SAFETY DATA SHEET
SODIUM HYDROXIDE SOLUTION

1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND THE COMPANY / UNDERTAKING

1.1 Product identifier

Product chemical name:	**SODIUM HYDROXIDE**
EC number:	215-185-5
CAS number:	1310-73-2
INDEX number:	011-002-00-6
IUPAC name:	sodium hydroxide
Synonym:	caustic soda, lye
Molecular formula:	NaOH
Molecular weight:	70.0
Type of product:	mono-constituent substance
REACH registration number:	**01-2119457892-27-XXXX**

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

The main industrial and professional uses: reagent (production of organics and inorganic, in the pulp and paper industry; in the metal industry; in the production of soap); pH –regulating agent (in waste water treatment); ion exchange resins regenerating agent, catalyst; cleaning agent (in the food industry, cleaning recycled bottles); etching agent.
The main household use: oven cleaner.

Tabel 1 Identified uses

Identified use/ UI number	Sector of end use (SU)	Product category (PC)	Process category (PROC)	Environmental release category (ERC)	Article category (AC)	Exposure scenario
1	SU 1-24 except 21, 22	Not applicable	PROC 1-4, 8-9	ERC 1	Not applicable	ES1 : Manufacturing of sodium hydroxide liquid
2	SU 1-24 except 21, 22	Not applicable	PROC 1-4, 8-9	ERC 1	Not applicable	ES2: Manufacturing of sodium hydroxide solid
3	SU 1-24 except 21, 22	PC 0-40	PROC 1-27	ERC 1-7, 12	Not applicable	ES3: Industrial and professional use of sodium hydroxide
4	SU 1-24 except 21, 22	PC 0-40	PROC 1-27	ERC 2, 3, 8-11	Not applicable	
5	SU 21	PC 0-40	Not applicable	ERC 8-11	Not applicable	ES4: Consumer use of sodium hydroxide

Uses advised against: not available

1.3 Details of the supplier of the safety data sheet

Name of the company:	**VINYL KFT.**
Address:	**1097 Budapest Illatos út 19-23.**
Telephone/Fax:	**+3612826768**
Email address:	**info@vinyl.hu**
Email of the competent person responsible with SDS:	**ehsq@vinyl.hu**

1.4 Emergency telephone number

Egészségügyi Toxikológiai Tájékoztató Szolgálat	**Tel: (06-1) 476-11-19**

Drawn up: July1997
Revised: February 2015

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS –Global Hazardous System Classification according to the European Regulation (EC) no. 1272/2008, as amended:

Hazard class	Code of hazard class and hazard category	Hazard statement
Skin corrosion	Skin Corr. 1A	H 314- Causes severe skin burns and eye damage
Corrosive to metals	Met. Corr. 1	H 290- May be corrosive to metals

Risk advice to the human and the environment

Sodium hydroxide causes severe burns of the eyes, even blindness. In skin contact can cause severe burns. Sodium hydroxide may be fatal if swallowed. Breathing the dust can irritate the mouth, nose and throat. Exposure to high levels may irritate the lungs, causing coughing and/or shortness of breath. Still higher exposure can cause a build up of fluid in the lungs (pulmonary edema).
In contact with water generates large amounts of heat. The high water miscibility and very low vapor pressure indicate that sodium hydroxide will be found predominantly in water. Significant emissions or exposure to the terrestrial environment and to the air are not expected either. The aquatic effect is due to possible pH changes related to OH- discharges, as the toxicity of the Na+ ion is expected to be insignificant compared to the (potential) pH effect.

2.2 Labels elements

Labeling according to the European Regulation (EC) no. 1272/2008, as amended:

- Name on label: **SODIUM HYDROXIDE (SOLUTION)**
- Signal word: **DANGER**
- Hazard symbols:

GHS 05-corrosive

Hazards statements: H 314: Causes severe skin burns and eye damage.
H 290: May be corrosive to metals.

Precautionary statements:

Prevention: P260: Do not breathe dust/fume/gas/mist/vapors/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
Response: 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.
P310: Immediately call a POISON CENTER or doctor/physician.

