

**SECTION 1: Identification of substance/mixture and the company undertaking****1.1. Product Identifier**

Product Name: **Vanadium pentoxide**  
 Chemical name: Vanadium pentoxide  
 Synonyms: Vanadium (V) oxide  
 Divanadium pentaoxide  
 Chemical formula:  $V_2O_5$   
 CAS Number: 1314-62-1  
 EC Number: 215-239-8  
 REACH registration  
 Number: 01-2119531331-52-0010

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

Identified uses: Divanadium pentaoxide is most commonly used as catalyst. The relevant identified uses of V<sub>2</sub>O<sub>5</sub> are: catalyst industry, production of steels and alloys; chemicals/battery electrolytes, as gas treatment agent (DENOX catalyst), in the petrochemical sector, as anticorrosion agent, in batteries, in inorganic chemicals; industrial use of V<sub>2</sub>O<sub>5</sub> in the production of pigments, frits, enamels and glass; professional use of V<sub>2</sub>O<sub>5</sub> solutions in laboratories and of V<sub>2</sub>O<sub>5</sub> (DENOX) catalysts

Uses advised against: None

**1.3. Details of the supplier of the safety data sheet**

Company Simba Materials Limited t/a CTM Potters Supplies  
 Unit 7-8, Broomhouse Lane Ind Estate, Edlington, Doncaster DN12 1EQ  
 T +44 (0)1709 770801 – F +44 (0)1709 770803 doncaster@ctmpotterssupplies.co.uk  
 Unit 10a, Millpark Ind Estate, White Cross Road, Woodbury Salterton EX5 1EL  
 T +44 (0)1395 233077 – F +44 (0)1395 233905 admin@ctmpotterssupplies.co.uk

**1.4. Emergency telephone number**

Tel + 44 (0) 1709770801 (09:00 – 17:00 hours)

**SECTION 2: Hazards Identification****2.1. Classification of the substance or mixture**

This material is a substance

**Classification according to Regulation (EC) 1272/2008 (EU 'CLP' regulation)**

Acute toxicity, Oral (Category 4)	H302	Harmful if swallowed.
Acute toxicity, Inhalation (Category 4)	H332	Harmful if inhaled.
Serious damage/ eye irritation (Category 1)	H318	Causes serious eye damage
Specific target organ toxicity		
- single exposure (Category 3)	H335	May cause respiratory irritation.
Germ cell mutagenicity (Category 2).	H341	Suspected of causing genetic defects.
Reproductive toxicity (Category 2)	H361	Suspected of damaging fertility or the unborn child
Specific target organ toxicity		
- repeated exposure (Category 1)	H372	Causes damage to organs through prolonged or repeated exposure.
Chronic aquatic toxicity (Category 2)	H411	Toxic to aquatic life with long lasting effects.

**2.2 Label elements**

**Labelling according to Regulation (EC) 1272/2008 (EU 'CLP' regulation)**

Pictogram(s)



Signal word(s)

Danger

Hazard statement(s)

H302

Harmful if swallowed.

H318

Causes serious eye damage.

H332

Harmful if inhaled.

H335

May cause respiratory irritation.

H341

Suspected of causing genetic defects.

H361

Suspected of damaging fertility or the unborn child.

H372

Causes damage to organs through prolonged or repeated exposure.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P273

Avoid release to the environment.

P281

Use personal protective equipment as required.

P314

Get medical advice/ attention if you feel unwell.

P405

Store locked up.

P501

Dispose of contents/container according to local regulations.

**2.3. Other hazards**

The substance does not meet the criteria of a PBT or vPvB substance. No other hazards identified.

**SECTION 3: Composition / information on ingredients****3.1. Substances**

This material is a substance

Chemical name	CAS No	EC Number	%	Hazard classification
Vanadium (V) oxide	1314-62-1	215-239-8	97 - 100	<p><b>According to Regulation (EC) 1272/2008</b></p> <p>Acute Toxicity, Oral (Category 4) H302 Harmful if swallowed.</p> <p>Eye damage (category 1) H318 Causes serious eye damage.</p> <p>Acute Toxicity Inhalation (Category 2) H332 Harmful if inhaled.</p> <p>Specific target organ toxicity – single exposure (Category 3) H335 May cause respiratory irritation.</p> <p>Germ cell mutagenicity (Category 2) H341 Suspected of causing genetic defects.</p> <p>Reproductive toxicity (Category 2) H361 Suspected of damaging fertility or the unborn child.</p> <p>Specific target organ toxicity (Category 1) H372 Causes damage to organs through prolonged or repeated exposure.</p> <p>Chronic aquatic toxicity (Category 2) H411 Toxic to aquatic life with long lasting effects.</p>

**SECTION 4: First aid measures****4.1. Description of first aid measures****General advice**

Obtain medical advice. Show this safety data sheet to the doctor in attendance.

