



**Trade name: ZF-Ecofluid HV**

**1. Identification of the substance/mixture and of the company/undertaking**

**1.1 Product identifier**

Trade name: ZF-Ecofluid HV  
Product code: 0671.090.498  
Substance/mixture: Mixture

**1.2 Recommended use of the chemical and restrictions on use**

Use of the Substance/Mixture: Gearbox oil.  
Uses advised against: Do not use for any purpose other than the one for which it is intended

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

**ZF Friedrichshafen AG  
ZF Aftermarket  
Obere Weiden 12  
97424 Schweinfurt  
Germany  
+49 9721 475 60  
www.zf.com/contact**

**1.4 Emergency telephone number**

**24/7h Emergency telephone number:**

+49 (0)89 19240 (Poison emergency call Munich) Information in German and English

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**2. Hazards identification**

**2.1 Classification of the substance or mixture**

REGULATION (EC) No 1272/2008  
For the full text of the H-Statements mentioned in this Section, see Section 2.2.  
Classification  
The product is not classified as dangerous according to Regulation (EC) No. 1272/2008

**2.2 Label elements**

Labelled according to REGULATION (EC) No 1272/2008

Hazard Statements: None  
Signal word: None



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Supplemental Hazard Statements

EUH210 - Safety data sheet available on request

EUH208 - Contains Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentoxide, and salted by amines, C12-14- tert-alkyl May produce an allergic reaction

**2.3 Other information**

Physical-Chemical Properties

Contaminated surfaces will be extremely slippery.

Environmental properties

The product may form an oil film on the water surface that may stop the oxygen exchange.  
Should not be released into the environment.

**3. Composition/information on ingredients**

**3.2 Mixture**

**Chemical nature**

The product is made from refined mineral base oils and synthetic oils.

Hazardous ingredients

Chemical name	EC-No	REACH registration No	CAS-No	Weight %	Classification (Reg. 1272/2008)
Distillates (petroleum), hydrotreated heavy Paraffinic	265-157-1	01-2119484627-25	64742-54-7	3-<5	Asp. Tox. 1 (H304)
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentoxide, and salted by amines, C12-14- tert-alkyl	931-384-6	01-2119493620-38	--	0.25-<1	Acute Tox. 4 (H302) Aquatic Chronic 2 (H411) Eye Dam. 1 (H318) Skin Sens. 1 (H317)



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Additional information

Product containing mineral oil with less than 3% DMSO extract as measured by IP 346.

For the full text of the H-Statements mentioned in this Section, see Section 16.

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#### **4. First aid measures**

##### **4.1 First aid measures for different exposure routes**

General advice:

IN CASE OF SERIOUS OR PERSISTENT CONDITIONS, CALL A DOCTOR OR EMERGENCY MEDICAL CARE.

Eye contact:

Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing.

Skin contact:

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Wash contaminated clothing before reuse. High pressure jets may cause skin damage. Take victim immediately to hospital. Remove contaminated clothing and shoes. Wash off with soap and water.

Inhalation:

Remove casualty to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Inhalation of high concentrations of vapor or aerosols may cause irritation of the upper respiratory tract.

Ingestion:

Clean mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician or Poison Control Center immediately. If swallowed, do not induce vomiting - seek medical advice.

Protection of First-aiders

First aider needs to protect himself. See Section 8 for more detail. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask



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equipped with a one-way valve or other proper respiratory medical device. Use personal protective equipment.

#### **4.2 Most important symptoms/effects, acute and delayed**

Skin contact:	Not classified based on available data. May cause an allergic skin reaction. High pressure injection of the products under the skin may have very serious consequences even though no symptom or injury may be apparent.
Eye contact:	Not classified based on available data.
Inhalation:	Not classified based on available data. Inhalation of vapors in high concentration may cause irritation of respiratory system.
Ingestion:	Not classified based on available data. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

#### **4.3 Indication of immediate medical attention and special treatment needed, if necessary**

Notes to physician	Treat symptomatically.
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### **5. Firefighting measures**

#### **5.1 Extinguishing media**

Suitable extinguishing media:	Carbon dioxide (CO <sub>2</sub> ). ABC powder. Foam. Water spray or fog.
Unsuitable extinguishing media:	Do not use a solid water stream as it may scatter and spread fire.