''EC label''

2.3 Other hazards

The product does not meet the criteria for classification as PBT, Persistent Bio-accumulative and Toxic or vPvB –very persistent, very bio-accumulative.

3. COMPOSITION / INFORMATION ON INGREDIENTS
3.1. Substances

The product is considered:	Substance
Chemical identity of substance:	Sodium hydroxide
Classification according to the (EC),	Skin corrosion, Skin Corr. 1A, H314
Regulation no. 1272/2008:	Corrosive to metals, Met. Corr. 1, H290
EINECS no:	215-185-5
CAS no*:*	1310-73-2
INDEX no:	011-002-00-6
% Weight:	≥ 30
Generic name:	Inorganic base
Impurities:	No impurities relevant for classification and labeling

3.2. Mixtures: not applicable

4. FIRST AID MEASURES
4.1 Description of first-aid measures
It causes ulcerative injuries, sternum and gastric pains, abundant salivation, vomiting, diarrhea. It is mandatory to request medical assistance, in case of accidental contact with this product (if possible, show the product label). **Remove contaminated clothing.**
If inhaled:
Evacuate the victim from the contaminated area to ventilated place. Give oxygen or will apply artificial respiration if necessary. Call a physician immediately.
In case of skin contact:
Remove quickly contaminated clothing and shoes. Wash skin with plenty of water. Call a physician or poison control centre. Wash the contaminated clothes before re-using.
In case of eye contact:
Immediately flush eyes with plenty of water, for at least 15 minutes, while moving eye pupils in all directions to eliminate product remains. Call a physician or poison control centre immediately.
If ingestion:
Call a physician or poison control centre immediately. Rinse mouth with plenty of water. Give oxygen or apply artificial respiration if necessary. Do not induce vomiting.

4.2 Most important symptoms and effects, acute and delayed
Inhalation:
The product is corrosive to respiratory system. May occur breathing difficulties, pulmonary edema, irritation, cough. If exposure is prolonged there is a risk of bronchitis, nose bleeds, sore throat.
Skin contact:
Causes sever burns. It causes ulcerative injuries, redness, swelling of tissue.
Eye contact:
Causes severe burns. Contact with substance into eyes can cause tissue damage and blindness. The symptoms are: redness, swelling of tissue.
Ingestion:
If ingested, the substance causes severe burns of the mouth, throat, esophagus and the stomach. Symptoms: sternum area and gastric pains, nausea, abundant salivation, vomiting, diarrhea, danger of suffocation.

4.3 Indication of any immediate medical attention and special treatment needed
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes and fluid intake are also required. If skin burns are present, treat as any thermal burn after decontamination.

5. FIREFIGHTING MEASURES
5.1 Extinguishing media*:*
- *recommended :* water spray, compact water jet
- *not recommended:* extinguishing powder, foam, steam, inert gases

5.2 Special exposure hazards arising from the substance or mixture
Not flammable and not combustible product. Hazardous decompositions products can formed under fire conditions. For large fires (caused by ignition packaging) use large amounts of water mist. Residues resulting from fire should be treated as waste, according to the national / european laws.

5.3 Advice for firefighters
Use breathing apparatus and individual protective clothing for interventions. Since the fire can lead to toxic products of thermal decomposition, use an independent breathing apparatus which will protect the entire face and will operate at the pressure, inside contaminated area or the over pressure.
Waste resulting from fire extinguishing must be treated as dangerous waste and will be discarded in a controlled manner according to legislation in force.

6. ACCIDENTAL RELEASE MEASURES
6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel:
Try to limit leaks of the product if possible. Keep away from incompatible products.
Advice for emergency personnel:
Evacuate all uninvolved persons from the danger area. Ventilate area. Use individual protection equipment and adequate gloves (see chapter 8).

6.2 Environmental precautions
Waste or accidental spillages must not be discarded in running waters, lakes, sewages or soil.
Inform local authorities in case of accidental spillages.

