SAFETY DATA SHEET

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

1.1. Product identifier **Venpure* AF Caplets**

Synonyms: Sodium tetrahydroborate, Sodium borohydride

Chemical Abstracts Registry No: 16940-66-2

REACH Registration Number: 01-2119485016-39-0001

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

Reagent in chemicals purification, reagent in fine chemicals synthesis, bleaching agent.

1.3. Details of the supplier of the safety data sheet

Vertellus Performance Chemicals LLC
4800 State Route 12
Elma, Washington 98541
1-360-482-4350

EU REACH Registrant:
Vertellus Specialties Belgium NV
Haven 611, Tijsmanstunnel West 3
Antwerp 2040 Belgium
Phone: +32 3 250-6188

e-mail Address: sds@vertellus.com

1.4. Emergency telephone number

Vertellus: 1-317-247-8141
CHEMTREC (USA): 1-800-424-9300 (collect calls accepted)
CHEMTREC (International): 1-703-527-3887 (collect calls accepted)
NRCC (China): +86 532 83889090

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

(According to Regulation (EC) No 1272/2008)	(According to Directive 67/548/EEC)
Contact With Water Emit Flammable Gases Category 1 Skin Corrosion/Irritation Category 1C Serious Eye Damage Category 1 Reproductive Toxicity Category 1B Acute Toxicity Oral Category 3	**Symbol:** C, T, F **Risk Phrases:** R25: Toxic if swallowed. R34: Causes burns. R60/61: May impair fertility and may cause harm to the unborn child. R14/15: Reacts violently with water, liberating extremely flammable gases. **Safety Phrases:** S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S53: Avoid exposure - obtain special instruction before use. S45: In case of accident or if you feel unwell, seek medical advice immediately. S8: Keep container dry. S30: Never add water to this product. S7/9: Keep container tightly closed and in a well ventilated place. S60: This material and/or its container must be disposed of as hazardous waste.

SAFETY DATA SHEET

2.2. Label elements

Hazard Symbols (Pictogram):

Signal Word: Danger

Hazard Precautions:
H260 - In contact with water releases flammable gases which may ignite spontaneously.
EUH014 - Reacts violently with water.
H314 - Causes severe skin burns and eye damage.
H301 - Toxic if swallowed.
H360FD - May damage fertility. May damage the unborn child.

Prevention Precautionary Statements:
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P201 - Obtain special instructions before use.

First Aid Precautionary Statements:
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - IF exposed or concerned: Get medical advice/attention.
P310 - Immediately call a POISON CENTER or doctor/physician.
P363 - Wash contaminated clothing before reuse.
P335+P334 - Brush off loose particles from skin. Immerse in cool water.

Storage Precautionary Statements:
P402+P404 - Store in a dry place. Store in a closed container.

2.3. Other hazards

Other Hazards: WARNING! MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR (DURING PROCESSING).

SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (weight %)	EC Number	CLP Inventory/ Annex VI	EU DSD Classification (67/548/EEC)	EU CLP Classification (1272/2008)
Sodium Borohydride	16940-66-2	~ 100	241-004-4	Not listed.	C, T, F R25, R14/15, R34, R60/61	Water-react. 1; H260 Skin Corr. 1C; H314 Eye Dam. 1; H318 Acute Tox. 3; H301 Repr. 1B; H360D

NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable). See Section 16 for the full text of the R-phrases above.

SAFETY DATA SHEET

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact: Immediately flush skin with plenty of water. Remove clothing. Get medical attention immediately. Wash clothing separately from other articles before reuse. Do NOT take contaminated clothing home.

Eye Contact: Immediately flush eyes with plenty of water for at least 20 minutes. Get immediate medical attention. Hold eyelids apart periodically while flushing. Continue to rinse until medical personnel arrive.

Inhalation: Remove from exposure. If not breathing, give artificial respiration and call a physician.

Ingestion: Do NOT induce vomiting. Immediately give 1 or 2 glasses of water and get prompt medical attention. Do not give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

Acute: Sodium borohydride is corrosive to eyes, skin and mucous membranes. Toxic upon ingestion.

Delayed Effects: None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to Physician: Material is corrosive. It may not be advisable to induce vomiting. If the product is ingested, probable mucosal damage may contraindicate the use of gastric lavage. Treat the affected person appropriately. Measures against circulatory shock and convulsions may be necessary.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media: Dry chemical, dry sand or earth to smother fire, dry limestone powder, dry sodium carbonate. Do not use water or carbon dioxide to extinguish fire.

5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion: Hydrogen gas. Oxides of boron.