#### **5.2 Special hazards arising from the substance or mixture**

Special Hazard:	Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot. These may be highly dangerous if inhaled in confined spaces or at high concentra-
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tion. Combustion products include sulphur oxides (SO<sub>2</sub> and SO<sub>3</sub>) and Hydrogen sulphide H<sub>2</sub>S. Phosphorous oxides. Nitrogen oxides (NO<sub>x</sub>).

### 5.3 Advice for firefighters

Special protective equipment for fire-fighters:

Wear self-contained breathing apparatus and protective suit.

Other information:

Cool containers / tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

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## 6. Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

General Information:

Do not touch or walk through spilled material. Contaminated surfaces will be extremely slippery. Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.

### 6.2 Environmental precautions

General Information

Do not allow material to contaminate ground water system. Prevent entry into waterways, sewers, basements or confined areas. Local authorities should be advised if significant spillages cannot be contained. Try to prevent the material from entering drains or water courses.

### 6.3 Methods and materials for containment and cleaning up

Methods for cleaning up:

Dike to collect large liquid spills. If necessary dike the product with dry earth, sand or similar non-combustible materials.

Methods for cleaning up:

Dam up. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous



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earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

#### **6.4 Reference to other sections**

Personal Protective Equipment: See Section 8 for more detail.  
Waste treatment: See section 13.

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### **7. Handling and storage**

#### **7.1 Precautions for safe handling**

Advice on safe handling: For personal protection see section 8. Use only in well-ventilated areas. Do not breathe vapors or spray mist. Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke.

Prevention of fire and explosion Take precautionary measures against static discharges.

Hygiene measures Ensure the application of strict rules of hygiene by the personnel exposed to the risk of contact with the product. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product. Regular cleaning of equipment, work area and clothing is recommended. Do not use abrasives, solvents or fuels. Do not dry hands with rags that have been contaminated with product. Do not put product contaminated rags into workwear pockets. Use personal protective equipment as required. Wash hands before breaks and at the end of workday. Wash hands with water as a precaution. Avoid breathing vapors, mist or gas. Do not wash off with: Fuel. Solvent. Abrasive. Avoid extended and repeated contact with the skin as this may cause skin conditions, which may also be aggravated by minor injuries or by contact with soiled clothing. Avoid prolonged and repeated contact with the



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skin, especially with used or waste product.

## 7.2 Conditions for safe storage, including any incompatibilities

Technical measures/Storage Conditions:

Keep away from food, drink and animal feedingstuffs. Keep in a bunded area. Keep container tightly closed. Keep preferably in the original container. Otherwise reproduce all indication of the regulation label on the new container. Do not remove the hazard labels of the containers (even if they are empty). Design the installations in order to avoid accidental emissions of product (due to seal breakage, for example) onto hot casings or electrical contacts. Store at room temperature. Protect from moisture. Protect from frost, heat and sunlight. Store in original container. Keep in properly

Materials to Avoid:

Strong oxidizing agents.

## 7.3 Specific end uses

Specific use(s):

Please refer to Technical Data Sheet for further information.

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## 8. Exposure controls/personal protection

### 8.1 Control parameters

Exposure limits

Mineral oil mist:  
USA: OSHA (PEL) TWA 5 mg/m<sup>3</sup>, NIOSH (REL) TWA 5 mg/m<sup>3</sup>, STEL 10 mg/m<sup>3</sup>, ACGIH (TLV) TWA 5 mg/m<sup>3</sup> (highly refined).