6.3 Methods and material for containment and cleaning up
Contain and recover when possible. Do not flush caustic residues to sewer. Residues from spills can be diluted with water, neutralized with diluted acid such as acetic and hydrochloric. Absorb neutralized caustic residues on sand or other absorbent material and place in a chemical waste container for disposal.

6.4. Reference to other sections
Firefighting measures are described in the chapter 5. Individual protection equipment is described in the chapter 8. The disposal consideration is described in the chapter 13.

7. HANDLING AND STORAGE
Handling imposes caution measures specific for a corrosive product.

7.1 Precaution for safe handling
Protection measure
Special attention is required when caustic soda is handled. All workers should be properly trained in the required safe handling and first aid procedure. Persons handling caustic soda must always wear protective clothing, close-fitting chemical worker's safety goggles, rubber gloves, in order to avoid any contact with hand, skin or eyes. Do not wear contact lenses when handling this product. It is also advisable to have individual pocket eyewash.

Advice on general occupational hygiene
Avoid inhalation or ingestion and contact with skin and eyes. General occupational hygiene measures are required to ensure safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no drinking, eating and smoking at the workplace.

7.2. Condition for storage, including incompatibilities
The product are kept in original package, tightly closed, in well vented places, away from moisture. Large product quantities are stored and kept in large tanks, in special arranged places.
Provide spaces for keeping and using of the neutralizing substances, necessary in case of accidental leakages (see chapter 13).

Tendency of freezing appears as follows:
- at the concentration higher than 40% of solution and the temperature around of 15°C, may appear the product freezing;
- at the concentration around 30-32% of solution, the tendency of freezing appear around of 1°C.
In such case is necessary to heat the product or to dilute it.
Provide venting units and water sources near the working areas, if is necessary. When handle the product use protective equipment (see cap 8). Avoid package degradation during handling. During cold weather use heating coils.

Incompatibilities: do not store or mix with water, strong acids, flammable liquids, organic halogens compounds, nitro methane; do not store in aluminum, zinc, tin and lead containers.

Packaging materials used	- railway steel tanks protected against corrosion, provided with heating coils necessary to defrost the product at its unloading on cold weather; - road tanker, anticorrosive protected; - polypropylene vessel; - other packing that provides quantitative and qualitative integrity of product.
Recommended	Plastics: type ABS-plastic, noryl, polypropylene, PVC; Elastomers type: natural rubber; Metals: stainless steel.
Not recommended	Plastics type: LDPE; PDVF; Metals type: aluminum, zinc, tin, lead and their alloys, brass.

7.3. Specific end-use(s)
The identified uses are described in the chapter 1.2.
For more information please check the relevant exposure scenario, available in the annex of this safety data sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters
National exposure limits values for sodium hydroxide:
VLE = 3 mg/m ^{3}, exposure period = 15 minutes; **VLE = 1 mg/m^3**, exposure period = 8 hours;
(according to European Directive 2006/15/CE, concerning establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39EEC).

DNELs –derived No-Effect levels for sodium hydroxide:
DNEL long term inhalation, population = **1.0 mg/mc;**
DNEL long term inhalation, workers = **1.0 mg/mc;**
PNECs –Predictible No-Effect Concentrations for sodium hydroxide:
PNEC water: not applicable;
PNEC soil/ground water: not applicable;
(values extracted from the Chemical Safety Report, included in REACH dossier).

8.2 Exposure control
8.2.1. Appropriate engineering controls
Provide local and general ventilation systems in the working area and storage spaces. Provide water sources and eyewash station in the proximity of the working area, if is necessary.

8.2.2. Individual protection measures, such as personal protective equipment
Workers will be fully equipped with individual protective equipment. The type and material of which it is made the protective equipment shall respect the national/european legal rules in force, on health and safety at work.

Respiratory protection: in case of insufficient ventilation, use individual face shield.
Hand protection: gloves resistant against acids and alkalis
Suitable materials: PVC, neoprene, natural rubber, butyl –rubber
Unsuitable material: leather

Eye protection: chemical safety goggles, face- shield
Skin and body protection: cotton overall, rubber apron, rubber boots.