Potential for Dust Explosion: Sodium Borohydride has been tested for dust explosivity parameters. Minimum Ignition Energy = 410 mJ (dust cloud); Minimum Ignition Temperature = 220°C (dust layer) and 390°C (dust cloud); Kst = 106 bar.m/s; powder is conductive; Dust Class = St 1.

Special Flammability Hazards: Do not use water to extinguish fire. Contact with water can liberate flammable hydrogen gas. Sodium borohydride products are combustible and burn vigorously with intense heat. Heated material can form flammable or explosive vapors with air.

5.3. Advice for firefighters

Basic Fire Fighting Guidance: Wear self-contained breathing apparatus and full protective clothing. Skin and eye contact must be avoided, material is corrosive and water-reactive. If exposed to material during clean-up operations, IMMEDIATELY remove all contaminated clothing and wash exposed skin areas with soap and water. DO NOT USE WATER OR CARBON DIOXIDE (CO_2) TO EXTINGUISH FIRE.

SAFETY DATA SHEET

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuation Procedures: Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remain upwind and use personal protective equipment. Avoid dust formation and remove all sources of ignition.

Special Instructions: See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

6.3. Methods and material for containment and cleaning up

Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. Scoop up spill and place in approved chemical waste container. Avoid generation of dust clouds during clean-up. Dispose of contents & container in accordance with local, regional, national or international regulations.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for Unique Hazards: Avoid contact with water; will violently decompose evolving flammable hydrogen gas.

Practices to Minimize Risk: Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds. Avoid contact with skin, eyes and clothing. Avoid contact with water. Do not breathe vapors or spray mist. Ensure adequate ventilation. Keep container tightly closed.

7.2. Conditions for safe storage, including any incompatibilities

Storage Precautions & Recommendations: Store in a tightly closed container Store in a cool dry place Keep away from sources of ignition Storage temperature <60°C. Moisture can cause the product to decompose and slowly liberate hydrogen, which can accumulate in the headspace of the storage container. Drums should be ventilated by loosening the top bung prior to opening.

Dangerous Incompatibility Reactions: Avoid water, acids, metals, aluminum, copper, zinc, oxidizing agents, alcohols and metal salts (such as Ni^{2+}, Co^{2+}, etc.)

Incompatibilities with Materials of Construction: Aluminum

7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SAFETY DATA SHEET

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limit: None established.

Air Monitoring Method: No data available.

Derived No Effect Levels (DNELs) – Workers:

Route	DNEL
Acute - local effects (inhalation)	5.1 mg/m^3
Acute - local effects (dermal)	Qualitative assessment – corrosive
Acute - systemic effects (dermal)	Qualitative assessment – corrosive
Acute - systemic effects (inhalation)	5.1 mg/m^3
Long-term - local effects (inhalation)	5.1 mg/m^3
Long term - local effects (dermal)	Qualitative assessment – corrosive
Long-term - systemic effects (inhalation)	5.1 mg/m^3
Long-term - systemic effects (dermal)	240 mg/kg bw/day

Derived No Effect Levels (DNELs) – General Population:

Route	DNEL
No consumer uses.	

Predicted No Effect Concentrations (PNECs):

Route	PNEC
PNEC aqua (freshwater)	1.75 mg/L
PNEC aqua (marine water)	1.75 mg/L
PNEC aqua (intermittent releases)	1.75 mg/L
PNEC sediment (freshwater)	2.55 mg/kg sediment dw
PNEC sediment (marine water)	0.255 mg/kg sediment dw
PNEC aqua (STP)	54.77 mg/L
PNEC soil	4.8 mg/kg soil dw

8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

Other Engineering Controls: All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.

Personal Protective Equipment: Chemical goggles. Chemical resistant gloves (neoprene, nitrile/butadiene rubber ("nitrile")); a thickness greater than 0.38 mm is recommended. Chemically resistant protective clothing such as face shield, boots, apron, or full body suit, depending on the exposure potential. Nationally approved air-purifying respirator with highly toxic particulate filters (HEPA filters).

SAFETY DATA SHEET

Respirator Caution:	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Thermal Hazards:	Not applicable.
Environmental Exposure Controls:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	White, free flowing, odorless solid		
Molecular Formula:	BH_4Na	**Molecular Weight:**	37.83 g/mol
Vapor Pressure:	< 0.000054 Pa @ 25°C	**Evaporation Rate:**	No data available
Specific Gravity or Density:	1.07 g/cm^3 @ 25°C	**Vapor Density (air = 1):**	No data available.
Boiling Point:	> 400°C @ 760 mm Hg	**Freezing / Melting Point:**	> 360°C
Solubility in Water:	Reacts with water	**Octanol / Water Coefficient:**	log Pow = -1.09 @ 22°C
pH:	No data available.	**Odor Threshold:**	No data available.
Viscosity:	Not applicable.	**Autoignition Temperature:**	> 400°C
Flash Point and Method:	Non-flammable	**Flammable Limits:**	Non-flammable
Flammability (solid, gas):	Did not propagate combustion at a rate considered highly flammable in EU Method A.10.	**Decomposition Temperature:**	No data available.
Explosive Properties:	Not explosive.	**Oxidizing Properties:**	Not an oxidizer.

