damage to organs through prolonged or repeated exposure

Precautionary statement(s) (GHS)	
Code	**Description**
P210 *	Keep away from heat/sparks/open flames/hot surfaces. - No smoking *
P233	Keep container tightly closed
P235	Keep cool
P240	Ground/bond container and receiving equipment
P241a *	Use explosion-proof equipment *
P242	Use only non-sparking tools
P243 *	Take precautionary measures against static discharge *
P260e	Do not breathe vapours
P263	Avoid contact during pregnancy/while nursing
P264a	Wash hands and contaminated skin thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P280d *	Wear protective gloves, eye/face protection and protective clothing *
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with 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
P308+P313 *	IF exposed or concerned: Get medical advice/attention *
P362	Take off contaminated clothing and wash before reuse
P378e	Use CO2, dry chemical powder, dry sand or foam for extinction
P403+P233 *	Store in a well-ventilated place. Keep container tightly closed *
P501a	Dispose of contents and container according to local regulation
gene0350	The precautionary statements marked with a * are mentioned on the label of the packaging of the product

3. COMPOSITION/INFORMATION ON INGREDIENTS

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SAFETY DATA SHEET

Carbon disulfide

This product is to be considered as a substance in conformance to EC directives
Information on hazardous ingredients
Chemical description Carbon disulfide, CS2
Composition / information on ingredients

Number	% w/w	CAS-number	Chemical name
1	100	000075-15-0	Carbon disulfide

Number	REACH Registration number	EC-number	Classification according to 1272/2008 as amended			Classification according to 67/548/EEC as amended
1	01-2119543707-33	200-843-6	Flammable liquid	category 2	H225 H315 H319 H332 H361 H372A	Xn F T Xi R11 R20 R36/38 R48/23 R62 R63
			Acute toxicity (inhalation)	category 4		
			Eye irritation	category 2		
			Skin corrosion/ irritation	category 2		
			Reproductive toxicity	category 2		
			Target organ, repeated exposure	category 1		

4. FIRST AID MEASURES

Most important symptoms and effects
Vapours/mist may irritate the respiratory tract. Inhalation of carbon disulfide vapour may cause headache, nausea, drop in blood pressure, dizziness, unconsciousness and, possibly, death. This product is absorbed through the skin. Degreases and damages the skin. Eye contact causes irritation and pain, possibly resulting in permanent injury and/or loss of vision.

Description of first aid measures

General
Obtain medical attention immediately (show this Safety Data Sheet). Do not delay treatment of exposed individuals, death may result. In case of insensibility bring into stable lateral position. If breathing is irregular or stopped, administer artificial respiration. Apply external cardiac massage in case of cardiac arrest.

Inhalation
Move to fresh air, rest, half upright position, loosen clothing. Oxygen or artificial respiration if there is difficulty in breathing. Avoid inhaling of expired air.

Skin
Remove all contaminated clothing immediately. Wash off with plenty of soap and water. Seek medical advice if irritation develops. Launder clothes before reuse.
In case of frostbite: DO NOT remove clothing, but first thaw frosted parts with water (never use warm water!). Remove contaminated clothing.

Eye
Shower for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing.

Ingestion
Only when conscious, rinse mouth, give plenty of water to drink. DO NOT induce vomiting. Seek medical advice.

Indication of any immediate medical attention and special treatment needed
May cause delayed pulmonary oedema.

5. FIRE-FIGHTING MEASURES

Extinguishing media
waterspray, foam. Do not extinguish a leaking gas flame unless absolutely necessary.

SAFETY DATA SHEET
Carbon disulfide

Unsuitable extinguishing media Carbon dioxide, fire-extinguishing powder
Hazardous decomposition / combustion products Sulfur dioxide, carbon monoxide (CO), COS.
Protective equipment Use self-contained or supplied-air respiratory equipment.
Other information Vapours are heavier than air and may spread along floors, Fire and explosion hazard.
Fire and explosion hazard Forms explosive mixtures with air, oxygen, chlorine.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions For personal protection see Section 8. Evacuate personnel to safe area. Stop leakage if possible. Eliminate all sources of ignition, and do not generate flames or sparks.
Environmental precautions Do not allow to escape into sewage system or water courses. Isolate spill area. Prevent liquid entering sewers, basement and work pits. Absorb with suitable material. Consult an expert. If the substance entered a water course or sewer advise the authorities.
Methods and material for containment and cleaning up If appropriate, collect under water or nitrogen. For small quantities and outdoors: Secure area and let evaporate.