Specific hygiene measures
After working with this product, change protection equipment and wash face and hands with plenty of water and soap. Ensure water sources and eyewash station in the proximity of the working area, if is necessary.
It is forbidden to smoke, eat, drink in the working areas.
Environmental exposure control
Waters contaminated with this product will not be discarded in watercourses, on the ground or in sewages without previous neutralization.

8.2.3. Environmental Exposure Control
All ventilation systems should be filtered before discharge to atmosphere. Avoid any releasing to the environment. Contain the spillage. For detailed explanations of the risk management measures that adequately control exposure of the environment to the substance please check the relevant exposure scenario, available in the annex of this safety data sheet.

9. PHYSICAL AND CHEMICAL PROPERTIES
9.1. Information on basic physical and chemical properties

Appearance	clear liquid
Color	colorless
Odor	odorless
pH	Strongly alkaline
pKa	No data
Sodium hydroxide content	30 - 51%
Boiling point	from 117-147 ^{0}C (ex. NaOH sol. 50% = 140^{0}C; NaOH sol. 30% = 115^{0}C)
Melting point	0-22^{0}C (ex. NaOH sol. 50% = 12^{0}C; NaOH sol. 30% = 1^{0}C)
Flash point	Not flammable
Evaporation rate	No data
Flammability(solid, gas)	Not flammable
Vapor pressure at 20^{0}C	1.3 mmHg
Vapor density	No data
Relative Density at 20^{0}C	1.33 -1.53 ex. (NaOH sol. 50% = 1.53 g/cm^3 ; NaOH sol. 30% = 1.33 g/cm^3)
Bulk density	No data
Solubility	No data
Solubility/qualitative	in any ratio (alcohol –glycerol)
Partition coefficient (n -octanol/water)	Not applicable
Auto-ignition temperature	No data
Decomposition temperature	No data
Viscosity for NaOH solution 50%	80 mPa*s at 20^{0}C; 49 mPa*s at 28^{0}C
Explosive properties	Not explosive (see chapter 10)
Oxidizing properties	Non oxidizing

9.2. Other information: no data

10. STABILITY AND REACTIVITY
10.1 Reactivity*:* May be corrosive to metals. It is possible to cause exothermic hazard.

10.2 Chemical stability
The product it's stable under recommended storage conditions.
Store keep and transport the product away from moisture and weather conditions.
Store and transport the product separate from incompatible substances.

10.3 Possibility of hazardous reactions
Violent reaction are produced with water. By reaction with metals release hydrogen In aqueous solution reacts with chlorine releasing sodium hypochlorite. Sodium chlorate is formed by warm and concentrated solution in reaction with chlorine. In the same way reacts with bromine and iodine. Not volatile but raises easy in air in form of aerosols. React with trichloroethylene resulting dichloro-acetylene explosive product. Corrosive action increases in presence nitro-compounds, nitrozo-compounds, diazo-derivatives.

10.4 Conditions to avoid Minimize exposure to moisture and avoid using faulty packaging. Avoid contact with incompatibles materials.

10.5 Incompatible materials
Acids (hydrochloric acid, sulfuric acid), organic halogenated compounds (trichloroethylene, chlorosulfonic acid), halogens (chlorine, bromine, iodine), flammable liquid, nitro-methane, metals –aluminum, zinc, cooper, lead, brass.

10.6 Hazardous decomposition product
The hazardous substance result from decomposition is hydrogen.

11. TOXICOLOGICAL INFORMATION
11.1 Information on toxicological effects

11.1.1 Acute toxicity: oral, inhalation, dermal
No reliable studies are available for acute toxicity of sodium hydroxide. According to the REACH Regulation, acute toxicity testing does not generally need to be conducted if the substance is classified as corrosive to the skin.
(CSR –Chemical Safety Report, Chapter 5.2.2. ''Summary and discussion of acute toxicity'').

11.1.2 Skin corrosion/irritation
The product is corrosive for skin.
Studies have shown that concentrations of 0.5 and 1% sodium hydroxide were irritating and that concentration of 2% sodium hydroxide was highly irritating.

