

1. Identification

| | | |
|--|--|----------------|
| Product identifier | ETHYL 2,4-DECADIENOATE | |
| Other means of identification | | |
| BRI Product Code | 433 | |
| FEMA number | 3148 | |
| Synonyms | 2,4-Decadienoic acid, ethyl ester, (2E,4Z)- * ethyl (2E,4Z)-decadienoate * Ethyl e-2,z-4-decadienoate * Ethyl trans-2,cis-4-decadienoate * Pear ester * Ethyl (2E,4Z)-2,4-decadienoate | |
| Recommended use | flavors and fragrances For Manufacturing Use Only | |
| Recommended restrictions | Not for use in Tobacco or Nicotine delivery device applications and/or products. | |
| Manufacturer/Importer/Supplier/Distributor information | | |
| Manufacturer | | |
| Company name | Bedoukian Research US | |
| Address | 6 Commerce Drive Danbury, CT 06810 United States | |
| Telephone | 1-203-830-4000 | |
| Website | www.bedoukian.com | |
| E-mail | customerservice@bedoukian.com | |
| Contact person | Joseph Bania | |
| Emergency phone number | Chemtrec (North America) | 1-800-424-9300 |
| | Chemtrec (International) | 1-703-527-3887 |

2. Hazard(s) identification

| | | |
|-----------------------|--|------------|
| Physical hazards | Not classified. | |
| Health hazards | Skin corrosion/irritation | Category 2 |
| Environmental hazards | Hazardous to the aquatic environment, acute hazard | Category 1 |
| | Hazardous to the aquatic environment, long-term hazard | Category 1 |
| OSHA defined hazards | Not classified. | |
| Label elements | | |



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|---|--|
| Signal word | Warning |
| Hazard statement | Causes skin irritation. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects. Contains D,L-alpha tocopherol. May produce an allergic reaction. |
| Precautionary statement | |
| Prevention | Wash thoroughly after handling. Avoid release to the environment. Wear protective gloves. |
| Response | If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. Collect spillage. |
| Storage | Not applicable. |
| Disposal | Dispose of contents/container in accordance with relevant area regulations. |
| Hazard(s) not otherwise classified (HNOC) | None known. |
| Supplemental information | Contains DL-alpha.-tocopherol. May produce an allergic reaction. |

3. Composition/information on ingredients

Substances

| Chemical name | Common name and synonyms | CAS number | % |
|--------------------------------|--|------------|------|
| Ethyl (2E,4Z)-2,4-decadienoate | 2,4-Decadienoic acid, ethyl ester, (2E,4Z) - ethyl (2E,4Z)-decadienoate Ethyl e-2,z-4-decadienoate Ethyl trans-2,cis-4-decadienoate Pear ester Ethyl (2E,4Z)-2,4-decadienoate | 3025-30-7 | 99.9 |
| DL- α -tocopherol | | 10191-41-0 | 0.1 |

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

Composition comments See Section 11 below for testing of the substance as a whole for skin sensitization.

4. First-aid measures

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| Inhalation | Move to fresh air. Call a physician if symptoms develop or persist. |
| Skin contact | Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse. |
| Eye contact | Rinse with water. Get medical attention if irritation develops and persists. |
| Ingestion | Rinse mouth. Get medical attention if symptoms occur. |
| Most important symptoms/effects, acute and delayed | Skin irritation. May cause redness and pain. |
| Indication of immediate medical attention and special treatment needed | Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed. |
| General information | Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. |

5. Fire-fighting measures

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|--|---|
| Suitable extinguishing media | Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂). |
| Unsuitable extinguishing media | Do not use water jet as an extinguisher, as this will spread the fire. |
| Specific hazards arising from the chemical | During fire, gases hazardous to health may be formed. |
| Special protective equipment and precautions for firefighters | Self-contained breathing apparatus and full protective clothing must be worn in case of fire. |
| Fire fighting equipment/instructions | Move containers from fire area if you can do so without risk. |
| Specific methods | Use standard firefighting procedures and consider the hazards of other involved materials. |
| General fire hazards | No unusual fire or explosion hazards noted. |

6. Accidental release measures

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| Personal precautions, protective equipment and emergency procedures | Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS. |
| Methods and materials for containment and cleaning up | <p>This product is miscible in water. Prevent entry into waterways, sewer, basements or confined areas.</p> <p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p> |

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|----------------------------------|--|
| Environmental precautions | Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. |
|----------------------------------|--|