7. HANDLING AND STORAGE

Precautions for safe handling Do not breathe vapour. Avoid contact with skin and eyes. Pregnant women should avoid inhalation or skin contact under all circumstances.
Fire and explosion prevention Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges.
Conditions for safe storage Keep container tightly closed and in a well-ventilated place. In case of insufficient ventilation, wear suitable respiratory equipment.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters Ensure good ventilation and local exhaustion of the working area. Use only in closed system. It is recommended to use equipment of temperature group T6. Equipment group IIC (EN 50014).
Personal protection

Respiratory When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Use self-contained or supplied-air respiratory equipment. (respirator with Filter B, grey).
Hand Wear suitable gloves with thermal insulation effect. For full contact use, 100% Viton gloves conforming to EN 374, e.g. KCL Vitoject 890 are recommended.
Eye A face shield is preferred over goggles.
Skin and body Wear suitable protective clothing.
Other information Pregnant women should avoid inhalation or skin contact under all circumstances. (30 mg/m³ = 10 ppm)

SAFETY DATA SHEET

Carbon disulfide

Carbon disulfide		
skin		Potential for cutaneous absorption
Short Term Exposure Limit (STEL)	30 ppm	
Short Term Exposure Limit (STEL)	96 mg/m³	
Time Weighted Average (TWA)	10 ppm	
Time Weighted Average (TWA)	32 mg/m³	

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance liquid
Colour clear
Odour characteristic, unpleasant (odour threshold < 1 ppm)
Boiling point/range 46.2 °C
Melting point/freezing point - 111.6 °C
Flash point - 30 °C
Flammability Highly flammable
Explosive properties Forms explosive mixtures with air, oxygen, chlorine
Vapour pressure 39.7 kPa (20 °C) (397 mBar (20 °C))
Density 1.262 kg/dm³ (20 °C);
Solubility in water 0.2 % (2 g/l at 20 °C)
Solubility in other solvents Miscible with: organic solvents.
pH value not applicable
Partition coefficient n-octanol/water 1.9
Relative vapour density (air=1) 2.64
Viscosity 0.36 mPa.s (20 °C)
Autoignition temperature 90-95 °C
Upper/lower flammability or explosive limits LEL: 19 mg/l (0.6 Vol %), UEL: 1900 mg/l (60 Vol %).

10. STABILITY AND REACTIVITY

Conditions to avoid

Avoid elevated temperatures.
Chemical stability Stable under recommended storage and handling conditions (see section 7).
Incompatible materials Halogens, nitrous gases (NOx), metals (Zn, Na, K), oxidants.

11. TOXICOLOGICAL INFORMATION

Carbon disulfide
Acute toxicity
Oral LD50 Rat LD50 > 2000 mg/kg bw (Method: OECD 423, GLP)
Dermal LD50 no data available
Inhalation LC50 Rat: 4-h LC50 10.35 mg/m3 (OECD 403 , GLP)
Summary of toxicological information The substance is a liquid. It is harmful via inhalation exposure. It is not irritating to skin, eyes and the respiratory system.The substance is not sensitising. Inhalation is the most relevant route of exposure to CS2. A LOAEC of 158 mg/m3 was derived from a 90-day inhalation study based on CNS effects. For the oral route a LOEAL of 253 mg/kg bw/day was found in a 4-week study for cardiodepressive effects. Based on these daya it is classified STOT Rep. Exp. 1 . The dat There is no data on carcinogenicity from animals. However epidemiological information shows that no carcinogenic effects need to be expected in exposed humans. There are no guildeline studies available for the aspect of reproductive toxicity. The available animal data indicates potential reproductive effects of carbon disulfide, primarily on male rodents, as well as developmental toxicity. Therfore CS2 is class
Germ cell mutagenicity Based on available data, the classification criteria are not met.
STOT - single exposure Based on available data, the classification criteria are not met.
STOT - repeated exposure STOT Rep. Exp. 1 . nervous system (PNS & CNS), cardiovascular system, eye
Aspiration hazard conclusive but not sufficient for classification, not likely due to substance composition.
Irritation
Skin In vitro: Relative absorbance values were decreased to 52.1% after 3 minutes. After the 1 hour exposure relative absorbance values were reduced to 16.0%. compared to the negative control. (draft OECD 431, GLP) Not Corrosive. IUCLID datasheet: in vitro: % viability 67% compared to the negative control. (RhE draft, GLP) Not irritating
Eye Mean IVIS 0.37, OECD 437 (BCOP), GLP. Not corrosive. Carbon disulfide is already classified as an eye irritant and on these grounds f urther in vivo testing cannot be justified. It should be also noted that CS2 is a solvent, and it is well known that solvents are usually at least mild irritants. The relevant endpoint is waived based on this
Respiratory Based on available data, the classification criteria are not met. (In an acute inhalative toxicity test in rats no adverse effects were observed on the respiratory tract, which would justify a classification of CS2 as an irritant to the respiratory tract.)
Sensitization Mouse: LLNA (Method: OECD 429, GLP) Not sensitizing. Respiratory: Due to the lack of skin sensitizing potential it is unlikely that this substance is a respiratory sensitizer.
Genotoxicity In vitro: Ames, Negative. OECD 471, GLP. Mouse lymphoma, mammalian genemutation: Negative. OECD 476, GLP. in vivo: Chromosome aberration, micronucleus assay. Negative. OECD 474, GLP. Notwithstanding the completeness of the set of available studies, a definitive classification is not possible, due to positive results in: 1) A non-standard in vitro cytogenetic test with human sperm