SECTION 10: Stability and reactivity

10.1. Reactivity	Reacts violently with water.
10.2. Chemical stability	Stable under normal temperatures and pressures.
10.3. Possibility of hazardous reactions	Polymerization is not expected to occur
10.4. Conditions to avoid	Contact with water (reacts with water).
10.5. Incompatible materials	Avoid water, acids, metals, aluminum, copper, zinc, oxidizing agents, alcohols and metal salts (such as Ni^{2+}, Co^{2+}, etc.)
10.6. Hazardous decomposition products	Oxides of boron; Hydrogen

SAFETY DATA SHEET

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD_{50}:	57 mg/kg (rat)	unpublished data
Acute Dermal LD_{50}:	4000 - 8000 mg/kg (rabbit)	unpublished data
Acute Inhalation LC_{50}:	1.5 mg/L, 4 hrs (rat)	unpublished data
Skin Irritation:	Corrosive to skin.	
Eye Irritation:	Corrosive to eyes.	
Skin Sensitization:	Not a sensitizer	
Mutagenicity:	Substance unable to be tested due to reactivity. For the hydrolysis product (Boric Acid), in vitro genetic toxicity studies were negative. Mammalian genetic toxicity studies were negative.	
Reproductive / Developmental Toxicity:	Unable to be tested due to reactivity. Hydrolysis product (Boric Acid) shows oral NOAEL of 17.5 mg boron/kg/day in rat studies; has been shown to impair fertility and has caused birth defects in laboratory animals.	
Carcinogenicity:	Unable to be tested due to reactivity. Hydrolysis product (Boric Acid) found negative for carcinogenic effects.	
Target Organs:	For the hydrolysis product (Boric Acid): testes and blood.	
Aspiration Hazard:	Not applicable.	
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.	
Most important symptoms and effects, both acute and delayed	Sodium borohydride is corrosive to eyes, skin and mucous membranes. Toxic upon ingestion. Delayed Effects: None known.	
Additive or Synergistic effects:	None known.	

SECTION 12: Ecological information

12.1. Toxicity	NOEC = 5.6 mg/L	*NOEC calculated based on fish toxicity of boric acid (most sensitive trophic level), equivalent to 5.6 mg boron/L.*
12.2. Persistence and degradability	Rapidly hydrolyzes in water to form sodium borate/boric acid and hydrogen gas.	
12.3. Bioaccumulative potential	The rapid hydrolysis of sodium borohydride, along with the high water solubility and low log Kow of boric acid indicates that this product is not capable of bioaccumulation.	
12.4. Mobility in soil	Soil mobility studies are not technically feasible given the rapid hydrolysis of this product, whose half-life ranges from seconds to minutes at environmentally relevant pH's.	
12.5. Results of PBT and vPvB assessment	This substance is not a PBT or vPvB.	

SAFETY DATA SHEET

SECTION 13: Disposal considerations

13.1. Waste treatment methods

US EPA Waste Number: D003

Waste Classification: (per US regulations) Reactive.

Waste Disposal: NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:

14.1. UN number	UN1426	**14.2. UN proper shipping name**	Sodium Borohydride
14.3. Transport hazard class(es)	4.3	**14.4. Packing group**	I
NA Emergency Guidebook Numbers:	138	**IMDG EMS:**	S-O; F-G
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code			Consult IMO regulations before transporting in bulk by ocean.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Inventory Lists:	**Status:**		
USA TSCA:	Listed	**EINECS:**	Listed (241-004-4)
Canada(DSL/NDSL):	Listed (DSL)	**Japan:**	Listed (1-61)
Korea:	Listed (KE-31365)	**Australia:**	Listed
China:	Listed	**Philippines:**	Listed
Taiwan:	Listed	**New Zealand:**	Listed (HSR001294)

WHMIS Classification: Class B, Division 6: Reactive Flammable Material.
Class D, Division 1, Subdivision B: Toxic Material.
Class D, Division 2, Subdivision A: Very Toxic Material
Class E: Corrosive Material.