7. Handling and storage

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|---|--|
| Precautions for safe handling | Avoid contact with eyes, skin, and clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices. |
| Conditions for safe storage, including any incompatibilities | Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Recommended Packaging: Glass, Plastic, Aluminum or Phenolic Lined Steel. Store tightly sealed under inert gas below 0 deg. C |

8. Exposure controls/personal protection

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| Occupational exposure limits | This substance has no PEL, TLV, or other recommended exposure limit. |
| Biological limit values | No biological exposure limits noted for the ingredient(s). |
| Appropriate engineering controls | Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash fountain and emergency showers are recommended. |
| Individual protection measures, such as personal protective equipment | |
| Eye/face protection | Face shield is recommended. Wear safety glasses with side shields (or goggles). |
| Skin protection | |
| Hand protection | Wear appropriate chemical resistant gloves. Select suitable chemical resistant protective gloves (EN 374) with a protective index 6 (>480min permeation time). |
| Other | Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended. |
| Respiratory protection | In case of insufficient ventilation, wear suitable respiratory equipment. |
| Thermal hazards | Wear appropriate thermal protective clothing, when necessary. |
| General hygiene considerations | Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. |

9. Physical and chemical properties

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|---|---|
| Appearance | |
| Physical state | Liquid. |
| Color | colorless to slightly yellow |
| Odor | responsible for bartlett pear odor. |
| Odor threshold | Not available. |
| pH | Not available. |
| Melting point/freezing point | -60.3 OECD 102 |
| Initial boiling point and boiling range | 479.84 °F (248.8 °C) OECD 103 |
| Flash point | > 212 °F (> 100 °C) EPA OPPTS 830.6315 The flash point was tested using the Pensky-Martens Closed Cup technique. The temperature of the substance exceeded 100 degrees C, so testing was stopped. The flash point was greater than 100 degrees C. The substance is therefore not flammable. 243 °F (117 °C) Closed Cup |
| Evaporation rate | Not available. |
| Flammability (solid, gas) | Not applicable. |
| Upper/lower flammability or explosive limits | |
| Flammability limit - lower (%) | Not available. |
| Flammability limit - upper (%) | Not available. |
| Explosive limit - lower (%) | Not available. |
| Explosive limit - upper (%) | Not available. |
| Vapor pressure | 160.0 Pa OECD 104 at 21.1°C |

| | |
|--|---------------------------------------|
| Vapor density | 6.8 Relative to air; air = 1 |
| Relative density | Not available. |
| Solubility(ies) | |
| Solubility (water) | 7.12 mg/l OECD 105 at 19°C |
| Partition coefficient (n-octanol/water) | 4.4 OECD 117 4.1 - 4.7 was the range. |
| Auto-ignition temperature | 512.6 °F (267 °C) ASTM E659 |
| Decomposition temperature | Not available. |
| Viscosity | Not available. |
| Other information | |
| Density | 0.905 g/ml OECD 109 |
| Explosive properties | Not explosive. |
| Flammability class | Combustible IIIB estimated |
| Molecular formula | C12H20O2 |
| Molecular weight | 196.28 |
| Oxidizing properties | Not oxidizing. |
| Specific gravity | 0.9 - 0.905 at 25°C |

10. Stability and reactivity

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| Reactivity | The product is stable and non-reactive under normal conditions of use, storage and transport. |
| Chemical stability | Material is stable under normal conditions. |
| Possibility of hazardous reactions | No dangerous reaction known under conditions of normal use. |
| Conditions to avoid | Contact with incompatible materials. |
| Incompatible materials | Strong oxidizing agents. |
| Hazardous decomposition products | No hazardous decomposition products are known. |

11. Toxicological information

Information on likely routes of exposure

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| Inhalation | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| Skin contact | Causes skin irritation. May cause an allergic skin reaction. |
| Eye contact | Direct contact with eyes may cause temporary irritation. |
| Ingestion | Expected to be a low ingestion hazard. |