11.1.3 Serious eye damage/eye irritation
The product is corrosive for eyes.
Irritation of the eyes of rabbits was reported at sodium hydroxide concentrations of 0.4; 0.5; 0.95; 1; 2 and 3%. Corrosive effects were found at 1%, 2%, 8% and 10% concentration of sodium hydroxide.

11.1.4 Respiratory or skin sensitization
Existing data do not demonstrate that sodium hydroxide is a skin sensitizer.

11.1.5 Mutagenicity
The tests in vitro and in vivo genetic toxicity indicated no evidence of mutagenic activity.

11.1.6 Carcinogenicity
Lack of positive in vitro and in vivo mutagenicity data support no classification for carcinogenicity.
The product is of no concern with regard to carcinogenicity.

11.1.7 Toxicity for reproduction
Sodium hydroxide is not expected to be systemically available in the body under normal handling and use conditions, and the substance will not reach the fetus nor reach male and female reproductive organs.

11.1.8 Repeat dose toxicity
Sodium hydroxide is not expected to be systemically available in the body under repeat dose toxicity (under normal condition).
Source: Chemical Safety Report developed for sodium hydroxide

12. ECOLOGICAL INFORMATION
12.1 Acute toxicity tests for aquatic organisms:
LC 50/ fish/ 96h = 35 - 189 mg/l;
EC 50/ ceriodaphnia -crustaceans/ 48h = 40.4 mg/l;
For algae / cyanobacteria: no data available.

Chronic toxicity tests for aquatic organisms:
All available tests for sodium hydroxide indicate in a rather small range of toxicity values. Chronic toxicity test: LC ≥ 25 mg/l.

Toxicity to soil macro-organisms: The terrestrial compartment was not included in the targeted risk assessment, because it is not considered relevant for sodium hydroxide since if emitted to the soil, sorption to soil particles will be negligible.
Toxicity to terrestrial plants: There is no direct exposure of soil to sodium hydroxide based on the available uses.
Toxicity to birds: No exposure to birds is foreseen.

12.2 Persistence and degradability;
Abiotic degradation conclusion: for air -neutralization by natural alkalinity; for water -ionization and neutralization; for soil- ionization and neutralization. The product does not meet criteria as ''Persistent''.

12.3 Bio-accumulative potential
The product does not meet the criteria for classification as ''Bio-accumulative''.

12.4 Mobility in soil
Water/Soil/Sediments
The high water solubility and very low vapor pressure indicate that sodium hydroxide will be found predominantly in water (including soil or sediment pore water).

12.5 Results of PBT and vPvB
The product does not meet the criteria for classification as PBT, Persistent Bio-accumulative and Toxic or vPvB –very persistent, very bio-accumulative.

12.6 Other adverse effects
Not applicable.

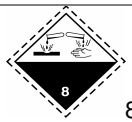
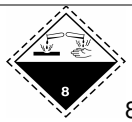
13. DISPOSAL CONSIDERATIONS
13.1 Waste treatment methods
Waste of substance must be eliminated in accordance with national/ European Regulations in force. Will be dilute with plenty of water and will not be disposed off without previous neutralization. Neutralization can be made with sulfuric acid, acetic acid or hydrochloric acid in diluted form.
Waste Codes recommended according to the legislation in force: 06 02 04*, 11 01 07*, 20 0115*.

Contaminated packaging
Packaging are not destroyed. They are recycled after cleaning. Packaging that cannot ensure anymore the qualitative and quantitative integrity of the product are stored in authorized warehouse for non-dangerous waste or incinerated in authorized incinerators. Local regulation in force will be respected.
Contaminated packing waste will not be used to store other products.