Legend

See section 16

Derived No Effect Level (DNEL)



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**DNEL Worker (Industrial/Professional)**

Chemical Name	Short term, systemic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	--	--	--	5.4 mg/m <sup>3</sup> /8h (aerosol - inhalation)
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentoxide, and salted by amines, C12-14-tert-alkyl	--	--	12.5 mg/kg/8h (dermal) 8.56 mg/m <sup>3</sup> /8h (inhalation) (ECHA CHEM)	

**DNEL Consumer**

Chemical Name	Short term, systemic effects	Short term, local effects	Long term, systemic effects	Long term, local effects
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	--	--	--	1.2 mg/m <sup>3</sup> /24h (aerosol - inhalation)
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentoxide, and salted by amines, C12-14-	--	--	6.25 mg/kg/24h (dermal) 2.2 mg/m <sup>3</sup> /24h (inhalation) 0.25 mg/kg/24h (oral) (ECHA CHEM)	--





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tert-alkyl				
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Predicted No Effect Concentration (PNEC)

Chemical Name	Water	Sediment	Soil	Air	STP	Oral
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentaoxide, and salted by amines, C12-14- tert-alkyl	0.0012 mg/l fw 0.00012 mg/l mw 0.064 mg/ or	3.13 mg/kg fw 0.313 mg/kg mw	2.54 mg/kg soil dw	--	24.33 mg/l	10 mg/kg food

## 8.2 Exposure controls

### Occupational Exposure Controls

Engineering Measures:

Apply technical measures to comply with the occupational exposure limits. Ensure adequate ventilation, especially in confined areas. When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.

Personal Protective Equipment

General Information:

Protective engineering solutions should be implemented and in use before personal protective equipment is considered. The personal protective equipment (PPE) recommendations apply to the product ITSELF. In case of mixtures or formulations, it is suggested that you contact the relevant PPE suppliers.

Respiratory protection:

None under normal use conditions. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Respirator with combination filter for vapour/particulate (EN 14387). Type A/P1. Warning ! filters have a limited use duration. The use of



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	breathing apparatus must comply strictly with the manufacturer's instructions and the regulations governing their choices and uses.
Eye Protection:	If splashes are likely to occur, wear: Safety glasses with side-shields. EN 166.
Skin and body protection:	Wear suitable protective clothing. Protective shoes or boots. Long sleeved clothing. Type 4/6. Do not wear rings, watches or anything similar which can retain the product and may give rise to skin conditions. Extended and repeated contacts with skin can cause skin ailments which may be aggravated by minor injuries or contact with soiled clothing.
Hand Protection:	Hydrocarbon-proof gloves. Fluorinated rubber. Nitrile rubber. In case of prolonged contact with the product, it is recommended to wear gloves complying with EN 420 and EN 374 standards, protecting at least for 480 minutes and having a thickness of 0,38 mm at least. These values are indicative only. The level of protection is provided by the material of the glove, its technical characteristics, its resistance to the chemicals to be handled, the appropriateness of its use and its replacement frequency. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves.
Environmental exposure controls	
General Information:	The product should not be allowed to enter drains, water courses or the soil.

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**9. Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

Appearance:	limpid
Colour:	No information available
Odour:	Characteristic
Odor Threshold:	No information available
Physical State @20°C	liquid
pH:	Not applicable

		Method
Boiling point/boiling range	No information available	
Melting point/range	No information available	
Flash point	No information available	
Evaporation rate	No information available	
Flammability Limits in Air	No information available	
Upper explosion limit	No information available	
Lower explosion limit	No information available	
Vapour pressure	No information available	
Vapour density	No information available	

Relative density	0.858 15°C	ASTM D4052
Density	858 kg/m <sup>3</sup> 15°C	ASTM D4052
<b>Solubility(ies)</b>		
Water solubility	Not applicable	
Solubility in other solvents	No information available	
logPow	No information available	



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Autoignition temperature	No information available	
Decomposition temperature	No information available	
Viscosity, kinematic	109 mm <sup>2</sup> /s 40°C	ASTM D445
Explosive properties	Not explosive	
Possibility of hazardous reactions	Not applicable	
Oxidizing properties	Not applicable	

**9.2 Other information**

Freezing Point: No information available

**10. Stability and reactivity**

**10.1 Reactivity**

None under normal processing.

**10.2 Chemical stability:**

Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions:**

No dangerous reaction known under conditions of normal use. None under normal processing.

**10.4 Conditions to avoid:**

Keep away from open flames, hot surfaces and sources of ignition. Keep away from heat and sparks. Heat, flames and sparks. Take precautionary measures against static discharges. Heat (temperatures above flash point), sparks, ignition points, flames, static electricity. Strong oxidizing agents.