German Water Hazard Classification: ID Number 2940, hazard class 2 - hazard to waters *(Natriumtetrahydroborat)*

SARA 313: Not applicable.

Reportable Quantities: Not applicable.

State Regulations: This product contains chemicals listed on the New Jersey Department of Health Hazard Right-to-Know Program Hazardous Substance List.

SAFETY DATA SHEET

Other Regulatory Listings:

- Hong Kong: Hazardous Chemicals Control Ordinance – Dangerous Goods List 20074, Category 6; Exempt Quantity: NIL; Label: H.
- Switzerland: On Swiss Giftliste 1 (List of Toxic Substances 1), 31 May 1999 Toxic Category 3, List number G-9541.

HMIS:

NFPA:

15.2. Chemical safety assessment

A chemical safety assessment has been prepared for this product.

SECTION 16: Other information

Full text of R phrases in Section 3:

R25: Toxic if swallowed.
R34: Causes burns.
R14/15: Reacts violently with water, liberating extremely flammable gases.
R60/61: May impair fertility and may cause harm to the unborn child.

Classification Method: On basis of test data; Expert judgment

Legend of Abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.
CAS = Chemical Abstracts Service.
CFR = Code of Federal Regulations.
DSL/NDSL = Domestic Substances List/Non-Domestic Substances List.
EC = European Community.
EINECS = European Inventory of Existing Commercial Chemical Substances.
ELINCS = European List of Notified Chemical Substances.
EU = European Union.
GHS = Globally Harmonized System.
LC = Lethal Concentration.
LD = Lethal Dose.
NFPA = National Fire Protection Association.
NIOSH = National Institute of Occupational Safety and Health.
NTP = National Toxicology Program.
OSHA = Occupational Safety and Health Administration
PEL = Permissible Exposure Limit.
RQ = Reportable Quantity.
SARA = Superfund Amendments and Reauthorization Act of 1986.
TLV = Threshold Limit Value.
WHMIS = Workplace Hazardous Materials Information System.

Important Note: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.

Revision Date:	30 April 2015	**Original Date of Issue:**	30 April 2015
Issued by:	Regulatory Management Department	**Email:**	SDS@Vertellus.com
Revision Details:	Newly issued in Vertellus template; all sections affected.		

SAFETY DATA SHEET

Annex

Sodium Borohydride - Summary of Uses

ES Number	Name	SU	ERC	PROC
ES1	Distribution of substance	3	1	1,8b,15
ES2	Formulation & (re) packing of substance and mixtures, industrial	3	2	2,3,4,5,8a,15
ES3	Reagent in chemicals purification	3	6a	2,4,8a,15,22,23
ES4	Reagent in fine chemicals synthesis	3	6a	2,4,8a,15,22,23
ES5	Bleaching agent for Pulps	3	6b	2,8b
ES6	Stabilizing and bleaching agent for textile fibres	3	6b	2,4,8b

Sodium Borohydride - Exposure Scenarios

Note: Guidance below is in addition to that indicated in sections 1-16 of the SDS

ES1

Title: Distribution of Substance - covers the importation, storage, transfers, maintenance, distribution of the bulk substance and sampling and associated laboratory activities.

Main Sector of Use Group

- SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
- SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 1: Standard operations in dedicated facilities. Continuous enclosed properties
- PROC 8b: Transfer of substance- (charging/discharging) from / to vessels / large containers at dedicated facilities
- PROC 15: Use as a laboratory reagent

Environmental Release Categories

- ERC 1 Manufacture of chemicals; SpERC 1v1.1b

ES2

Title: Formulation & (re) packing of substance and mixtures, industrial exposure scenario covering the following

Main Sector of Use Group

- SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
- SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 2: Use in closed, continuous process with occasional controlled exposure
- PROC 3: Formulation in closed bath process
- 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- non-dedicated facilities
- PROC 15: Use as a laboratory reagent

Environmental Release Categories

- ERC 2: Formulation

SAFETY DATA SHEET

ES3

Title: Reagent in chemicals purification **- e**xposure scenario covering the following

Main Sector of Use Group

- SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites
  - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 2: Use in closed, continuous process with occasional controlled exposure
- PROC 4: Use in batch processes-opportunities for exposure
- PROC 8a: Transfer of substance-Non-Dedicated facilities
- PROC 15: Laboratory Use –Sampling
- PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting
- PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature

Environmental Release Categories

- ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)

ES4

Title: Reagent in fine chemicals synthesis **- e**xposure scenario covering the following

Main Sector of Use Group

- SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
  - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 2: Use in closed, continuous process with occasional controlled exposure
- PROC 4: Use in batch processes-opportunities for exposure
- PROC 8a: Transfer of substance-Non-Dedicated facilities
- PROC 15: Laboratory Use –Sampling
- PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting
- PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature

Environmental Release Categories

- ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)

ES5

Title: Bleaching agent for pulps - exposure scenario covering the following

Main Sector of Use Group

- SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites
  - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 2: Use in closed, continuous process with occasional controlled exposure
- PROC 8b: Transfer of substance or preparation (charging/discharging) from / to vessels / large containers at dedicated facilities

Environmental Release Categories

- ERC 6b: Industrial use of reactive processing aids

SAFETY DATA SHEET

ES6
Title: Stabilizing and bleaching agent for textile fibres - exposure scenario covering the following
Main Sector of Use Group

- SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites
  - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 2: Use in closed, continuous process with occasional controlled exposure
- PROC 4: Use in batch processes-opportunities for exposure
- PROC 8b: Transfer of substance or preparation (charging/discharging) from / to vessels / large containers at dedicated facilities

Environmental Release Categories

- ERC 6b: Industrial use of reactive processing aids

1. Control of Worker Exposure

Product Characteristics:

- Substance volatility: 5.4E-5 Pa - considered non-volatile
- Volatility for liquid: low (worst case)
- Dustiness for solid: medium
- Physical Form:

ES	Physical Form	Concentration %
1	Liquid	5-25
2	Solid	<25
3	Solid	<25
4	Solid	<25
5	Liquid	5-25
6	Liquid	5-25

Amounts used: Not relevant for human risk assessment

Frequency and duration of use/exposure, PPE, Ventilation:

ES	PROC	Application	Indoors / Outdoors	Hours / Shift	Respirator	Gloves	Coveralls	Eye	Ventilation
1 W1	1	Storage		8		Basic			General
W2	8b	Loading/Filling	Indoors	1-4		Basic	yes	yes	Local exhaust ventilation extract
W3	8b	Loading/Filling	Indoors	8	yes	Basic	yes	yes	Extraction point
W4	8b	Cleaning	Indoors	1		Basic	yes	yes	
W5	8b	Cleaning	Indoors	8	yes	Basic	yes	yes	
W6	15	Laboratory	Indoors	8		Basic		yes	Fume Cupboard
2 W1	2	Processing	Indoors	8		Basic	yes	yes	
	3	Storage, processing and formulation	Indoors	8		Basic	yes	yes	
W2	4	Batch enclosed processes	Indoors	8		Basic	yes	yes	Extraction point
W3	4	Unloading		8	yes	Basic	yes		
W4	5	Mixing or blending		8	yes	Basic	yes		

SAFETY DATA SHEET

ES	PROC	Application	Indoors / Outdoors	Hours / Shift	Respirator	Gloves	Coveralls	Eye	Ventilation
W5	8a	Cleaning	Indoors	8	yes	Basic	yes		
W6	15	Laboratory	Indoors	<4		Basic	yes	yes	Extraction point
W7	15	Laboratory	Indoors	8		Basic		yes	Fume cupboard
3 W1	2	Loading continuous closed	Outdoors	8		Basic	yes	yes	
W2	4	Loading batch closed	Outdoors	<4		Basic	yes	yes	
W3	2	Processing	Indoors	8		Basic	yes	yes	
W4	2	Storage	Indoors	8		Basic	yes	yes	
W5	2	Post processing operations	Indoors	8		Basic	yes	yes	
W6	4	General process exposures. Closed/semi closed. Up to 200°C		4		Basic	yes	yes	
W7	4	Storage, batch operation. Ambient		4		Basics	yes	yes	
W8	4	Post processing operation. Batch or semi closed or vented sampling. Ambient		4		Basic	yes	yes	
W9	8a	Cleaning, dedicated facility		4		Basic	yes	yes	
W10	22b	Closed operations at elevated temperature		4		Basic	yes	yes	
W11	23b	Open processing and transfer at elevated temperature		4		Basic	yes	yes	
W12	15	Laboratory with local exhaust ventilation	Indoors	4		Basic	yes	yes	Extraction point
W13	15	Laboratory with fume cupboard	Indoors	8		Basic	yes	yes	
4 W1	2	Loading, closed	Outdoors	8		Basic	yes	yes	
W2	4	Loading, Batch	Outdoors	4	yes	Basic	yes		
W3	2	Processing operations, ambient to 200°C		8		Basic	yes	yes	
W4	2	Storage, ambient	Indoors	4	yes	Basic	yes		
W5	2	Post processing; enclosed		8		Basic	yes	yes	
W6	4	General exposure, closed / semi or vented sampling. To 200°C		8		Basic	yes	yes	
W7	4	Storage; batch; ambient		4		Basic	yes	yes	
W8	4	Post processing; closed/semi closed or vented sampling		8	yes	Basic	yes		
W9	8a	Cleaning; no local exhaust ventilation	Indoors	4	yes	Basic	yes		
W10	22b	Closed processing up to 200°C		8	yes	Basic	yes		
W11	23B	Open processing and transfer up to 200°C		4		Basic	yes	yes	
W12	15	Laboratory with local exhaust ventilation	Indoors	8		Basic	yes	yes	

