# SAFETY DATA SHEET

In compliance with EC Regulations No.: 1907/2006, 830/2015 and 1272/2008 (CLP).

Date last modified: 30 October 2020 - Version 5.0

## 1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY

### 1.1 Product Identifier

**Product Name: REFRIGERANT R407C**
**Product Code #: 330226**

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

**Relevant identified uses: Refrigerant.**
**Industrial and professional uses only. Perform risk assessment prior to use.**

**Uses advised against:** This product is not recommended for any industrial, professional or consumer use other than the Intended Uses above and the instructions written in this Safety Data Sheet.

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

**Company/undertaking identification**

**Supplier/Manufacturer:**

Marichem Marigases Hellas SA
Sfaktirias 64,
185 45 Piraeus,
Greece
Tel. No.: ++30 210 4148800
Fax No.: ++30 210 4133985
http://www.marichem-marigases.com

**e-mail: mail@marichem-marigases.com**

### 1.4 Emergency telephone number

Tel. No.: ++30 210 4148800 (including working hours)

Emergency Information:
Inside U.S. and Canada: (800)-424-9300 (CHEMTREC)
Outside U.S. and Canada: 1-703-527-3887 (CHEMTREC)
National Emergency Centre (Greece): ++30 210 7793777

## 2. HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or mixture

**Hazard Class and Category Code Regulation EC 1272/2008 (CLP/GHS)**

**Physical hazards**

Gases under pressure, Liquefied gas.

H280: Contains gas under pressure; may explode if heated.

Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

### 2.2. Label elements

### Labelling Regulation EC 1272/2008 (CLP)

### Hazard pictograms:

GHS04

**Signal word:** Warning

**Hazard Statements**

H280 - Contains gas under pressure; may explode if heated.

**Precautionary statements**

**Storage**

P403: Store in a well-ventilated place.

**Supplemental label information**

EIGA-0783: Contains fluorinated greenhouse gases covered by the Kyoto protocol.
EIGA-As: Asphyxiant in high concentrations.

### 2.3. Other hazards

Contact with evaporating liquid may cause frostbite or freezing of skin.
Misuse or intentional inhalation abuse may lead to death without warning.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Rapid evaporation of the liquid may cause frostbite.

**Mixture/substance classification and labelling according to Directive 67/548/EEC, European Dangerous Preparations Directive (1999/45/EC), European Regulation 648/2004 and their amendments.**

Not classified as hazardous to users. No special information required according to EC directives.

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

**3.1 Chemical Composition:**

| Ingredients | CAS Number | Concentration (%) | Hazard Code(s)* |
|---|---|---|---|
| Difluoromethane (HFC-32) | 75–10–5 | 23 % | H220; H280 |
| Pentafluoroethane (HFC 125) | 354–33–6 | 25 % | H280 |
| 1,1,1,2-Tetrafluoroethane (HFC 134a) | 811–97–2 | 52 % | H280 |

*See section 16 for the full text of the Hazard Code(s) declared above.

Occupational Exposure Limits, if available, are listed in section 8.

## 4. FIRST AID MEASURES

### 4.1. Description of first aid measures

**General advice**
If unconscious place in recovery position and seek medical advice.
Never give anything by mouth to an unconscious person.
If breathing is irregular or stopped, administer artificial respiration.
First aider needs to protect himself.
If symptoms persist, call a physician.

**Inhalation**
Move to fresh air. Keep patient warm and at rest.
Remove from exposure, lie down.
Artificial respiration and/or oxygen may be necessary. Call a physician.

**Skin contact**
Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
Take off contaminated clothing and shoes immediately.

**Eye contact**
Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes.
Get medical attention.

**Ingestion**
Is not considered a potential route of exposure.

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

**Symptoms**
Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
Other symptoms potentially related to misuse or inhalation abuse are:, Anaesthetic effects, Light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.

Skin contact may provoke the following symptoms:
Frostbite, Irritation, Discomfort, Itching, Redness, Swelling of tissue

Eye contact may provoke the following symptoms:
Frostbite, Irritation, Tearing, redness, or discomfort.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Do not give adrenaline or similar drugs.

## 5. FIRE FIGHTING MEASURES

**5.1. Extinguishing media**
Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Use water spray, alcohol-resistant foam, dry chemical or Carbon Dioxide.

