1 Identification

- Product name
- Trade name: Tetrakis(dimethylamino)titanium(IV), 99% TDMAT
- Item number: 93-2240
- CAS Number: 3275-24-9
- EC number: 221-904-3

Details of the supplier of the safety data sheet
- Manufacturer/Supplier: Strem Chemicals, Inc.
  7 Mulliken Way
  NEWBURYPORT, MA 01950
  USA
  info@strem.com
- Information department: Technical Department
- Emergency telephone number:
  EMERGENCY: CHEMTREC: +1 (800) 424-9300
  During normal opening times: +1 (978) 499-1600

2 Hazard(s) identification

- Classification of the substance or mixture
  - GHS02 Flame
    Flam. Liq. 2 H225 Highly flammable liquid and vapor.
    Water-react. 1 H260 In contact with water releases flammable gases, which may ignite spontaneously.
  - GHS06 Skull and crossbones
    Acute Tox. 3 H301 Toxic if swallowed.
    Acute Tox. 3 H311 Toxic in contact with skin.
  - GHS05 Corrosion
    Skin Corr. 1B H314 Causes severe skin burns and eye damage.
    Eye Dam. 1 H318 Causes serious eye damage.
  - GHS07
    Acute Tox. 4 H332 Harmful if inhaled.

- Label elements
- GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).

(Contd. on page 2)
Hazard pictograms

GHS02  GHS05  GHS06

Signal word Danger

Hazard-determining components of labeling:
none

Hazard statements
H225 Highly flammable liquid and vapor.
H260 In contact with water releases flammable gases, which may ignite spontaneously.
H301+H311 Toxic if swallowed or in contact with skin.
H332 Harmful if inhaled.
H314 Causes severe skin burns and eye damage.

Precautionary statements
P231+P232 Handle under inert gas. Protect from moisture.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P422 Store contents under inert gas.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)

Health = 3
Fire = 3
Reactivity = 2

The substance demonstrates unusual reactivity with water.

HMIS-ratings (scale 0 - 4)

Health = 3
Fire = 3
Reactivity = 2

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS No. Description
3275-24-9 none
# 4 First-aid measures

- **Identification number(s)**
- **EC number:** 221-904-3

## First-aid measures

### General information:
Immediately remove any clothing soiled by the product. Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident. In case of irregular breathing or respiratory arrest provide artificial respiration.

### After inhalation:
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist. In case of unconsciousness place patient stably in side position for transportation.

### After skin contact:
Immediately wash with water and soap and rinse thoroughly.

### After eye contact:
Rinse opened eye for several minutes under running water. Then consult a doctor.

### After swallowing:
Do not induce vomiting; immediately call for medical help. Drink copious amounts of water and provide fresh air. Immediately call a doctor.

### Information for doctor:
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

# 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
  - Sand. Do not use water.
  - CO2, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

# 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  - Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Prevent seepage into sewage system, workpits and cellars.
- **Methods and material for containment and cleaning up:**
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Use neutralizing agent.
  - Dispose contaminated material as waste according to item 13.
  - Ensure adequate ventilation.
  - Do not flush with water or aqueous cleansing agents
- **Reference to other sections**
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
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See Section 13 for disposal information.

7 Handling and storage

· **Handling:**

  · **Precautions for safe handling**
    Ensure good ventilation/exhaustion at the workplace.
    Open and handle receptacle with care.
  
  · **Information about protection against explosions and fires:**
    Keep ignition sources away - Do not smoke.
    Protect against electrostatic charges.

· **Conditions for safe storage, including any incompatibilities**

· **Storage:**

  · **Requirements to be met by storerooms and receptacles:** Store in a cool location.
  
  · **Information about storage in one common storage facility:** Not required.

· **Further information about storage conditions:**

  · **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:** Not required.

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**

  · **Personal protective equipment:**

    · **General protective and hygienic measures:**
      Keep away from foodstuffs, beverages and feed.
      Immediately remove all soiled and contaminated clothing.
      Wash hands before breaks and at the end of work.
      Store protective clothing separately.
      Avoid contact with the eyes.
      Avoid contact with the eyes and skin.

    · **Breathing equipment:**
      In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

    · **Protection of hands:**

      _Protective gloves_

      The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
      Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
      Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**

  The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
9 Physical and chemical properties

- **Information on basic physical and chemical properties**
  - **General Information**
  - **Appearance:**
    - **Form:** Liquid
    - **Color:** Yellow
  - **Odor:** Amine-like
  - **Odor threshold:** Not determined.
  - **pH-value:** Not determined.

- **Change in condition**
  - **Melting point/Melting range:** no data °C
  - **Boiling point/Boiling range:** 50 /0.5mm °C (122 /33mm °F)

- **Flash point:** Not applicable.