**Inhalation**

Move to fresh air. Give oxygen if breathing is difficult. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Obtain medical assistance.

**If swallowed**

Never give anything by mouth to an unconscious person. Rinse mouth with water.

Do not induce vomiting.

Obtain medical assistance.

**Skin contact**

Wash off immediately with plenty of soap and water. Seek medical advice.

**Eye contact**

Rinse immediately with plenty of water. After initial flushing, remove any contact lenses and continue flushing. Obtain medical assistance.

**4.2. Most important symptoms and effects, both acute and delayed**

**Acute effects:**

- Irritating to the respiratory system and corrosive to the eyes
- Acutely harmful if inhaled or swallowed

**Delayed effects:**

- Toxic by prolonged exposure through inhalation
- Suspected to be reprotoxic with a possible risk of impaired fertility or damage to the unborn child.
- Suspected to cause genetic defects

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

No information available.

---

**SECTION 5: Fire-fighting measures**

**5.1. Extinguishing media**

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide or extinguishing media based on surrounding materials.

Unsuitable extinguishing media: None known.

**5.2. Special hazards arising from the substances or mixture**

Thermal decomposition may lead to release of vanadium.

Substance may react with other chemicals to form irritating or toxic chemicals.

**5.3. Advice for fire fighters**

Wear self-contained breathing apparatus and full protective clothing.

Residues from fire-fighting may be irritant or toxic

---

**SECTION 6: Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Do not breathe dust, vapours or mist.

Evacuate personnel from area of spillage.

Do not re-enter the area until a full evaluation of risk has been undertaken.

If immediate entry into an area of significant airborne dust is essential, wear respiratory protection (minimum: particle dust mask type P3)

Do not undertake actions that will create airborne dust.

**6.2. Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

**6.3. Methods and material for containment and cleaning up**

Take up mechanically while minimising dust generation.

Collect spilled material in sealable containers.

Dispose of all contaminated materials from the cleaning-up operation as hazardous waste.

**6.4. Reference to any other sections**

See section 13 for disposal information

---

**SECTION 7: Handling and storage****7.1. Precautions for safe handling:**

Avoid generation of dust.

Avoid contact with skin, eyes and clothing.

Prevent inhalation or ingestion of dust. Provide good ventilation / extraction at the point of use or wherever dust is formed.

Maintain a high standard of industrial hygiene: do not eat, drink or smoke in the workplace. Wash hands after use. Remove contaminated clothing before entering eating areas.

**7.2. Conditions for safe storage, including any incompatibilities**

Keep containers tightly closed in a dry, cool and well-ventilated place.

Do not store with acids.

**7.3. Specific end use(s)**

The substance has industrial and professional uses. Please check the identified uses in Section 16 and in the Annex of this SDS. For more information, please see relevant exposure scenarios (see Annex) or contact supplier.

---

**SECTION 8: Exposure controls / personal protection****8.1. Control parameters**

A UK Workplace Exposure Limit (WEL) exists for Vanadium pentoxide: 0.05 mg/m<sup>3</sup> LTEL (8hr TWA)

Derived No Effect Level (DNEL)

DNEL inhalation = 0.14 mg /m<sup>3</sup> (V<sub>2</sub>O<sub>5</sub> - inhalable fraction according to EN481)

Predicted No Effect Concentration (PNEC)

Threshold concentrations for the environment are based on elemental vanadium concentrations.

PNEC aquatic (freshwater) = 7.6 µg V/L

PNEC STP = 450 µg V/L

PNEC sediment (freshwater) = 240 mg V/L /kg sediment dw

PNEC soil = No or insufficient data are available at present.

Refer to section 11 and 12 of the SDS for information on PNEC and DNEL derivation. Guidance on how to comply with these DNELs and PNECs is provided in the attached Annex.

**8.2. Exposure controls****Appropriate engineering controls**

Use under a chemical fume hood with extraction where possible, otherwise provide local exhaust ventilation at places where dust is formed. Apply technical measures to comply with DNELs and PNECs. Detailed information on exposure controls, including engineering controls and individual protection measures, is provided in the attached Annex.

**Personal protective equipment**

Personal protective equipment should be considered only when exposure cannot be controlled by other means.