**5.2. Special hazards arising from the substance or mixture**
Specific hazards during fire-fighting:
Exposure to fire may cause containers to rupture/explode. Non flammable.
Pressure build-up.
Fire or intense heat may cause violent rupture of packages.

Hazardous thermal decomposition products:
Fluorinated compounds
Hydrogen fluoride
Carbon oxides

Exposure to decomposition products may be a hazard to health.

**5.3. Advice for fire-fighters**
Special protective equipment for fire-fighters
In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.
Further information: Cool containers/tanks with water spray

## 6. ACCIDENTAL RELEASE MEASURES

**6.1. Personal precautions, protective equipment and emergency procedures**
Personal precautions:
Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.

**6.2. Environmental precautions**
Environmental precautions: Should not be released into the environment.
It must be used in accordance with local and national regulations.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Try to stop release.

**6.3. Methods and materials for containment and cleaning up**
Methods for cleaning up: Evaporates.

**6.4. Reference to other sections**

For disposal instructions see section 13.

## 7. HANDLING AND STORAGE

### 7.1. Precautions for safe handling

**Advice on safe handling**
Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Vapours are heavier than air and may spread along floors.

**Advice on protection against fire and explosion**
The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

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

**Requirements for storage areas and containers**
Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Keep at temperature not exceeding 52°C. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from contamination. Protect cylinders from damage. Keep away from direct sunlight. Store only in approved containers.

**Advice on common storage**
No materials to be especially mentioned. For further information see Section 10 of the safety data sheet.

Storage period: > 10 years.
Storage temperature: < 52 °C.

### 7.3. Specific end use(s)
No data available.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1. Control parameters

If sub-section is empty then no values are applicable.

**Components with workplace control parameters**

| **1,1,1,2-Tetrafluoroethane (CAS-No. 811-97-2)** | | | | |
|---|---|---|---|---|
| **Type/Form of exposure** | **Control parameters** | **Update** | **Regulatory basis** | **Remarks** |
| Time Weighted Average (TWA): | 4,240 mg/m$^3$<br>1,000 ppm | 2007 | UK. EH40 Workplace Exposure Limits (WELs) | |

**Difluoromethane**
AEL * (DUPONT) 1,000 ppm 8 & 12 hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

**Derived No Effect Level (DNEL)**

**Pentafluoroethane**
Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 16444 mg/$m^3$

Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 1753 mg/$m^3$

**1,1,1,2-Tetrafluoroethane**
Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 13936 mg/$m^3$

Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 2476 mg/$m^3$

**Predicted No Effect Concentration (PNEC)**

**Pentafluoroethane**
Value: 0.1 mg/l
Compartment: Fresh water

Value: 1 mg/l
Compartment: Water
Remarks: Intermittent use/release.

Value: 0.6 mg/kg
Compartment: Fresh water sediment.

**1,1,1,2-Tetrafluoroethane**
Value: 0.1 mg/l
Compartment: Fresh water

Value: 0.01 mg/l
Compartment: Marine water

Value: 1 mg/l
Compartment: Water
Remarks: Intermittent use/release.

Value: 0.75 mg/kg dry weight (d.w.)
Compartment: Fresh water sediment.

Value: 73 mg/l
Compartment: Water
Remarks: Sewage treatment plants

### 8.2 Exposure Controls

**Engineering measures**
Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.

**Eye protection**
Wear safety glasses or coverall chemical splash goggles. Eye protection complying with EN 166. or ANSI Z87.1 Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

**Hand protection**
Material: Leather gloves
The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Material: Low temperature resistant gloves
Protective gloves complying with EN 374. or US OSHA guidelines

The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. 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.

**Skin and body protection**
Wear suitable protective equipment.
Wear as appropriate: impervious clothing

**Protective measures**
Self-contained breathing apparatus (SCBA) is required if a large release occurs.
The type of protective equipment must be selected according to the concentration and amount of the substance at the specific workplace.

**Hygiene measures**
Handle in accordance with good industrial hygiene and safety practice.

**Respiratory protection**
For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Respiratory protection complying with EN 137.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

| | |
|---|---|
| **Form:** | Liquified gas |
| **Color:** | Colorless |
| **Odor:** | Slight, ethereal odour |
| **Boiling Point:** | $-43.9^0$ C (–47 F) Average |
| **Vapor Pressure:** | 171.8 psia at 25 $^o$C (77 F) |

| | |
|---|---|
| **Solubility in Water:** | Not determined |
| **Solubility (Other):** | soluble in alcohol, esters, chlorinated solvents, |
| **Density (g / ml):** | 1,136 at 25°C |
| **Evaporation Rate:** | Greater than 1 |

**9.2. Other information**

No data available.