**10.5 Incompatible materials:**

Strong oxidising agents.

**10.6 Hazardous decomposition products:**

Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot.



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Phosphorous oxides. Nitrogen oxides (NOx). Combustion products include sulphur oxides ( SO<sub>2</sub> and SO<sub>3</sub> ) and Hydrogen sulphide H<sub>2</sub>S.

## 11. Toxicological information

### 11.1 Information on toxicological effects

Acute toxicity Local effects Product Information

Skin contact: Not classified based on available data. May cause an allergic skin reaction. High pressure injection of the products under the skin may have very serious consequences even though no symptom or injury may be apparent.

Eye contact. Not classified based on available data.

Inhalation Not classified based on available data. Inhalation of vapors in high concentration may cause irritation of respiratory system.

Ingestion Not classified based on available data. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

ATEmix (inhalation-dust/mist) 112.70 mg/l

Acute toxicity - Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Distillates (petroleum), hydrotreated heavy paraffinic	LD50 > 5000 mg/kg bw (rat - OECD 420)	LD50 > 5000 mg/kg bw (rabbit - OECD 402)	LC50 (4h) > 5 mg/l (aerosol) (rat - OECD 403)
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentoxide, and	LD50 2000 mg/kg bw (Rat - OECD TG 401)	--	--



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salted by amines, C12-14-tert-alkyl			
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Sensitization: Not classified based on available data.  
Contains sensitizer(s). May produce an allergic reaction.

**Specific effects**

Carcinogenicity: Not classified based on available data.

Germ Cell Mutagenicity: Not classified based on available data.

Reproductive toxicity: Not classified based on available data.

**Repeated Dose Toxicity**

Subchronic toxicity: Not classified based on available data.

**Target Organ Effects (STOT)**

Target Organ Effects (STOT): Not classified based on available data.

Specific target organ systemic toxicity (single exposure): Not classified based on available data.

Specific target organ systemic toxicity (repeated exposure): Not classified based on available data.

Aspiration toxicity: Not classified based on available data.

**Other information**

Other adverse effects: Characteristic skin lesions (pimples) may develop following prolonged and repeated exposures (contact with contaminated clothing).

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**12. Ecological information**

**12.1 Toxicity**

Not classified based on available data.

Acute aquatic toxicity - Product Information: No information available.



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**Acute aquatic toxicity - Component Information**

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	EL50 (48h) > 100 mg/l (Pseudokirchnerella subcapitata - OECD 201)	EL50 (48h) > 10000 mg/l (Daphnia magna - OECD 202)	LL50 (96h) > 100 mg/l (Oncorhynchus mykiss - OECD 203)	--
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentaoxide, and salted by amines, C12-14- tert-alkyl	EL50 (96h) > 15 mg (Senastrum capricornutum - OECD 201) EC50 (96h) 6.4 mg/l (Pseudokirchnerella subcapitata - OECD 201) EC50 (96h) 15 mg/l (Pseudokirchnerella subcapitata - OECD 201) EC50 (96h) 6.4 mg/L (Senastrum capricornutum- OECD TG 201) (ECHA CHEM)	EL50 (48h) ca. 91.4 mg/l (Daphnia magna - OECD 202)	LL50 (96h) ca. 24 mg/l (Oncorhynchus mykiss - OECD 203)	--

Chronic aquatic toxicity - Product Information No information available.

**Chronic aquatic toxicity - Component Information**

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Distillates (pe-	--	NOEL (21d)	NOEL	--



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roleum), hydrotreated heavy paraffinic 64742-54-7		10 mg/l (Daphnia magna - QSAR Petrotox)	(14/28d) > 1000 mg/l (Oncorhyn- chus mykiss - QSAR Pe- trotox)	
Reaction products of 4-methyl-2- pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentaoxide, and salted by amines, C12-14- tert- alkyl ^	NOEC (96h) 1.7 mg/l (Pseudokirch- nerella subcapitata - OECD 201) par NOEC (96h) 3.3 mg/l (Pseudokirch- nerella subcapitata - OECD 201)	EL50 (21d) 0.91 mg/l (Daphnia magna - OECD 211) NOEL (21d) 0.12 mg/l (Daphnia magna - OECD 211) EL50 (21d) 0.66 mg/l (Daphnia magna - OECD 211)	--	EC50 (3h) ca. 2433 mg/L (Activated Sludge, do- mestic - OECD TG 209) (ECHA CHEM)

Effects on terrestrial organisms                      No information available.