**Eye / face Protection** Face shield, safety glasses or box goggles compliant with EN 166 (EU).

**Skin protection****Hand protection**

Wear chemically impervious gloves e.g. nitrile, PVC. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves as hazardous waste.

Gloves must comply with the requirements of the standard EN 374.

**Body protection**

Wear long sleeved clothing (e.g. lab coat) to prevent skin exposure to small quantities. If handling large quantities of material a chemical apron or oversuit may be necessary.

**Respiratory Protection**

If mechanical extraction is not available or if irritation is experienced, use respiratory protective equipment selected in accordance with HSE document HSG53. This is likely to require a European Standard EN 149 approved respirator fitted with a particle filter type FFP3 as an absolute minimum requirement.

The correct fit and use of the respirator is essential to provide protection. Follow manufacturer's instructions and provide adequate training in the use of the equipment.

**Environmental exposure controls**

. Apply technical measures to comply WITH PNECs. Detailed information on exposure controls, including engineering controls and individual protection measures, is provided in the attached Annex.

**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties**

<b>(a) Appearance</b>	solid, yellow to rust-brown crystalline powder or granules	Literature value taken from registration dossier
<b>(b) Odour</b>	Odourless	Literature value taken from registration dossier
<b>(e) Melting point</b>	681°C to 690°C at 1013 hPa	Literature value taken from registration dossier
<b>(f) Initial boiling point and boiling range</b>	No boiling point. Decomposition at 1750°C	Literature value taken from registration dossier
<b>(g) Flash point</b>	Not applicable (inorganic solid, melting point: 681°C).	
<b>(h) Evaporation rate</b>	Not applicable (inorganic solid).	
<b>(i) Flammability (solid, gas)</b>	Not flammable.	Based on assessment performed by lead registrant for the registration dossier
<b>(j) Upper/lower flammability or explosive limits</b>	Neither flammable nor explosive.	Based on assessment performed by lead registrant for the registration dossier
<b>(m) Relative density</b>	3.65 g/cm <sup>3</sup> at 25 °C	OECD TG 109 / Eu Method A.3, Reliability 1 ,
<b>(n) Solubility</b>	0.92 g/L at 20 °C	OECD TG 105 / EU Method A.6, flask method, performed under argon gas (exclusion of CO <sub>2</sub> and O <sub>2</sub> ), Reliability 1
<b>(o) Partition coefficient n-octanol/water</b>	Not applicable (inorganic solid).	
<b>(p) Auto-ignition temperature</b>	Not applicable (inorganic solid, melting point: 681°C).	
<b>(q) Decomposition temperature</b>	1750°C	Literature value taken from registration dossier
<b>(s) Explosive properties</b>	Non explosive.	Based on assessment performed by lead registrant for the registration dossier
<b>(t) Oxidising properties</b>	Not oxidising.	Regulation UN-Test O.I, Reliability 1

**9.2. Other information**

No additional data available

**SECTION 10: Stability and reactivity****10.1. Reactivity**

No data available

**10.2. Chemical stability**

Stable at room temperature and under recommended storage conditions

**10.3. Possibility of hazardous reactions**

No hazardous reactions expected under recommended storage conditions

**10.4. Conditions to avoid**

No data available

**10.5. Incompatible materials**

Strong acids and alkali metals. Aluminium powder.

**10.6. Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions – Vanadium, vanadium oxides

**SECTION 11: Toxicological Information****11.1. Information on toxicological effects****(a) Acute toxicity**

LD50 Oral – rat (female) – 466.93 mg/kg bw	According to OECD Guideline 401 (Acute Oral Toxicity). Reliability 1
LC50 Inhalation rat (female): 4.29 mg/L air	According to OECD Guideline 403 (Acute Inhalation Toxicity). Reliability 1
LD50 Dermal – rat – • 2500 mg/kg	According to OECD Guideline 402 (Acute Dermal Toxicity). Reliability 1

**(b) Skin corrosion/irritation**

Not irritating according to OECD Guidelines for Testing of Chemicals, Draft Proposal for a New Guideline: In vitro skin irritation: Reconstructed Human Epidermis (RhE) Test method; in vitro. Reliability 1.

**(c) Serious eye damage/ eye irritation**

Method: OECD Guideline 405, rabbit

Result: irreversible eye effects (classified as Eye damage 1)

**(d) Respiratory or skin sensitisation**

Method: OECD Guideline 406; guinea pig, intradermal and epicutaneous induction

Result: not sensitising to skin

**(e) Germ cell mutagenicity**

Based on available data, the classification as germ cell mutagen are not met. However, classification according to Annex VI of CLP still applies.