European Regulations regarding waste
European Directive no. 94/62/EC on packaging and packaging waste as amended;
European Directive no. 91/689/CEE on hazardous waste, as amended;

14. TRANSPORT INFORMATION

14.1 UN number, UN proper shipping name, transport hazard class(es), packing group, environmental hazards

International Transport Regulation ADR	
- UN no. /HI no.	1824/ 80
- Class / classification code	8 / C5 – corrosive, liquid, basic, inorganic substance, without subsidiary risk
- Product name	SODIUM HYDROXIDE SOLUTION
- Packing group	II - substance with a medium degree of danger
- Label	 8 -corrosive
RID	
- UN /HI no.	1824/ 80
- Class / classification code	8 / C5 – corrosive, liquid, basic, inorganic substance, without subsidiary risk
- Product name	SODIUM HYDROXIDE SOLUTION
- Packing group	II - substance with a medium degree of danger
- Label	 8 -corrosive
IMDG	
- UN no.	1824
- Class	8
- Packing group	II - substance with a medium degree of danger
- Label	8 -corrosive
- EmS	F-A; S-B
- Proper shipping name	SODIUM HYDROXIDE SOLUTION
- Subsidiary risk	Does not present any subsidiary risk
- Packing group	II - substance with a medium degree of danger

ICAO/IATA: no data available

14.2 Environmental hazards

The product is not dangerous for the environment.

14.3. Special precaution for use

Users (customers, carriers) who will moving in the area with the product will respect all the security measures, available in an area with dangerous chemicals.

14.4. Transport in bulk according to Annex II of MARPOL73/78 and the IBC code: No data available

15. REGULATORY INFORMATION

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

The product sodium hydroxide is not a SEVESO substance, not ozone depleting substance, not a persistent organic pollutant (POP); the product was not included in the SVHC list and no need to be authorized according to the REACH Regulation.

European legislation:

- Regulation (EC) No. 1907/2006 of the European Parliament concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as amended;
- Regulation (EU) No. 453/2010 amending Regulation (EC) No. 1907/2006 of European Parliament concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), Annex II;
- Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labeling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006;

- Council Regulation (EC) No 440/2008 on test methods pursuant to Regulation (EC) No 1907/2006 –REACH;
- Commission Regulation (EC) No 340/2008 on the fees and charges payable to the European Chemicals Agency pursuant to Regulation (EC) No.1907/2006 –REACH;
- Council Directive 98/24/EC concerning the protection of the health and safety of workers from the risks related to chemical agents at work, as amended;
- Directive 91/322/EEC **-** indicative limit values on establishing indicative limit values by implementing Council Directive 80/1107/EEC on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work, as amended;
- Commission Directives 2000/39/EC, 2006/15/CE and 2009/161/UE establishing a first, second and third lists of indicative occupational exposure limit values, in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work, as amended;
- Council Directive 89/656/EEC on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace;
- European Directive 91/689/EEC on hazardous waste;
- European Directive no. 2010/75/CE on industrial emissions.

15.2 Chemical Safety Assessment
A chemical safety assessment was carried out as a part of the substance registration, according to the REACH Regulation.

16. OTHER INFORMATION
16.1. Updates of safety data sheet
Compared with last revision from November 2010, the safety data sheet have been updated to the following chapters: 1-16.

16.2 Full text of hazard and precautionary statements stated on Section 2:
H 290: May be corrosive to metals.
H 314: Causes severe skin burns and eye damage.
P260: Do not breathe dust/fume/gas/mist/vapors/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
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.
P310: Immediately call a POISON CENTER or doctor/physician.

16.3 Legend to abbreviations
CSR: Chemical Safety Report;
PBT: Persistent, Bio-accumulative and Toxic;
vPvB: very persistent, very bio-accumulative;
VLE: National exposure limits values;
DNEL: Derived No-Effect levels;
PNEC: Predictable No-Effect Concentrations;
ADR: European Agreement concerning the International Carriage of Dangerous Goods by road;
RID: Agreement concerning the International Carriage of Dangerous Goods by rail;
IMDG: International Maritime Dangerous Goods Code;
ICAO/IATA: International Air Transport Association.

16.4 Literature references and sources for data
The Safety Data Sheet has been revised according to the Annex II of European Regulation No. 453/2010-REACH. Information contained herein was obtained from the documents developed in the REACH registration process, from the technical literature and from our own experience. These characterize the product respecting the safety requirements, however without a guarantee of its particular properties.

It is the client's (final users/ downstream users) obligation to take all the necessary caution measures, so that the product can be safely used.