Symptoms related to the physical, chemical and toxicological characteristics Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity

| Components | Species | Test Results |
|--|---|---|
| Ethyl (2E,4Z)-2,4-decadienoate (CAS 3025-30-7) | | |
| Acute | | |
| Dermal | | |
| Liquid | | |
| LD50 | Rabbit | > 5000 mg/kg Guideline: FHSA, 16 CFR 1500.3(c)(2)(i). The acute dermal toxicity of ethyl decadienoate was determined. Two animals were dosed at 5.0 g/ kg dermally. If either of these animals die, then three additional groups are given various doses to determine the LD50. If neither animal in the initial dose group die, then an additional eight animals are dosed at 5.0 g/kg. As the two initial animals did not die, an additional 8 animals were dosed at 5.0 g/kg. Dermal exposure was for 24 hrs with occlusive covering. Animals were observed for mortality, toxicity, pharmacological effect, body weight, dermal irritation and gross pathology. No animals died during the study. |
| Oral | | |
| Liquid | | |
| LD50 | Rat | > 5000 mg/kg Guideline: FHSA, 16 CFR 1500.3(c)(2)(i). The oral toxicity of ethyl decadienoate was tested in 10 rats. The 10 male rats were given doses of 5 g/kg of the test substance. They were then monitored for 14 days. No animals died during the study. Some minor clinical signs were noted, and only one abnormality was noted during the necropsies. |
| * Estimates for product may be based on additional component data not shown. | | |
| Skin corrosion/irritation | Causes skin irritation. | |
| Irritation Corrosion - Skin | | |
| Ethyl (2E,4Z)-2,4-decadienoate | 3 % Patch test, Vehicle Petrolatum. Result: No irritation observed. Species: Human Organ: Skin Notes: RIFM 5000 mg/kg LD50, Evaluated on days 1, 7, and 14 of an LD50 study, 10 animals evaluated. moderate redness in 8, slight redness in 2; moderate edema in 2, slight edema in 8. Day 14, severe redness in 4 with flaking & eschar formation. Result: Irritation noted. Species: Rabbit Organ: Skin Notes: RIFM OECD 404, 3 male rabbits were exposed to 0.5 cc of test substance for 4 hrs. The test substance was then removed, and observations made at 1, 24, 48, and 72 hrs after removal, and also at 6, 9, 12, and 14 days after removal. All animals showed evidence of irritation that was not fully resolved by Day 14. The test substance is moderately irritating to skin. Result: Irritation noted. Species: Rabbit Organ: Skin | |
| Serious eye damage/eye irritation | Direct contact with eyes may cause temporary irritation. | |

Irritation Corrosion - Eye

Ethyl (2E,4Z)-2,4-decadienoate

OECD 405, Three rabbits were exposed to 0.1 cc of test substance. The other eye remained untreated as a control. Some redness and discharge was seen at the 1 hr and 24 hr observations, but there were no signs of irritation at the 48 hr observation. The irritation index was 1.83/110. The test substance is therefore not irritating to the eye.

Result: Not irritating.

Species: Rabbit

Organ: Eye

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Skin sensitization

Ethyl (2E,4Z)-2,4-decadienoate

3 % Patch test, Vehicle Petrolatum. 30 volunteers, 27 completed the study.

Result: Not sensitizing.

Species: Human

Organ: Skin

Notes: RIFM

OECD 422E, In theory, the test item is considered to be no skin sensitizer. However, since the log KOW is higher than 3.5, the results must be considered as inconclusive. The controls confirmed the validity of the study for all experiments. In this study under the given conditions the test item did not upregulate the expression of the cell surface markers in at least two independent experiment runs. However, since the log KOW is higher than 3.5, the results must be considered as inconclusive.

Result: inconclusive.

Organ: In vitro human cell line activation test (h-CLAT)

OECD 442C, The skin sensitization potential of the test substance was determined in a peptide reactivity assay. The test evaluates the reactivity of the test substance to peptides containing lysine and cysteine. Although the control shows the test to be valid, phase separation of the test substance means a prediction of sensitivity cannot be made.

Result: not determinable.

Species: In chemico

OECD 442D, In this study under the given conditions the test item did not induce the luciferase activity in the transgenic KeratinoSens™ cell line in at least two independent experiment runs. Therefore, the test item can be considered as nonsensitizer.

The data generated with this method may not be sufficient to conclude on the absence of skin sensitisation potential of chemicals and should be considered in the context of integrated approach such as IATA.

Result: Not sensitizing.

Organ: In vitro KeratinoSens™ assay

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Germ cell mutagenicity: Ames test

Ethyl (2E,4Z)-2,4-decadienoate

OECD 471, E. coli WP2 uvrA. The mutagenicity was tested both in the presence and absence of S9 using DMSO as a solvent. Doses of 5.00, 15.0, 50.0, 150, 500, 1500, and 5000 ug/plate were tested. Toxicity was seen at doses of 500 ug/plate or higher. The test substance was not mutagenic either in the presence or absence of S9.