Method: OECD Guideline 471 (Ames Test; Bacterial Reverse Mutation Assay); *S. typhimurium*; 0.03 -333 µg/plate V2O5 Result: Genetic toxicity negative

Method: OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test); mouse lymphoma; 0.5 to 64 µg/mL V2O5

Result: Genetic toxicity negative

Method: equivalent or similar to OECD Guideline 475 (In vivo Mammalian Bone Marrow Chromosome Aberration Test), mouse; inhalation; 1-16 mg/m<sup>3</sup> (nominal conc.) V2O5

Result: Genetic toxicity negative

#### **(f) Carcinogenicity**

IARC: 2B- Group 2B: Possibly carcinogenic to humans (Vanadium Pentoxide)

Based on available data, classification for carcinogenicity should be examined once the needed data will be generated.

Method: no guideline followed; mouse; 1 - 4 mg/m<sup>3</sup> (nominal conc.) V2O5; inhalation: aerosol (whole body)

Result: Carcinogenicity positive

Method: no guideline followed; rat; 0.5 - 2 mg/m<sup>3</sup> (nominal conc.) V2O5; inhalation: aerosol (whole body)

Result: Carcinogenicity equivocal

Method: Human data: occupational monitoring over 11 years; 0.1 - 3.9 mg V/m<sup>3</sup>;

Result: Carcinogenicity negative

#### **(g) Reproductive toxicity**

Effects on fertility

Guideline-conform prenatal developmental toxicity studies (according to OECD 414) via the oral route are not available.

Fertility impairment in male and female rats: LOAEC of 20 mg/kg bw/day NH<sub>4</sub>VO<sub>3</sub>, corresponding to 15 mg/kg bw/day V2O5 (Morgan et al., 2003)

Developmental toxicity

Guideline-conform Two-Generation Reproduction Toxicity Studies (according to OECD Guideline 416) are not available.

Fetotoxicity in mice: NOEL of 15 mg/kg bw/d Na<sub>3</sub>VO<sub>4</sub>, corresponding to 7.41 mg/kg bw/d V2O5 (Sanchez et al., 1991)

#### **(h) Specific target organ toxicity – Single exposure**

Specific target organ toxicant (STOT) – single exposure: oral

The classification criteria as STOT – SE, oral are not met as reversible or irreversible adverse health effects were not observed immediately or delayed after exposure and effects were not observed at the guidance values of 300 mg/kg bw and 2000 mg/kg bw (Cat 1 and Cat 2 classification, respectively) in addition to effects that were responsible for the death of the animals. No classification required.

Specific target organ toxicant (STOT) – single exposure: inhalation

The classification criteria as STOT – SE, inhalation are met as several epidemiological studies link upper respiratory symptoms to V2O5 exposure. Epidemiological data support that respiratory symptoms are observed at V2O5 exposure concentrations that are above 0.1 mg/ V/m<sup>3</sup>. Classification required.

#### **(i) Specific target organ toxicity – Repeated exposure**

The classification criteria as STOT – RE, inhalation are met as local effects on the respiratory tract are considered relevant for chronic V2O5 exposure.

#### **(j) Aspiration hazard**

No data available. Aspiration hazard not expected.