2) A cytogenetic bone marrow test with female rats and rat fetuses exposed in utero
3) A test for chromosomal aberrations in mice oocytes and prenuclei zygotes.
4) A sperm head shape abnormality test
Essential methodological details are lacking for these studies and/or they were not validated. If for this reason these studies are not taken into account, no classification for genotoxicity is necessary.

Chronic toxicity / Carcinogenicity
Oral: No standard oral repeated dose toxicity studies were available. WoE: rat, 4-weeks, SIGNS: Decreased body weight, cardiodepressive effect (electrophysiological and mechanical parameters), increased the blood pressure and caused electrocardiograph alterations indicative of myocardial ischemia, following administration of epinephrine or norepinephrine . NOAEL: 253 mg/kg bw (No guideline followed not GLP) rat, 12-weeks. SIGNS: Body weight depression, and neurological deficits, i.e. abnormal gait. Th accompanied by significant alterations in the cytoskeletal proteins of the cerebral cortex and spinal cord homogenates, suggesting that they might be implicated with the manifested neuropathy. Effect level 300 mg/kg bw No guideline followed not GLP)

Inhalation: Rat, 90-day , 6 hours/day; 5 days/week; LOAEC 50 ppm. Signs: brain weight depression. Similar to OECD 413, GLP. mouse, 90-day , 6 hours/day; 5 days/week; NOAEC 300 ppm. Signs: decreased body weight, decreased erythrocytes (blood), hemoglobin and hematocrit, decline in total serum protein, decrease in several absolute organ weights, increases of organ/bw and organ/brain ratios, histopathological changes of the neurons, spleen and kidneys. Similar to OECD 413, GLP. rat, 90-day , 6 hours/day; 5 days/week; NOAEC 50 ppm. Signs: neuropathology. Similar to OECD 413, GLP.

Reproductive toxicity: WoE: FERTILITY: rat:, inhalation; 14-days before mating until day 19 of gestation, 6/hours day, P NOAEC general tox. 250 ppm . Signs: gestational body weight and food consumption decreases and indications of dystocia. P NOAEC reproduction 500 ppm . Signs live litter size. No guideline followed, not GLP. rat:, inhalation; 10-weeks, 6/hours day, P LOAEC 600 ppm . Signs: effects on the copulatory behaviour of animals; decreased mount and ejaculation latencies; decreased sperm count in the ejaculate. No guid clinical signs of toxicity including ataxia, low food consumption, labored respiration, wheezing, tremors, and abortion with bloody excretion involving the death of two animals. NOAEC developmental tox. 300 ppm. Signs: postimplantation loss, resorptions

Neurotoxicity test: WoE: The results of the studies concerned with the neurotoxicity and related effects of carbon disulfide in experimental animals combined with the effects of the compound on the nervous system that have been observed in humans (WoE 7 studies), point to the need for classification for specific target organ toxicity (STOT) repeated exposure (RE). The dose levels justify for Category 1.

Other toxicological information
Chronic toxicity (dermal): No data available.