SAFETY DATA SHEET

ES	PROC	Application	Indoors / Outdoors	Hours / Shift	Respirator	Gloves	Coveralls	Eye	Ventilation
W13	15	Laboratory fume cupboard	Indoors	4		Basic	yes	yes	
5 W1	2	Unloading from tank truck into tank	Outdoors	8		Basic	yes	Yes	
W2	2	Storage; no local exhaust ventilation	Indoors	8		Basic	yes	yes	
W3	2	Making the product w/water, caustic liquid sulfur dioxide or bisulfite solution	Indoors	8		Basic	yes	yes	
W4	2	Sampling at storage tank	Indoors	4		Basic	yes	yes	
W5	8b	Cleaning, no local exhaust ventilation	Indoors	1		Basic	yes	yes	
W6	8b	Cleaning w/respirator	Indoors	8	yes	Basic	yes		
6 W1	2	Unloading delivery truck to customer storage		8		Basic	yes	yes	
W2	4	Unloading delivery truck to customer storage		4		Basic	yes	yes	
W3	2	Designated storage area at customer for IBC and drums		8		Basic	yes	yes	
W4	4	Designated storage area at customer for IBC and drums		4		Basic	yes	yes	
W5	2	Material transfer. Connecting hose from IBC or drum to dosing station	Indoors	8		Basic	yes	yes	
W6	4	Material transfer. Connecting hose from IBC or drum to dosing station	Indoors	4		Basic	yes	yes	
W7	2	Mixing.	Indoors	8		Basic	yes	yes	
W8	4	Mixing, short term exposure	Indoors	1		Basic	yes	yes	
W9	8b	General Maintenance		4		Basic	yes	yes	
W10	8b	General Maintenance w/ respirator		8	yes	Basic	yes		
W11	8b	Storage of empty IBC and collection of empty		4		Basic	yes	yes	

Other given operational conditions affecting workers exposure

- The work is performed indoors and outdoors.

Technical conditions and measures at process level (source) to prevent release:

- See Section 7 of SDS.

Technical conditions and measures to control dispersion from source towards the worker:

- See Section 7 and 8 of SDS.
- See Ventilation comments above.

Organisational measures to prevent /limit releases, dispersion and exposure: See SDS

- Avoid direct eye contact with product.
- Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely.
- Clean up contamination/spills as soon as they occur.
- Wash off skin contamination immediately.

- Provide basic employee training to prevent / minimize exposures and to report any skin effects that may develop.
- Implementation of basic standards of occupational hygiene.
- Regular cleaning of equipment and work areas.
- Ensure suitable management/supervision is in place to check that risk management measures are being used and operating conditions followed correctly.

Conditions and measures related to personal protection, hygiene and health evaluation:

- See sections 7, 8 and 10 of SDS.
- Respirators: See Table above.
- Wear chemically resistant gloves (tested to EN374) in combination with 'Basic' employee training,
- Wear suitable coveralls to prevent exposure to skin.
- Use suitable eye protection.

Where there is the potential for additional and significant aerosol exposure to liquid solutions (e.g. associated with PROCs 7, 11, 17 or 18), the following phrase also applies:

- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

2. Control of Environmental Exposure

Frequency and duration of use

- Continuous and Intermittent release possible

ES	Emission days per year	Local volume per day (kg)
1	350	4914
2	300	1000
3	350	500
4	350	1000
5	350	600
6	350	500

Environment factors not influenced by risk management

- Default values of 18,000 m^3/day for receiving waters are assumed

Technical conditions and measures at process level (source) to prevent release

- See sections 7 and 8 of the SDS

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Water / Air / Soil Release

ES	Air Release Fraction	Water Release Fraction	Soil Release Fraction	Local Release to air (kg/d)	Local release to sewage (kg/d)	Local Release to soil (kg/d)	Criteria
1	1.0E-04	1.0E-07	1.0E-05	4.91E-04	4.91E-04	4.91E-04	ESVOC SpERC 1.1bv1
2	2.50E-03	5.00E-03	1.00E-04	2.5	5	0.10	ESVOC SpERC 2.2.v1
3	0.0	1.00E-05	1.00E-03	0	5.00E-03	5.00E-01	ESVOC SpERC 6.1av1
4	0.00	1.00E-07	1.00E-03	0.00	1.00E-02	1.00	ESVOC SpERC 6.1.1a.v1
5	0.00	2.00E-02	0.00	0.00	10.0	0.00	TEGEWA SpERC 6b.1.v1
6	0.00	2.00E-02	0.00	0.00	10.0	0.00	TEGEWA SpERC 6b.1.v1