**SECTION 12: Ecological information****12.1. Toxicity**

	Endpoint	Concentration	Test details
<b>Aquatic compartment</b>			
<b>Acute fish toxicity</b>			
freshwater fish <i>Leuciscus idus</i>	LC <sub>50</sub> (96h)	693 µg V/L	OECD 203, mortality; V <sub>2</sub> O <sub>5</sub>
marine fish <i>Limanda limanda</i>	LC <sub>50</sub> (96h)	27800 µg V/L	no referenced guideline, mortality; NH <sub>4</sub> VO <sub>3</sub>
<b>Chronic fish toxicity</b>			
freshwater fish <i>Jordanella floridae</i>	EC <sub>10</sub> (30d)	76 µg V/L	no referenced guideline, growth; V <sub>2</sub> O <sub>5</sub>
marine fish		no reliable data	
<b>Acute toxicity to aquatic invertebrates</b>			
freshwater invertebrates <i>Daphnia magna</i>	LC <sub>50</sub> (48h)	1520 µg V/L	similar to OECD 202, immobilisation; V <sub>2</sub> O <sub>5</sub>
marine water invertebrates <i>Americamysis bahia</i>	LC <sub>50</sub> (48h)	13300 µg V/L	US EPA & NJDEPE guideline, mortality; NaVO <sub>3</sub>
<b>Chronic toxicity to aquatic invertebrates</b>			
freshwater invertebrates <i>Daphnia magna</i>	NOEC (98d)	560 µg V/L	no referenced guideline, ephippia production; NaVO <sub>3</sub>
marine water invertebrates <i>Crassostrea gigas</i>	NOEC (48d)	25 µg V/L	SWRCB, 1996, development; V <sub>2</sub> O <sub>5</sub>
<b>Toxicity to algae and aquatic plants</b>			
freshwater algae <i>Scenedesmus subspicatus</i>	EC <sub>50</sub> (72h) EC <sub>10</sub> (72h)	2907 µg V/L 716 µg V/L	OECD 201, growth inhibition; V <sub>2</sub> O <sub>5</sub>
marine water algae		no reliable data	
<b>Toxicity to microorganisms</b>			
microorganisms	EC <sub>50</sub> (3h) EC <sub>10</sub> (3h)	100 mg V /L 4.5 mg V /L	OECD 209, respiration inhibition; NaVO <sub>3</sub> ; activated sludge of predominantly domestic sewage
<b>Toxicity to other aquatic organisms</b>			
no reliable data available			
<b>Sediment compartment</b>			
<b>Toxicity to sediment organisms</b>			
No toxicity to <i>Hyallela azteca</i> (10d, growth, survival) in field-contaminated sediments at 503 and 1590 mg V/kg dw. No other reliable acute/chronic sediment data for vanadium are available. The PNEC derivation was based on the equilibrium partitioning method considering the PNEC <sub>aqua</sub> (freshwater) and the partition coefficient (Kp) for solids-water in suspended matter (log Kp = 4.50 L/kg dw).			
<b>Terrestrial compartment</b>			
<b>Toxicity to soil invertebrates</b>			
no reliable data available			
<b>Toxicity to soil invertebrates terrestrial plants</b>			
terrestrial plants <i>Glycine max</i>	NOEC (45d)	97 mg V/kg soil dw	no referenced guideline, seedling growth; NH <sub>4</sub> VO <sub>3</sub>
<b>Toxicity to soil microorganisms</b>			
soil microorganisms inoculum: soil	NOEC (28d)	≥ 122 mg V/kg soil dw	no referenced guideline, N mineralization & nitrification; NaVO <sub>3</sub>
<b>Toxicity to birds</b>			
birds <i>Gallus domesticus</i>	NOEC (4wks)	5 mg V/kg food	no referenced guideline, body weight; NH <sub>4</sub> VO <sub>3</sub>
<b>Toxicity to mammals</b>			
mammals <i>Rattus norvegicus</i> Wistar	NOEC (103d)	33.3 mg V/kg food	no referenced guideline, hematotoxicity; V <sub>2</sub> O <sub>5</sub>

Non-compartment specific effects	
For non-compartment specific effects that are relevant for the food chain (secondary poisoning), please refer to toxicity to birds and mammals (see above).	
PNEC values	
<b>PNEC aqua</b> (freshwater)	7.6 µg V/L
<b>PNEC aqua</b> (marine water)	2.5 µg V/L
<b>PNEC sediment</b> (freshwater)	240 mg V/kg sediment dw
<b>PNEC sediment</b> (marine water)	79 mg V/kg sediment dw
<b>PNEC STP</b>	450 µg V/L
<b>PNEC soil</b>	insufficient data available
<b>PNEC oral</b> (secondary poisoning)	0.167 mg V/kg food

### 12.2. Persistence and biodegradability

Abiotic degradation: Not relevant for an inorganic substance (CSA was based on total elemental V concentrations).

Biodegradation: Not relevant for an inorganic substance (no potential for biodegradation).

### 12.3. Bioaccumulative potential

Aquatic compartment: There is no bioaccumulative potential in fish and aquatic invertebrates. Available BCF/BAF values for fish and invertebrates indicate an inverse relationship with vanadium concentrations in the exposure medium. There is no indication for biomagnification of vanadium in marine food chains.

BCF for fish & invertebrates: 12.3 L/kg wet weight

Terrestrial compartment: No bioaccumulative potential in terrestrial plants.

BSAF for terrestrial plants: < 0.036 dimensionless

### 12.4. Mobility in soil

log Kp (solids-water in soil): 2.66 L/kg

### 12.5. Results of PBT and vPvB assessment

Not applicable to inorganic substances.