Result: Not mutagenic.

Species: Escherichia coli

Germ cell mutagenicity: Ames test
Ethyl (2E,4Z)-2,4-decadienoate

OECD 471, S. typhimurium TA 1535, TA 1537, TA 98, TA 100. The mutagenicity was tested both in the presence and absence of S9 using DMSO as a solvent. Doses of 5.00, 15.0, 50.0, 150, 500, 1500, and 5000 ug/plate were tested. Toxicity was seen at doses of 500 ug/ plate or higher. The test substance was not mutagenic either in the presence or absence of S9.
Result: Not mutagenic.
Species: Salmonella typhimurium

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Further information May cause allergic respiratory and skin reactions.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

| Components | | Species | Test Results |
|--|------|---------|---|
| Ethyl (2E,4Z)-2,4-decadienoate (CAS 3025-30-7) | | | |
| Aquatic | | | |
| Acute | | | |
| Algae | EC50 | Algae | 0.13 mg/l, 72 hr OECD 201 |
| | NOEC | Algae | 0.074 mg/l, 96 hr OECD 201 |
| Crustacea | EC50 | Daphnia | 1.4 mg/l, 48 hr OECD 202. Groups of Daphnia magna were exposed to concentrations of 0.18 mg a.i./L, 0.34 mg a.i./L, 0.66 mg a.i./L, 1.5 mg a.i./L, or 2.6 mg a.i./L (measured), for 48 hrs. 60% immobility was seen in the 1.5 mg a.i./L group, and 100% immobility in the 2.6 mg a.i./L group. No immobility was seen in other groups. |

* Estimates for product may be based on additional component data not shown.

Persistence and degradability The product is readily biodegradable.

Biodegradability

Percent degradation (Aerobic biodegradation-ready)

Ethyl (2E,4Z)-2,4-decadienoate

OECD 301F, 30 mg/L of test substance was monitored for biodegradation by activated sludge for 34 days. Sodium benzoate was used as a reference substance. The oxygen consumption was monitored during this time. The reference substance results met the validity criteria. The test substance biodegraded 72% in 28 days, and met the 10-day window requirement. It is therefore readily biodegradable.
Result: Readily biodegradable.
Species: activated sludge, domestic (adaptation not specified)

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

ETHYL 2,4-DECADIENOATE

4.4 OECD 117, 4.1 - 4.7 was the range.

Partition coefficient n-octanol / water (log Kow)

Ethyl (2E,4Z)-2,4-decadienoate

4.1 - 4.7 OECD 117

Mobility in soil

No data available.

Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations**Disposal instructions**

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information**DOT**

Not regulated as dangerous goods.

IATA**UN number**

UN3082

UN proper shipping name

Environmentally hazardous substance, liquid, n.o.s. (ETHYL 2,4-DECADIENOATE)

Transport hazard class(es)**Class**

9

Subsidiary risk

-

Packing group

III

Environmental hazards

Yes

ERG Code

9L

Special precautions for user

Read safety instructions, SDS and emergency procedures before handling.

Other information**Passenger and cargo aircraft**

Allowed with restrictions.

Cargo aircraft only

Allowed with restrictions.

IMDG**UN number**

UN3082

UN proper shipping name

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (ETHYL 2,4-DECADIENOATE), MARINE POLLUTANT

Transport hazard class(es)**Class**

9

Subsidiary risk

-

Packing group

III

Environmental hazards**Marine pollutant**

Yes

EmS

F-A, S-F

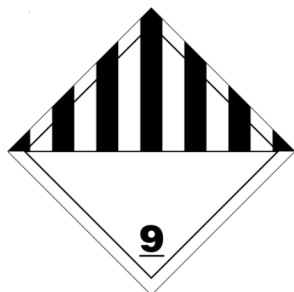
Special precautions for user

Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not established.

IATA; IMDG



Marine pollutant



General information

IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical

No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|-----------------------------|--|------------------------|
| Australia | Australian Inventory of Chemical Substances (AICS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | Yes |
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | Yes |
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes |
| Taiwan | Taiwan Toxic Chemical Substances (TCS) | Yes |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | Yes |

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

| | |
|----------------------|--|
| Issue date | 16-May-2015 |
| Revision date | 29-January-2024 |
| Version # | 19 |
| Disclaimer | Bedoukian Research US cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available. |
| Revision information | Product and Company Identification: Product and Company Identification Physical & Chemical Properties: Multiple Properties HazReg Data: Europe - EU |