SAFETY DATA SHEET

Organizational measures to prevent/limit release from site

- See Sections 6 and 7 of the SDS

Conditions and measures related to municipal sewage treatment plant disposal

- *Estimated substance* removal from wastewater via STP: 0.04%

Conditions and measures related to external treatment of waste for disposal

- See section 13 of the SDS
- Observe all regional, state and local environmental regulations
- No application of sludge to soil
- Retain drain downs in sealed storage pending disposal

Conditions and measures related to external recovery of waste

- There is no recovery at an external waste treatment site

3. Exposure estimation and reference to its source

The ECETOC Targeted Risk Assessment Tool (TRA) version 2.0 was used for the occupational exposure assessment. Details of the TRA may be found in the ECETOC Technical Report No. 93 (2004), and the accompanying Addendum Technical Report No. 107 (2009), or at https://www.ecetoc-tra.org/. The assessment of environmental exposure was carried out using EUSES v3.0. Documentation for EUSES 3.0 may be found at http://ecb.jrc.ec.europa.eu/euses.

The human health risk assessment and the environmental risk assessment were performed using Chesar with ECETOC TRA 3.0.. Tables below summarize the calculated exposures and resulting Risk Characterization Ratios (RCR) at < 1.0. Note the worker exposures in ECETOC TRA are calculated by multiplying the full shift calculations by the following factors:

- > 4 hours: 1
- 1 - 4 hours: 0.6
- 15 minutes to 1 hour: 0.2
- < 15 minutes: 0.1

4. Guidance to DU - Operational conditions and Risk Management Measures

The activities discussed above result in an acceptable exposure if individually performed by an industrial/professional worker, and considering the operational conditions and the risk management measures (RMM) as defined. The downstream user may re-calculate the RCR values based on variations in the local operational conditions and application of RMM to confirm that operations are within the control limits.

Predicted Exposure Concentrations / Risk Characterization – Environmental

Compartment	Local PEC; Use 1	RCR*	Local PEC; Use 2	RCR*	Local PEC; Use 3	RCR*
Water: Fresh; mg/L	2.37E-04	1.35E-04	2.50E-01	1.43E-01	4.62E-04	2.64E-04
Water: Fresh Sediment; mg/kg	9.20E-04	3.61E-04	9.71E-01	3.81E-01	1.80E-03	7.04E-04
Water: Marine; mg/L	2.39E-05	1.37E-05	2.50E-02	1.43E-02	4.65E-05	2.66E-05
Water; Marine Sediment; mg/kg	9.30E-03	3.65E-04	9.71E-02	3.81E-01	1.81E-04	7.08E-04
Water: STP mg/L	2.46E-04	4.49E-06	2.5	4.57E-02	2.50E-03	4.57E-05
Soil: mg/kg	1.46E-03	3.04E-04	9.57E-03	1.99E-03	8.46E-05	1.76E-05

Compartment	Local PEC; Use 4	RCR*	Local PEC; Use 5	RCR*	Local PEC; Use 6	RCR*
Water: Fresh; mg/L	7.12E-04	4.07E-04	6.00E-01	3.43E-01	5.00E-01	2.86E-01
Water: Fresh Sediment; mg/kg	2.77E-03	1.08E-03	2.33	9.14E-01	1.94	7.62E-01
Water: Marine; mg/L	7.15E-05	4.08E-05	6.00E-02	3.43E-02	5.00E-02	2.86E-02

SAFETY DATA SHEET

Water; Marine Sediment; mg/kg	2.78E-04	1.09E-03	2.33E-01	9.14E-01	1.94E-01	7.62E-01
Water: STP mg/L	5.00E-03	9.14E-05	6.00	1.10E-01	5.00	9.14E-02
Soil: mg/kg	8.81E-05	1.84E-05	8.42E-03	1.75E-03	7.03E-03	1.46E-01

***Risk Characterization Ratio**

Predicted Exposure Concentrations / Risk Characterization Ratio– Worker

Qualitative assessment was completed to demonstrate control considering alternate modes and the use of defined operational conditions and risk management measures for routes other than long term inhalation.