12. ECOLOGICAL INFORMATION

Carbon disulfide

Ecotoxicity

Ecotoxicological information

Anthropogenic soil exposure can be considered negligible. There will only be some soil contamination due to atmospheric deposition of CS2 on the soil in the immediate vicinity of industry. CS2 has no affinity for soil and its evaporation half life in soi The expected low bioconcentration potential is in line with the observed and estimated bioconcentration factors. Estimated BCF, based on Kow or on the solubility are in the order of magnitude of 5

fish
Acute toxicity – Danio rerio, freshwater, semi-static, 96h LC50 3 mg/L (OECD 203); Chronic toxicity – Danio rerio , freshwater, embryo and sac-fry stage: (sub)lethal effects, 8d NOEC 1 mg/L (OECD 212)

daphnia
The 48-h EC50 of CS2 for Daphnia magna was 2.1 mg/L, according to the OECD 202 guideline

algae
Chlorella pyrenoidosa (algae), freshwater, static, 96-h ErC50 21 mg/L (OECD 201, non-GLP)

bacteria
The inhibition of the oxygen consumption of a mixed bacterial population (activated sludge) by CS2 was studied in a closed system according to German guideline DEV-L 9.The EC50 was 13 mg/L, the EC 10 was 4.6 mg/L and the EC100 was 100 mg/L.

SAFETY DATA SHEET
Carbon disulfide

Mobility in soil Carbon disulfide will be mainly found in air. It has no affinity for the soil compartment, the Log Koc value is 1.5, therefore it will not adsorb into sediment or soil. Moreover, the Henry l aw constant is high, with a value of 1748 Pa•m3/mol at 25 °C at 1 atm. Distribution modeling with CS2indicate that concentrations in air and water are negligible, which further support the prediction that CS2will partition in the air.
Fate
Degradation Abiotic CS2 is a stable substance. In water it does not hydrolyze, subsequently no half-life was estimated. Regarding phototransformation in air, the determination of the half- life is complicated due to the complex chemistry of the test substance. Nonetheless, an estimation of 5-15 days can be made.
Degradation Biotic The biodegradation of CS2 was >80 % after 28 days of exposure, therefore CS2 is readily biodegradable
Bioaccumulation The bioconcentration potential of CS2 is limited. CS2 has a log Kow value < 3 (it was measured to be 1.94), and it is a non-ionisable substance. In addition, most organisms can rapidly metabolise CS2. The expected low bioconcentration potential is in line with the observed and estimated bioconcentration factors. Estimated BCF, based on Kow or on the solubility are in the order of magnitude of 5
Other information n.a.

13. DISPOSAL CONSIDERATIONS

Product Please refer to your specific industry in the European Waste Catalogue. According to local regulations (most probably controlled incineration).
Contaminated packaging Drain drums as good as possible, then flush with nitrogen and warm up with steam.

14. TRANSPORT INFORMATION

Land transport
Transport hazard class 3
RID class 3
Packing group I
Hazard Identification No. 336
Substance Identification No. 1131
UN number 1131
Proper Shipping Name Carbon disulphide CARBON DISULPHIDE
Other information TOXIC risk label required additionally.
Tunnel code C/E

Sea transport (IMO / IMDG-code)
Transport hazard class 3

SAFETY DATA SHEET

Carbon disulfide

Packing group I
UN number 1131
EMS F-E, S-D
Marine pollutant no
Proper Shipping Name Carbon disulphide

Air transport (ICAO-TI / IATA-DGR)
UN number 1131
Transport hazard class Forbidden
Packing group not relevant
Proper Shipping Name not relevant

15. REGULATORY INFORMATION

Product label name Carbon disulfide
Labelling according to EC directives
EC-number See section 3
Classification based on Annex-VI to regulation EC No. 1272/2008.

Other information To be displayed on the label: "EC label". Substance and/or product listed in Directive 96/82/EC.
German Water Hazard Class (WGK) 2 (VwVwS Anhang 2, Kenn-Nr 183)

16. OTHER INFORMATION

Relevant hazard statements		
Chemical name	Hazard statement(s) (GHS-classifcation)	
Carbon disulfide	H225.	Highly flammable liquid and vapour.
	H315.	Causes skin irritation.
	H319.	Causes serious eye irritation.
	H332.	Harmful if inhaled.

SAFETY DATA SHEET
Carbon disulfide

	H361.	Suspected of damaging fertility or the unborn child.
	H372a.	Causes damage to organs through prolonged or repeated exposure.