**12.2 Persistence and degradability**

General Information    No information available.

**12.3 Bioaccumulative potential**

Product Information    No information available.  
logPow    No information available.

**Component Information**

Chemical Name	log Pow
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	--
Reaction products of 4-methyl-2-pentanol and diphosphorus pentasulfide, propoxylated, esterified with diphosphorus pentaoxide, and salted by amines, C12-14- tert-alkyl - ^	< 0.30 to >7.10 (OECD TG 117) (ECHA CHEM)





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**12.4 Mobility**

Soil	Given its physical and chemical characteristics, the product generally shows low soil mobility.
Air	Loss by evaporation is limited.
Water	The product is insoluble and floats on water.

**12.5 Results of PBT and vPvB assessment**

PBT and vPvB assessment:	No information available.
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**12.6 Other adverse effects**

General Information:	No information available.
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**13. Disposal considerations**

**13.1 Waste treatment methods**

Waste from Residues / Unused Products:	Should not be released into the environment. Do not empty into drains. Dispose of in accordance with the European Directives on waste and hazardous waste. Where possible recycling is preferred to disposal or incineration. After use, this oil must be sent to a licensed waste oil facility. Incorrect disposal of used oil poses a risk to the environment. Mixture with other waste types such as solvents, brake- and cooling liquids is forbidden. Dispose of in accordance with local regulations. If recycling is not practicable, dispose of in compliance with local regulations.
Contaminated packaging:	Empty containers should be taken to an approved waste handling site for recycling or disposal.
EWC Waste Disposal No.:	According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on



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the application for which the product was used. The following Waste Codes are only suggestions: 13 02 05, 13 02 06.

Other information:

Refer to section 8 for safety and protective measures for disposal personnel. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

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## 14 Transport information

ICAO/IATA	Not regulated
IMDG/IMO	Not regulated
ADR/RID	Not regulated
ADN	Not regulated

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## 15. Regulatory information

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

European Union

Further information: No information available

### 15.2 Chemical Safety Assessment

Chemical Safety Assessment: No information available

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## 16. Other information

Full text of H-Statements referred to under sections 2 and 3:

H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
H411	Toxic to aquatic life with long lasting effects



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Abbreviations, acronyms

ACGIH = American Conference of Governmental Industrial Hygienists  
bw = body weight  
bw/day = body weight/day  
EC x = Effect Concentration associated with x% response  
GLP = Good Laboratory Practice  
IARC = International Agency for Research of Cancer  
LC50 = 50% Lethal concentration - Concentration of a chemical in air or a chemical in water which causes the death of 50% (one half) of a group of test animals  
LD50 = 50% Lethal Dose - Chemical amount, given at once, which causes the death of 50% (one half) of a group of test animals  
LL = Lethal Loading  
NIOSH = National Institute of Occupational Safety and Health  
NOAEL = No Observed Adverse Effect Level  
NOEC = No Observed Effect Concentration  
NOEL = No Observed Effect Level  
OECD = Organization for Economic Co-operation and Development  
OSHA = Occupational Safety and Health Administration  
UVCB = Substance of unknown or Variable composition, Complex reaction products or Biological material  
Version EU  
DNEL = Derived No Effect Level  
PNEC = Predicted No Effect Concentration  
dw = dry weight  
fw = fresh water  
mw = marine water  
or = occasional release

Legend Section 8:

TWA: Time Weight Average  
STEL: Short Time Exposure Limit  
PEL: Permissible exposure limit  
REL: Recommended exposure limit  
TLV: Threshold Limit Values

+	Sensitizer	*	Skin designation
**	Hazard Designation	C:	Carcinogen
M:	Mutagen	R:	Toxic to reproduction

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

This safety data sheet serves to complete but not to replace the technical product



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sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfil his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.