### 12.6. Other adverse effects

Dangerous contaminate of drinking water supplies. No other adverse effects have been reported in the REACH CSR for V2O5.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

#### Product

Dispose of as hazardous waste via a licensed waste disposal company

European waste code will depend upon the use of the material and cannot be specified here.

#### Packaging

Clean, uncontaminated packaging can be recycled.

Packaging contaminated with the product must be disposed of as hazardous waste.

## SECTION 14: Transport Information

14.1. UN number: 2862

	ADR/RID	ADN	IMDG	IATA:
<b>14.2. UN proper shipping name</b>	VANADIUM PENTOXIDE			
<b>14.3. Transport hazard class(s)</b>	6.1	n/a	6.1	6.1
<b>14.4. Packing group</b>	III	n/a	III	III
<b>14.5. Environmental hazards</b>	No	n/a	Marine pollutant: No	No

**14.6. Special precautions for user**

None identified

**14.7. Transport in bulk according to Annex II of MARPOL 73/78 and IBC Code**

No information available

---

**SECTION 15: Regulatory information**

This Safety Data Sheet has been prepared in accordance with the requirements of regulation (EC) No 1907/2006 as amended by regulation (EU) No 453/2010.

The Workplace exposure Limit given in section 8 has been taken from the UK HSE document: 'EH40/2005 Workplace exposure limits' as amended.

Relevant regulations:

Regulation (EC) 1272/2008 (EU 'CLP' regulation)

Regulation (EC) 790/2009 First Adaptation to Technical Progress (ATP) for CLP regulation

EU Directive 67/548/EEC ('Dangerous Substances Directive')

Regulation (EC) No 1907/2006 ('REACH')

Regulation (EU) No 453/2010.

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

None identified

**15.2. Chemical safety assessment**

A Chemical Safety Assessment has not been undertaken by this supplier

---

**SECTION 16: Other information**

This SDS (version 4) is a complete revision of the previous SDS and contains multiple changes.

**Abbreviations:**

(Not all abbreviations are used in this SDS.)

AC Article category

ADR European agreement concerning the international carriage of dangerous goods by road

AND European agreement concerning the international carriage of dangerous goods by inland waterways

BSAF Bio soil accumulation factor

BCF Bio concentration factor

CAS Chemical Abstracts Service

CLP Classification, labelling and packaging

CMR Carcinogenic, mutagenic or toxic for reproduction

CSA/CSR Chemical safety assessment / Chemical safety report

D50 Median particle size

DNEL Derived no effect level

DSD Dangerous Substance Directive

EC10 Concentration of a substance where 10% of the population is affected

EC50 Concentration of a substance where 50% of the population is affected

ECHA European chemicals agency

EINECS EU list of existing chemical substances

EmS Emergency schedule

ERC Environmental release category

ES Exposure scenario

eSDS Extended safety data sheet

FOREGS Forum of European Geological Surveys

GHS Globally harmonised system

HERAG Health risk assessment guidance for metals

SDS Ref: SML 22 – 17-03-2017

IATA-DGR International air transport association - dangerous goods regulations  
ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air  
IU Identified use  
IUPAC International Union of Pure and Applied Chemistry  
IBC code International code for the construction and equipment of ships carrying dangerous chemicals in bulk  
IMDG International maritime dangerous goods  
KP Partition coefficient  
LC10 Lethal concentration of a substance that can be expected to cause death in 10% of the population  
LC50 Lethal concentration of a substance that can be expected to cause death in 50% of the population  
LD50 Lethal dose of a substance that can be expected to cause death in 50% of the population  
MARPOL 73/78 International convention for the prevention of pollution from ships, 1973 as modified by the protocol of 1978  
MMAD Mass median aerodynamic diameter  
NO(A)EC No observed (adverse) effect concentration  
NO(A)EL No observed (adverse) effect level  
OECD Organisation for economic co-operation and development  
OEL Occupational exposure limit  
PBT Persistent, bioaccumulative, and toxic  
PC Product category  
PNEC Predicted no-effect concentration  
PROC Process category  
REACH Registration, evaluation, authorisation and restriction of chemicals (i.e. Regulation (EC) No. 1907/2006)  
RID International rule for transport of dangerous substances by railway  
SDS Safety data sheet  
STOT Specific target organ toxicant  
STP Sewage treatment plant  
SU Sector of end use  
TWA Time weighted average  
vPvB Very persistent, very bioaccumulative

**Disclaimer:**

The Company provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose.

THE COMPANY MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, THE COMPANY WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.