R-phrase information		
Chemical name	R(isk) phrase(s) (EU classification)	
Carbon disulfide	R11	Highly flammable
	R20	Harmful by inhalation
	R36/38	Irritating to eyes and skin
	R48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation
	R62	Possible risk of impaired fertility
	R63	Possible risk of harm to the unborn child

History
Date of printing/ pdf file generated 2010/12/30
Revision 1.00
Composed by Dr. B. Weuste T. van Hoek
Changes were made in section Status
This information only concerns the above mentioned product and does not need to be valid if used with other product(s) or in any process. The information is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

SAFETY DATA SHEET
Carbon disulfide

ES 1 Manufacture of CS2 (CAS number: 75-15-0)	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Worker	
Production of CS2 in closed process, no likelihood of exposures	PROC 1
Environment	
CS2 is manufactured in closed systems, under strictly controlled conditions, as supported by the respective manufacturers; strictly controlled conditions are required due to the high flammability of CS2, resulting in a high risk of explosion at even low concentrations of CS2 in indoor air. Emission of CS2 from both point sources and diffuse sources is strictly controlled and therefore zero, except during loading. Consequently there is zero emission of CS2 to outdoor air, and thus to the environment. The only place where exposures occur are in the tanker loading areas. Concerning the loading areas, measured exposure concentrations, based on personal samplers, reach a maximum of 14 ppm as 5 second average peak concentrations; hourly averages are well below 0.5 ppm. Apart from this part of the process, there are no environmental emissions of CS2. Therefore, in view of the fact that the manufacturing of CS2 is performed in a closed system and the predicted quantitative exposure to carbon disulfide is negligible, exposure scenario development for the environment is not relevant.	
Exposure criteria	
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation	

SAFETY DATA SHEET
Carbon disulfide

Operational conditions and risk management measures					
Under Strictly controlled conditions					
Control of workers exposure for "Production of CS2 in closed process, no likelihood of exposures" [PROC 1]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Outdoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed process, no likelihood of exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	No		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Chemical resistant gloves with specific activity training					

SAFETY DATA SHEET
Carbon disulfide

Guidance to check compliance with the Exposure Scenario				
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]				
Additional good practice advice beyond the REACH CSA				

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported

ES 2 Manufacturing of regenerated cellulose	
The cellulose is leached with NaOH to form "white crumbs". These "white crumbs" are mixed with CS 2 to form "yellow crumbs", technically a "xantogenate". The "yellow crumbs" are dissolved in NaOH to form a sticky viscous dark yellow liquid called viscose. The viscose is then regenerated to cellulose by extrusion into an acidic bath (rayon and cellulose) or by boiling (sponges). During the regeneration, almost all of the CS 2 is released. The residual CS 2 is expelled from the product with hot water and the final product is treated with various chemicals for removal of free sulphur and for bleaching	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Market sector:	
PC 20 - Products such as ph-regulators, flocculants, precipitants, neutralization agents	
Worker	
Use in closed process	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Environment	
Industrial use of reactive processing aids	ERC 6b
Manufacture of viscose rayon (yarn and staple fiber) The highest environmental exposure to carbon disulfide is found in the manufacturing of Rayon. The manufacture of Rayon can be either an open or a (semi) closed spinning process. This process is done with large volumes of air being used to dilute CS_2 concentrations at workplaces. The ventilated air is directly emitted through the stacks, without further measures to reduce emissions, though occasionally biological treatment is carried out. The high volumes of air combined with relatively low concentrations of carbon disulfide do not allow for an easy stack treatment of the emissions. The high volumes of air that are "sucked" through the building make sure that there are no diffuse emissions. At the working place it is definitely draughty. An average concentration of 5 ppm at workplace is technically the maximum (in terms of ventilation) that is achievable. In the semi closed process, exposures are much lower. Highest exposures occur if a "spinning bed" needs to be re-woven partly (like when one or more of the threads break) or entirely. *Manufacture of cellophane* Cellophane is made in principally by the same process as Rayon, although a wide narrow slit, rather than small holes, are used to expel the viscose through.	

Manufacture of sponge

Manufacturing is done in a slightly different process: the viscose contains less CS_2 to make it dough-like and is mixed with sodium sulfate crystals to cater for the holes in the sponges. It is then either pressed into steel containers or spread out over a conveyor belt. The containers c.q. the belt are then led through a hot bath for a prolonged period of time. CS_2 emissions are lower than in rayon production because of the lower CS_2 content of the viscose.

Exposure criteria

Workers Inhalation DNELs:

- Acute - systemic effects: 48 mg/m³
- Long-term - systemic effects: 15.8 mg/m³

Environment PNECs:

- PNEC aqua (freshwater): 10 µg/L
- PNEC aqua (marine water): 1 µg/L
- PNEC aqua (intermittent releases): 0.021 mg/L
- PNEC sediment (freshwater): 0.12 mg/kg sediment dw
- PNEC sediment (marine water): 60 µg/kg sediment dw.
- PNEC soil: 14.76 µg/kg soil dw
- PNEC STP: 0.13 mg/L
- No potential for bioaccumulation

Operational conditions and risk management measures

Control of workers exposure for "Use in closed process" [PROC 1]