## 10. STABILITY AND REACTIVITY

**10.1. Reactivity**
Decomposes on heating.

**10.2. Chemical stability**
The product is chemically stable.

**10.3. Possibility of hazardous reactions**
Stable under recommended storage conditions.

**10.4. Conditions to avoid**
The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions. Avoid open flames and high temperatures. Pressurized container: Do not pierce or burn, even after use. Keep at temperature not exceeding 52°C.

**10.5. Incompatible materials**
Alkali metals
Alkaline earth metals
Powdered metals
Powdered metal salts

**10.6. Hazardous decomposition products**
Hazardous thermal decomposition products may include:
Hydrogen fluoride
Carbon oxides

## 11. TOXICOLOGICAL INFORMATION

**11.1. Information on toxicological effects**

**Acute inhalation toxicity**

**Difluoromethane (HFC-32)**

Inhalation 4 h LC50: > 520000 ppm , Rat
Inhalation Low Observed
Adverse Effect
Concentration (LOAEC): > 350000 ppm, Dog

Cardiac sensitization
Inhalation No Observed
Adverse Effect
Concentration: 350000 ppm, Dog

**Pentafluoroethane**

LC50 / 4 h Rat :> 800000 ppm
Method: OECD Test Guideline 403

No Observed Adverse Effect Concentration / Dog :75000 ppm
Cardiac sensitization.

Low Observed Adverse Effect Concentration (LOAEC) / Dog :100000 ppm
Cardiac sensitization.

**1,1,1,2-Tetrafluoroethane**

LC50 / 4 h Rat :> 567000 ppm

No Observed Adverse Effect Concentration / Dog :40000 ppm
Cardiac sensitization.

Low Observed Adverse Effect Concentration (LOAEC) / Dog :80000 ppm
Cardiac sensitization.

**Skin irritation**

**Difluoromethane (HFC-32)**

No skin irritation, Not tested on animals.
Not expected to cause skin irritation based on expert review of the properties of the substance.

**1,1,1,2-Tetrafluoroethane**

Rabbit
Classification: Not classified as irritant
Result: No skin irritation

**Eye irritation**

**Difluoromethane (HFC-32)**

No eye irritation. Not tested on animals.
Not expected to cause eye irritation based on expert review of the properties of the substance.

**1,1,1,2-Tetrafluoroethane**

Rabbit
Classification: Not classified as irritant
Result: No eye irritation

**Sensitisation**

**Difluoromethane (HFC-32)**

Skin sensitization: Does not cause skin sensitisation. Not tested on animals
Not expected to cause sensitization based on expert review of the properties of the substance.
There are no reports of human respiratory sensitization.

**Pentafluoroethane**

Human
Classification: Does not cause respiratory sensitisation.
Result: Does not cause respiratory sensitisation.

**1,1,1,2-Tetrafluoroethane**

Guinea pig
Classification: Does not cause skin sensitisation.
Result: Does not cause skin sensitisation.

Rat
Classification: Does not cause respiratory sensitisation.
Result: Does not cause respiratory sensitisation.

**Repeated dose toxicity**

**Difluoromethane (HFC-32)**

Inhalation
Rat: -
No toxicologically significant effects were found.

**Pentafluoroethane**

Inhalation Rat
No toxicologically significant effects were found.

**1,1,1,2-Tetrafluoroethane**

Inhalation Rat
No toxicologically significant effects were found.

**Mutagenicity assessment**

**Difluoromethane (HFC-32)**

Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

**Pentafluoroethane**

Animal testing did not show any mutagenic effects. Evidence suggests this substance does not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.

**1,1,1,2-Tetrafluoroethane**

Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

**Carcinogenicity assessment**

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition). None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

**Pentafluoroethane**

Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.

**1,1,1,2-Tetrafluoroethane**

Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.

**Toxicity to reproduction assessment**

**Difluoromethane (HFC-32)**

No toxicity to reproduction. Animal testing showed no reproductive toxicity. Information given is based on data obtained from similar substances.