ES	PROC	Application	Indoors / Outdoors	Hours / Shift	Inhalation exposure: Long term (ppm v/v)	Risk Characterization Ratio
1 W1	1	Storage		8	0.001	0.0003
W2	8b	Loading/Filling	indoors	1-4	1.26	0.38
W3	8b	Loading/Filling	Indoors	8	0.11	0.03
W4	8b	Cleaning	Indoors	1	0.60	0.18
W5	8b	Cleaning	Indoors	8	0.15	0.05
W6	15	Laboratory	Indoors	8	0.03	0.01
2 W1	2	Processing	Indoors	8	0.30	0.06
W2	3	Storage, processing and formulation	Indoors	8	0.70	0.14
W3	4	Batch enclosed processes	Indoors	8	0.11	0.02
W4	4	Unloading		8	0.15	0.03
W5	5	Mixing or blending		8	0.15	0.03
W6	8a	Cleaning	Indoors	8	0.15	0.03
W7	15	Laboratory	Indoors	<4	1.26	0.38
W8	15	Laboratory	Indoors	8	0.03	0.01
3 W1	2	Loading continuous closed	Outdoors	8	0.30	0.06
W2	4	Loading batch closed	Outdoors	<4	1.80	0.35
W3	2	Processing	Indoors	8	0.30	0.06
W4	2	Storage	Indoors	8	0.30	0.06
W5	2	Post processing operations	Indoors	8	0.30	0.06
W6	4	General process exposures. Closed/semi closed. Up to 200°C		4	1.80	0.35
W7	4	Storage, batch operation. Ambient		4	1.80	0.35
W8	4	Post processing operation. Batch or semi closed or vented sampling. Ambient		4	1.80	0.35
W9	8a	Cleaning, dedicated facility		4	1.80	0.35
W10	22b	Closed operations at elevated temperature		4	1.08	0.21
W11	23b	Open processing and transfer at elevated temperature		4	1.08	0.21
W12	15	Laboratory with local exhaust ventilation	Indoors	4	1.26	0.38
W13	15	Laboratory with fume cupboard	Indoors	8	0.03	0.006
4 W1	2	Loading, closed	Outdoors	8	0.30	0.06
W2	4	Loading, Batch	Outdoors	4	1.80	0.35
W3	2	Processing operations, ambient to 200C		8	0.30	0.06
W4	2	Storage, ambient	Indoors	4	0.30	0.06
W5	2	Post processing; enclosed		8	0.30	0.06
W6	4	General exposure, closed / semi or vented sampling. To 200°C		8	1.80	0.35
W7	4	Storage; batch; ambient		4	1.80	0.35

SAFETY DATA SHEET

W8	4	Post processing; closed/semi closed or vented sampling		8	1.80	0.35
W9	8a	Cleaning no local exhaust ventilation	Indoors	4	1.80	0.35
W10	22b	Closed processing up to 200°C		8	1.08	0.21
W11	23B	Open processing and transfer up to 200°C		4	1.08	0.21
W12	15	Laboratory with local exhaust ventilation	Indoors	8	1.26	0.38
W13	15	Laboratory fume cupboard	Indoors	4	0.03	0.006
5 W1	2	Unloading from tank truck into tank	Outdoors	8	0.60	0.18
W2	2	Storage; no local exhaust ventilation	Indoors	8	0.60	0.18
W3	2	Making the product w/water, caustic liquid sulfur dioxide or bisulfite solution	Indoors	8	0.60	0.18
W4	2	Sampling at storage tank	Indoors	4	0.36	0.11
W5	8b	Cleaning, no local exhaust ventilation	Indoors	1	0.60	0.18
W6	8b	Cleaning w/respirator	Indoors	8	0.15	0.05
6 W1	2	Unloading delivery truck to customer storage		8	0.60	0.18
W2	4	Unloading delivery truck to customer storage		4	1.80	0.55
W3	2	Designated storage area at customer for IBC and drums		8	0.60	0.18
W4	4	Designated storage area at customer for IBC and drums		4	1.80	0.53
W5	2	Material transfer. Connecting hose from IBC or drum to dosing station	Indoors	8	0.60	0.18
W6		Material transfer. Connecting hose from IBC or drum to dosing station	Indoors	4	1.80	0.55
W7	2	Mixing.	Indoors	8	0.60	0.18
W8	4	Mixing, short term exposure	Indoors	1	1.80	0.55
W9	8b	General Maintenance		4	1.80	0.55
W10	8b	General Maintenance w/ respirator		8	0.15	0.05
W11	8b	Storage of empty IBC and collection of empty		4	1.80	0.55