		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L

SAFETY DATA SHEET
Carbon disulfide

Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed process, no likelihood of exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	No		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use in closed, continuous process with occasional controlled exposure" [PROC 2]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed, continuous process with occasional controlled exposure		L		

SAFETY DATA SHEET
Carbon disulfide

Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 90.5% efficiency (~ 1.2 ACH**) [Inhalation: 90.5%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use in batch and other process (synthesis) where opportunity for exposure arises" [PROC 4]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in batch and other process (synthesis) where opportunity for exposure arises		L		
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 95.3% efficiency (~ 2.6 ACH**) [Inhalation: 95.3%]		L		

SAFETY DATA SHEET
Carbon disulfide

Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Guidance to check compliance with the Exposure Scenario					
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]					
Additional good practice advice beyond the REACH CSA					

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported.
**) ACH = Air changes per hour

ES 3 Industrial use of products such as ph-regulators, flocculants, precipitants, neutralization agents, other unspecific	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Market sector:	
PC 20 - Products such as ph-regulators, flocculants, precipitants, neutralization agents	
Worker	
Use in closed process	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Transfer (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Environment Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
There are three process categories for the use of CS2 as a ph-regulator, flocculant, precipitants, neutralization agents. These are PROC 1: Use in closed process, no likelihood of exposure, PROC 2: Used in closed, continuous process with occasional controlled exposure; and PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. The use of CS2 as ph-regulators, flocculants, precipitants, neutralization agents, is mainly performed in closed systems, under strictly controlled conditions, as supported by the respective downstream users; strictly controlled conditions are required due to the high flammability of CS2, resulting in a high risk of explosion at even low concentrations of CS2 in indoor air. It is expected during the transfer of the substance/preparation to vessels or containers, an increase of indoor concentrations of CS2. Regarding environmental exposure, there will be no releases of CS2 to the environment, therefore, no modelling is required, as the predicted environmental concentration is zero.	

SAFETY DATA SHEET
Carbon disulfide

Exposure criteria					
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation					
Operational conditions and risk management measures					
Control of workers exposure for "Use in closed process" [PROC 1]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed process, no likelihood of exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	No		L		
Organisational measures to prevent /limit releases, dispersion and exposure					

SAFETY DATA SHEET
Carbon disulfide

Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use in closed, continuous process with occasional controlled exposure" [PROC 2]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed, continuous process with occasional controlled exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 90.5% efficiency (~ 1.2 ACH**) [Inhalation: 90.5%]		L		

SAFETY DATA SHEET
Carbon disulfide

Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Transfer (charging/discharging) from/to vessels/large containers at non-dedicated facilities" [PROC 8a]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands (960 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 98.1% efficiency (~ 6.5 ACH**) [Inhalation: 98.1%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L

SAFETY DATA SHEET
Carbon disulfide

Guidance to check compliance with the Exposure Scenario				
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]				
Additional good practice advice beyond the REACH CSA				

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported.
**) ACH = Air changes per hour

SAFETY DATA SHEET
Carbon disulfide

ES 4 Industrial use as an intermediate	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Market sector:	
PC 19 - Intermediate	
Worker	
Use in closed process	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Environment	
Industrial use resulting in manufacture of another substance (use of intermediates)	ERC 6a
Biocidal products are manufactured in closed systems, while the use of CS2 as an intermediate and for the manufacturing of plant protection products, is mainly performed in closed systems. These processes are performed under strictly controlled conditions, as supported by the respective downstream users; strictly controlled conditions are required due to the high flammability of CS2, resulting in a high risk of explosion at even low concentrations of CS2 in indoor air. The process category reported for the manufacture of biocidal products is PROC1: Use in closed process, no likelihood of exposure. Emission of CS2 from both point sources and diffuse sources is strictly controlled and therefore zero. Consequently there is zero emission of CS2 to outdoor air, and thus to the environment. Therefore, in view of the fact that the manufacturing biocidal products are performed in a closed system and the predicted quantitative exposure to carbon disulfide is negligible, exposure scenario development for the environment is not relevant. Regarding the use of CS2 as an intermediate and for the manufacturing of plant protection products, the process categories reported for both intended uses are PROC 1: Use in closed process, no likelihood of exposure; PROC 2: Used in closed, continuous process with occasional controlled exposure; PROC 3: Use in closed batch process (synthesis or formulation); and PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. During the process phase of synthesis in a batch, indoor exposure to CS2 is expected. Regarding environmental exposure, there will be no releases of CS2 to the environment, therefore, no modelling is required, since the predicted environmental concentration is zero.	