**Pentafluoroethane**

No toxic to reproduction. Animal testing showed no reproductive toxicity.

**1,1,1,2-Tetrafluoroethane**

No toxic to reproduction. No effects on or via lactation. Animal testing showed no reproductive toxicity.

**Assessment teratogenicity**

**Difluoromethane (HFC-32)**

Animal testing showed no developmental toxicity.

**Pentafluoroethane**

Animal testing showed no developmental toxicity.

**1,1,1,2-Tetrafluoroethane**

Animal testing showed no developmental toxicity.

**Further information**
Avoid skin contact with leaking liquid (danger of frostbite).

**Difluoromethane (HFC-32)**

Further information: Cardiac sensitisation threshold limit: > 735000 mg/m$^3$

## 12. ECOLOGICAL INFORMATION

### 12.1. Toxicity

**Toxicity to fish**

**Difluoromethane (HFC-32)**

96 h LC50: Fish 1,507 mg/l

**Pentafluoroethane**
LC50 / 96 h / Oncorhynchus mykiss (rainbow trout): 450 mg/l
Information given is based on data obtained from similar substances.

**1,1,1,2-Tetrafluoroethane**
LC50 / 96 h / Oncorhynchus mykiss (rainbow trout): 450 mg/l

**Toxicity to aquatic plants**

**Difluoromethane (HFC-32)**

96 h EC50: Algae 142 mg/l
30 d: NOEC Fish (unspecified species) 65.8 mg/l

**Pentafluoroethane**
ErC50 / 96 h / Algae: 142 mg/l
Information given is based on data obtained from similar substances.

NOEC / 72 h / Pseudokirchneriella subcapitata (green algae): 13.2 mg/l
Information given is based on data obtained from similar substances.

**1,1,1,2-Tetrafluoroethane**
ErC50 / 96 h / Algae: 142 mg/l
Information given is based on data obtained from similar substances.

NOEC / 72 h / Pseudokirchneriella subcapitata (green algae): 13.2 mg/l
Information given is based on data obtained from similar substances.

**Toxicity to aquatic invertebrates**

**Difluoromethane (HFC-32)**

48 h EC50: Daphnia (water flea) 652 mg/l

**Pentafluoroethane**
EC50 / 48 h / Daphnia magna (Water flea): 980 mg/l
Information given is based on data obtained from similar substances.

**1,1,1,2-Tetrafluoroethane**
EC50 / 48 h / Daphnia magna (Water flea): 980 mg/l

### 12.2. Persistence and degradability

**Biodegradability**

**Difluoromethane (HFC-32)**

Biodegradability: 5 % OECD Test Guideline 301D
Not readily biodegradable.

**Pentafluoroethane**
Not rapidly biodegradable.

**1,1,1,2-Tetrafluoroethane**
Not biodegradable.

**12.3. Bioaccumulative potential**

**Bioaccumulation**

No data available.

**12.4. Mobility in soil**

No data available.

**12.5. Results of PBT and vPvB assessment**

**PBT and vPvB assessment**

This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT). / This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

**12.6. Other adverse effects**

**Global Warming Potential**

Global warming potential: 1774
Contains fluorinated greenhouse gases covered by the Kyoto protocol. When discharged in large quantities may contribute to the greenhouse effect. For GWP value of mixture and quantities, refer to container label.

**Component information**

**Pentafluoroethane**

UN/IPCC. Greenhouse Gas Global Warming Potentials (IPCC Fourth Assessment Report, Climate Change - Table TS.2 - Global warming potential: 3500 100-yr

## 13. DISPOSAL CONSIDERATIONS

**13.1 Waste treatment methods**

**General information**
Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place. Avoid discharges to atmosphere.

**Disposal methods**
Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

**European Waste Codes**
**Container:** 14 06 01*: chlorofluorocarbons, HCFC, HFC

## 14. TRANSPORT INFORMATION

### 14.1 US DOT/IMO/IATA/ADR transportation codes

### 14.2 Proper shipping name: REFRIGERANT GAS R 407C

#### 14.3 LAND TRANSPORT

UN number: 3340
ADR class: 2
RID-class: 2.2
Packing group: N/A
Labeling: 2.2 - Non-flammable gas

#### 14.4 SEA TRANSPORT

UN number: 3340
IMDG class: 2.2
IMDG packing group: N/A
Labeling: 2.2 - Non-flammable gas
EmS: F-C, S-V

