

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 05.11.2010

Version 6.1

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

1.1 Product identifier

| | |
|---------------------------|--|
| Catalogue No. | 821083 |
| Product name | Tetraethyl orthotitanate for synthesis |
| REACH Registration Number | A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline. |

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

| | |
|-----------------|---|
| Identified uses | Chemical for synthesis For additional information on uses please refer to the Merck Chemicals portal (www.merck-chemicals.com). |
|-----------------|---|

1.3 Details of the supplier of the safety data sheet

| | |
|------------------------|---|
| Company | Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0 |
| Responsible Department | LS-QHC * e-mail: prodsafe@merckgroup.com |

| | |
|--------------------------------|---|
| 1.4 Emergency telephone number | Please contact the regional company representation in your country. |
|--------------------------------|---|

2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquid, Category 3, H226

Eye irritation, Category 2, H319

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

Classification (67/548/EEC or 1999/45/EC)

R10

Xi; R36

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms



Signal word

Warning

Hazard statements

H226 Flammable liquid and vapour.

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H319 Causes serious eye irritation.

Precautionary statements

P210 Keep away from heat.

P262 Do not get in eyes, on skin, or on clothing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Reduced labelling (≤125 ml)

Hazard pictograms



Signal word
Warning

CAS-No. 3087-36-3

Labelling (67/548/EEC or 1999/45/EC)

Symbol(s) Xi Irritant

R-phrases 10-36 Flammable. Irritating to eyes.

S-phrases 24 Avoid contact with skin.

EC-No. 221-410-8

Reduced labelling (≤125 ml)

Symbol(s) Xi Irritant

R-phrases 10 Flammable.

2.3 Other hazards

None known.

3. Composition/information on ingredients

| | | |
|------------|---|---|
| Formula | (C ₂ H ₅ O) ₄ Ti | C ₈ H ₂₀ O ₄ Ti (Hill) |
| CAS-No. | 3087-36-3 | |
| EC-No. | 221-410-8 | |
| Molar mass | 228,15 g/mol | |

4. First aid measures

4.1 Description of first aid measures

After inhalation: fresh air.

After skin contact: wash off with plenty of water. Remove contaminated clothing.

After eye contact: rinse out with plenty of water. Call in ophthalmologist.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Irritation and corrosion

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4.3 Indication of immediate medical attention and special treatment needed

No information available.

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂), Dry powder

Unsuitable extinguishing media

Water, Foam

5.2 Special hazards arising from the substance or mixture

Combustible material, Vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Special protective equipment for fire-fighters

In the event of fire, wear self-contained breathing apparatus.

Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid substance contact. Do not breathe vapours, aerosols. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

6.2 Environmental precautions

Do not empty into drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills.

Observe possible material restrictions (see sections 7.2 and 10.5).

Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment see section 13.

7. Handling and storage

7.1 Precautions for safe handling

Keep workplace dry. Do not allow product to come into contact with water.

Observe label precautions.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

7.2 Conditions for safe storage, including any incompatibilities

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Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Store at +15°C to +25°C.

7.3 Specific end uses

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

8. Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Eye/face protection

Safety glasses

Hand protection

full contact:

| | |
|---------------------|--------------|
| Glove material: | butyl-rubber |
| Glove thickness: | 0,7 mm |
| Break through time: | > 480 min |

splash contact:

| | |
|---------------------|----------------|
| Glove material: | Nitrile rubber |
| Glove thickness: | 0,40 mm |
| Break through time: | > 30 min |

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 730 Camatril® -Velours (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:

Flame retardant antistatic protective clothing

Respiratory protection

required when vapours/aerosols are generated.

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Environmental exposure controls

Do not empty into drains.

Risk of explosion.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|------------------------------------|
| Form | liquid |
| Colour | colourless |
| Odour | alcohol-like |
| Odour Threshold | No information available. |
| pH | No information available. |
| Melting point | -40 °C |
| Boiling point/boiling range | 150 - 155 °C at 16 hPa |
| Flash point | 33 °C |
| Evaporation rate | No information available. |
| Flammability (solid, gas) | No information available. |
| Lower explosion limit | No information available. |
| Upper explosion limit | No information available. |
| Vapour pressure | No information available. |
| Relative vapour density | No information available. |
| Relative density | 1,08 g/cm ³ at 20 °C |
| Water solubility | at 20 °C Hydrolysis |
| Partition coefficient: n-octanol/water | No information available. |
| Autoignition temperature | No information available. |
| Decomposition temperature | 350 °C |
| Viscosity, dynamic | 55 - 65 mPa.s at 20 °C |
| Explosive properties | No information available. |
| Oxidizing properties | No information available. |

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9.2 Other data

none

10. Stability and reactivity

10.1 Reactivity

Vapour/air-mixtures are explosive at intense warming.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Water

10.4 Conditions to avoid

Heating (decomposition).

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.5 Incompatible materials

no information available

10.6 Hazardous decomposition products

no information available

11. Toxicological information

11.1 Information on toxicological effects

Eye irritation

Causes serious eye irritation.

Specific target organ toxicity - single exposure

The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ toxicity - repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

No aspiration toxicity classification

11.2 Further information

Further information

Quantitative data on the toxicity of this product are not available.

Further data:

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

12. Ecological information

12.1 Toxicity

No information available.

12.2 Persistence and degradability

No information available.

12.3 Bioaccumulative potential

No information available.

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12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects

Additional ecological information

We have no quantitative data concerning the ecological effects of this product.

Further information on ecology

Do not allow to run into surface waters, wastewater, or soil.

13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

14. Transport information

ADR/RID

UN 1993 FLAMMABLE LIQUID, N.O.S. (TETRAETHYLORTHOTITANAT), 3, III

IATA

UN 1993 FLAMMABLE LIQUID, N.O.S. (TETRAETHYLORTHOTITANAT), 3, III

IMDG

UN 1993 FLAMMABLE LIQUID, N.O.S. (TETRAETHYLORTHOTITANAT), 3, III

EmS F-E S-E

The transport regulations are cited according to international regulations and in the form applicable in Germany. Possible national deviations in other countries are not considered.

15. Regulatory information

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

EU regulations

| | |
|-----------------------|----------------------|
| Major Accident Hazard | 96/82/EC |
| Legislation | Flammable. |
| | 6 |
| | Quantity 1: 5.000 t |
| | Quantity 2: 50.000 t |

| | |
|---------------------------|--|
| Occupational restrictions | Take note of Dir 94/33/EC on the protection of young people at work. |
|---------------------------|--|

National legislation

| | |
|-------------------|---------------------|
| Storage class VCI | 3 Flammable Liquids |
|-------------------|---------------------|

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out.

16. Other information

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

| | |
|------|------------------------------|
| H226 | Flammable liquid and vapour. |
|------|------------------------------|

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H319 Causes serious eye irritation.

Full text of R-phrases referred to under sections 2 and 3

R10 Flammable.

R36 Irritating to eyes.

Training advice

Provide adequate information, instruction and training for operators.

Regional representation: This information is given on the authorised Safety Data Sheet for your country.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.