SAFETY DATA SHEET
Carbon disulfide

Operational conditions and risk management measures					
Exposure criteria					
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation					
Control of workers exposure for "Use in closed process" [PROC 1]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed process, no likelihood of exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	No		L		L

SAFETY DATA SHEET
Carbon disulfide

Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use in closed, continuous process with occasional controlled exposure" [PROC 2]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed, continuous process with occasional controlled exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 90.5% efficiency (~ 1.2 ACH**) [Inhalation: 90.5%]		L		

Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use in closed batch process" [PROC 3]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed batch process (synthesis or formulation)		L		
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 95.3% efficiency (~ 2.6 ACH**) [Inhalation: 95.3%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		

SAFETY DATA SHEET
Carbon disulfide

Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use in batch and other process (synthesis) where opportunity for exposure arises" [PROC 4]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in batch and other process (synthesis) where opportunity for exposure arises		L		
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 95.3% efficiency (~ 2.6 ACH**) [Inhalation: 95.3%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L

SAFETY DATA SHEET
Carbon disulfide

Guidance to check compliance with the Exposure Scenario				
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]				
Additional good practice advice beyond the REACH CSA				

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported.
**) ACH = Air changes per hour

ES 5 Formulation of laboratory Chemicals	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Market sector:	
PC 21 - Laboratory Chemicals	
Worker	
Use in closed process	PROC 1
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer into small containers (dedicated filling line, including weighing)	PROC 9
Use as laboratory reagent	PROC 15
Environment	
Industrial use of reactive processing aids	ERC 6b
The process category for the use of CS2 as a laboratory chemical is PROC 15: Use as a laboratory reagent. The use of CS2 as a laboratory reagent, has to be performed under strictly controlled safety measures due to its high volatility and toxicity. Handling of the substance is done under the fume hood. Regarding environmental exposure, there will be no releases of CS2 to the environment, therefore, no modelling is required, as the predicted environmental concentration is zero.	
Operational conditions and risk management measures	
Exposure criteria	
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation	

SAFETY DATA SHEET
Carbon disulfide

Control of workers exposure for "Use in closed process" [PROC 1]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed process, no likelihood of exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	No		L		L
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) " [PROC 5]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					

SAFETY DATA SHEET
Carbon disulfide

Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 98.1% efficiency (~ 6.5 ACH**) [Inhalation: 98.1%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Transfer (charging/discharging) from/to vessels/large containers at dedicated facilities" [PROC 8b]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					

SAFETY DATA SHEET
Carbon disulfide

Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 96.9% efficiency (~ 4 ACH**) [Inhalation: 96.9%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Transfer into small containers (dedicated filling line, including weighing) " [PROC 9]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 97.7% efficiency (~ 5.3 ACH**) [Inhalation: 97.7%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					

SAFETY DATA SHEET
Carbon disulfide

Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Use as laboratory reagent " [PROC 15]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 90.5% efficiency (~ 1.2 ACH**) [Inhalation: 90.5%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L

SAFETY DATA SHEET
Carbon disulfide

Guidance to check compliance with the Exposure Scenario				
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]				
Additional good practice advice beyond the REACH CSA				

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported.
**) ACH = Air changes per hour

SAFETY DATA SHEET
Carbon disulfide

ES 6 Industrial use of laboratory chemicals	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Market sector:	
PC 21 - Laboratory Chemicals	
Worker	
Use as laboratory reagent	PROC 15
Environment	
Industrial use of reactive processing aids	ERC 6b
The process category for the use of CS2 as a laboratory chemical is PROC 15: Use as a laboratory reagent. The use of CS2 as a laboratory reagent, has to be performed under strictly controlled safety measures due to its high volatility and toxicity. Handling of the substance is done under the fume hood. Regarding environmental exposure, there will be no releases of CS2 to the environment, therefore, no modelling is required, as the predicted environmental concentration is zero.	
Operational conditions and risk management measures	
Exposure criteria	
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation	

SAFETY DATA SHEET
Carbon disulfide

Control of workers exposure for "Use as laboratory reagent " [PROC 15]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 90.5% efficiency (~ 1.2 ACH**) [Inhalation: 90.5%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Guidance to check compliance with the Exposure Scenario					
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]					
Additional good practice advice beyond the REACH CSA					

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported.
**) ACH = Air changes per hour