#### 14.5 AIR TRANSPORT

UN number: 3340
IATA/ICAO class: 2.2
Packing group: N/A
Labeling: 2.2 - Non-flammable gas

Shipping Containers
Tank Cars
Cylinders
Ton Tanks

#### 14.6 GENERAL
Gas cylinders must be equipped with valve protection caps during transportation.

#### 14.7 ADDITIONAL INFORMATION
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

## 15. REGULATORY INFORMATION

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

EU Regulations

Directive 96/61/EC: concerning integrated pollution prevention and control (IPPC): Article 15, European Pollution Emission Registry (EPER):

| Chemical name | CAS-No. | Concentration |
|---|---|---|
| Pentafluoroethane | 354-33-6 | 10% - 25% |

**National Regulations**

Management of Health and Safety at Work Regulations (1999 No. 3242). The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541). Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677). Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306). Personal Protective Equipment Regulations (1992 No. 2966). Control of Major Accident Hazards Regulations (COMAH, 2015 No. 483). Pressure Systems Safety Regulations (PSSR, 2000 No. 128). Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives. This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

### 15.2 Chemical safety assessment

No Chemical Safety Assessment has been carried out.

## 16. OTHER INFORMATION

### 16.1 Full text of Hazard Code(s) referred in Section 3.

H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

### 16.2 Abbreviations and acronyms

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road).
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail).
IMDG: International Maritime Code for Dangerous Goods.
IATA: International Air Transport Association.
ICAO: International Civil Aviation Organization.
bw: Body weight.
Carc.: Carcinogenicity.
CAS number: Chemical Abstracts Service number.
CLP: Classification Labelling Packaging Regulation.
CSA: Chemical Safety Assessment.
CSR: Chemical Safety Report.
DNEL: Derived No Effect Level.
dw: Dry weight.

EC number: EINECS and ELINCS number.
EC: European Commission.
EC50: Half maximal effective concentration.
EINECS: European Inventory of Existing Commercial Chemical Substances.
ELINCS: European List of Notified Chemical Substances.
EmS: Emergency Schedule.
ERC: Environmental Release Category.
ES: Exposure scenario.
food: oral feed.
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
Irrit.: Irritation.
LC50: Lethal concentration, 50 %.
LD50: Median Lethal dose.
LOAEC: Lowest Observed Adverse Effect Concentration.
LOAEL: Lowest Observed Adverse Effect Level.
MK value: Maximum Concentration value.
NCO: An international corporation that provides customer service contracting.
NOAEC: No Observed Adverse Effect Concentration.
NOAEL: No Observed Adverse Effect Level.
NOEC: No Observed Effect Concentration.
OECD: Organisation for Economic Cooperation and Development.
PBT: Persistent, Bioaccumulative and Toxic.
PNEC: Predicted No Effect Concentration.
PROC: Process category.
REACH: The Registration, Evaluation, Authorisation and Restriction of Chemicals.
Resp.: Respiratory.
Sens.: Sensitization.
STEL value: Short Term Exposure Limit value.
STOT RE: Specific target organ toxicity — repeated exposure.
STOT SE: Specific target organ toxicity — single exposure.
STOT: Specific Target Organ Toxicity.
STP: Sewage Treatment Plant.
SU: Sector of use.
Tox.: Toxicity.
TWA value: Time Weighted Average value.
vPvB: Very Persistent and Very Bioaccumulative.

## 16.3 Notice to reader

All information, instructions and statements contained in this Material Safety Data Sheet are compiled in accordance with European Directives, corresponding national legislation and on the basis of information given by our suppliers.
The information disclosed in this Material Safety Data Sheet (which supersedes all previous versions) is believed to be correct, at the date of issue, to the best of our current knowledge and experience. It only relates to the specific product designated herein and it may not be valid when said product is used in combination with any other products or in any processed form, unless specified in the text. This document aims to provide the necessary health and safety information of the product and is not to be considered a warranty or quality specification. It is the responsibility of the recipient of this Material Safety Data Sheet to ensure that information given here is read and understood by all who use, handle, dispose of or in any way come in contact with the product.
Also, it is the responsibility of the user to comply with local legislation relating to safety, health, environment and waste management. Data and information provided concerning the product are informative, exclusively presented to the customer.