SAFETY DATA SHEET
Carbon disulfide

ES 8 Manufacturing of Polymer Preparations and Compounds	
Physical form of product	*Liquid and 1013 hPa (20°C)*
Market sector:	
PC 32 - Polymer Preparations and Compounds	
Worker	
Use in closed process	PROC 1
Production of preparations or articles by tabletting, compression, extrusion, pelletisation	PROC 14
Environment	
Industrial use of reactive processing aids	ERC 6b
The use of CS2 for the manufacturing of polymer preparations and compounds is mainly performed in closed systems, under strictly controlled conditions, as supported by the respective downstream users; strictly controlled conditions are required due to the high flammability of CS2, resulting in a high risk of explosion at even low concentrations of CS2 in indoor air. The process categories are PROC 1: Use in closed process, no likelihood of exposure; and PROC 14: Production of preparations or articles by tabletting, compression, extrusion and pelletisation. During the production of preparations or articles, it is expected an increase in indoor concentrations of CS2. No exposure of CS2 to the environment is expected, therefore, no modelling is required, as the predicted environmental concentration is zero.	
Operational conditions and risk management measures	
Exposure criteria	
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation	

SAFETY DATA SHEET
Carbon disulfide

Control of workers exposure for "Use in closed process" [PROC 1]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					
Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Level of containment	Use in closed process, no likelihood of exposure		L		
Technical conditions and measures to control dispersion from source towards the worker					
Local Exhaust Ventilation	No		L		L
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Control of workers exposure for "Production of preparations or articles by tabletting, compression, extrusion, pelletisation" [PROC 14]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					

SAFETY DATA SHEET
Carbon disulfide

Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	Two hands face (480 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 98.1% efficiency (~ 6.5 ACH**) [Inhalation: 98.1%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Guidance to check compliance with the Exposure Scenario					
The EcetocTra tool has been used to estimate workplace unless otherwise indicated [G21]					
Additional good practice advice beyond the REACH CSA					

*) The route of exposure (**Inhal**ation, **Derm**al) and type of effect (**Loc**al, **Sys**temic and **A**cute or **L**ong term) for which the determinant has been used for exposure estimation are reported.
**) ACH = Air changes per hour

SAFETY DATA SHEET
Carbon disulfide

ES 7 Professional use of laboratory chemicals	
Market sector:	
PC 21 - Laboratory Chemicals	
Worker	
Use as laboratory reagent	PROC 15
Environment	
Wide dispersive indoor use of reactive substances in open systems	ERC 8b
The process category for the use of CS2 as a laboratory chemical is PROC 15: Use as a laboratory reagent. The use of CS2 as a laboratory reagent, has to be performed under strictly controlled safety measures due to its high volatility and toxicity. Handling of the substance is done under the fume hood. Regarding environmental exposure, there will be no releases of CS2 to the environment, therefore, no modelling is required, as the predicted environmental concentration is zero.	
Operational conditions and risk management measures	
Exposure criteria	
Workers Inhalation DNELs: • Acute - systemic effects: 48 mg/m³ • Long-term - systemic effects: 15.8 mg/m³ **Environment PNECs:** • PNEC aqua (freshwater): 10 µg/L • PNEC aqua (marine water): 1 µg/L • PNEC aqua (intermittent releases): 0.021 mg/L • PNEC sediment (freshwater): 0.12 mg/kg sediment dw • PNEC sediment (marine water): 60 µg/kg sediment dw. • PNEC soil: 14.76 µg/kg soil dw • PNEC STP: 0.13 mg/L • No potential for bioaccumulation	

Control of workers exposure for "Use as laboratory reagent " [PROC 15]					
		Inhal*)		Derm*)	
		Loc	Sys	Loc	Sys
Product characteristics					
Substance in preparation	No		L		
Amounts used					

SAFETY DATA SHEET
Carbon disulfide

Frequency and duration of use/exposure					
Duration of activity	>4 hours		L		
Human factors not influenced by risk management					
Other given operational conditions affecting workers exposure					
Place of use	Indoors		L		
Surface of skin exposed	One hand face only (240 cm2)				L
Technical conditions and measures at process level (source) to prevent release					
Technical conditions and measures to control dispersion from source towards the worker					
Ventilation/Extraction	Any ventilation or extraction with a minimum of 90.5% efficiency (~ 1.2 ACH**) [Inhalation: 90.5%]		L		
Organisational measures to prevent /limit releases, dispersion and exposure					
Conditions and measures related to personal protection, hygiene and health evaluation					
Respiratory protection	Respiratory protection is not used		L		
Use of gloves	In case of potential of contact to substance in fluid state, chemical resistant gloves have to be used to completely avoid dermal exposure				L
Guidance to check compliance with the Exposure Scenario					
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