- **Flammability (solid, gaseous):** Not determined.

- **Ignition temperature:**
  - **Decomposition temperature:** Not determined.
  - **Auto igniting:** Not determined.

- **Danger of explosion:**
  - **Product is not explosive. However, formation of explosive air/vapor mixtures are possible.**
  - **Explosion limits:**
    - **Lower:** Not determined.
    - **Upper:** Not determined.
  - **Vapor pressure:** no data hPa
  - **Density at 20 °C (68 °F):** 0.96 g/cm³ (8.011 lbs/gal)
  - **Relative density** Not determined.
  - **Vapor density** Not determined.
  - **Evaporation rate** Not determined.

- **Solubility in / Miscibility with Water:** Not miscible or difficult to mix.

- **Partition coefficient (n-octanol/water):** Not determined.

- **Viscosity:**
  - **Dynamic:** Not determined.
  - **Kinematic:** Not determined.
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- Solvent content:
  - Organic solvents: 0.0 %
  - VOC content: 0.0 g/l / 0.00 lb/gl
- Other information No further relevant information available.

10 Stability and reactivity

- Reactivity No further relevant information available.
- Chemical stability
- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
- Possibility of hazardous reactions Contact with water releases flammable gases.
- Conditions to avoid No further relevant information available.
- Incompatible materials: No further relevant information available.
- Hazardous decomposition products: No dangerous decomposition products known.

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
  - Primary irritant effect:
    - on the skin: Caustic effect on skin and mucous membranes.
    - on the eye: Strong caustic effect. Strong irritant with the danger of severe eye injury.
  - Sensitization: No sensitizing effects known.
- Additional toxicological information: Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
- Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    Substance is not listed.
  - NTP (National Toxicology Program)
    Substance is not listed.
  - OSHA-Ca (Occupational Safety & Health Administration)
    Substance is not listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - Persistence and degradability No further relevant information available.
  - Behavior in environmental systems:
  - Bioaccumulative potential No further relevant information available.
  - Mobility in soil No further relevant information available.
  - Additional ecological information:
  - General notes: Must not reach bodies of water or drainage ditch undiluted or unneutralized.
  - Results of PBT and vPvB assessment
  - PBT: Not applicable.

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Reviewed on 07/31/2016

Trade name: Tetrakis(dimethylamino)titanium(IV), 99% TDMAT

- vPvB: Not applicable.
- Other adverse effects No further relevant information available.

13 Disposal considerations

- Waste treatment methods
  - Recommendation:  
    Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- Uncleaned packagings:
  - Recommendation: Disposal must be made according to official regulations.

14 Transport information

- UN-Number  
  DOT, IMDG, IATA  
  UN3399

- UN proper shipping name
  DOT, IATA  
  IMDG  
  Organometallic substance, liquid, water-reactive, flammable
  ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE

- Transport hazard class(es)
  - DOT  
    - Class  
      4.3 Substances which, in contact with water, emit flammable gases
    - Label  
      4.3, 3

  - IMDG
  - Class  
    4.3 Substances which, in contact with water, emit flammable gases
  - Label  
    4.3/3

  - IATA
  - Class  
    4.3 Substances which, in contact with water, emit flammable gases
  - Label  
    4.3 (3)

- Packing group
  - DOT, IMDG, IATA  
    II

- Environmental hazards:
  - Marine pollutant:  
    No
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according to OSHA HCS  

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Reviewed on 07/31/2016  

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- Special precautions for user: Not applicable.  
- EMS Number: F-G,S-N  
- Stowage Category: D  
- Stowage Code: SW2 Clear of living quarters.  
- Handling Code: H1 Keep as dry as reasonably practicable  
- Segregation Code: SG26 In addition: from goods of classes 2.1 and 3 when stowed on deck of a containership a minimum distance of two container spaces athwartship shall be maintained, when stowed on ro-ro ships a distance of 6 m athwartship shall be maintained. SG35 Stow "separated from" acids.  

- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.  

- Transport/Additional information:  
  - DOT:  
    - Quantity limitations: On passenger aircraft/rail: 1 L  
    - On cargo aircraft only: 5 L  
  - IMDG:  
    - Limited quantities (LQ): 500 ml  
    - Excepted quantities (EQ): Code: E2  
    - Maximum net quantity per inner packaging: 30 ml  
    - Maximum net quantity per outer packaging: 500 ml  

- UN "Model Regulation": UN 3399 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE, 4.3 (3), II  

15 Regulatory information  

- Safety, health and environmental regulations/legislation specific for the substance or mixture:  
  - Sara:  
    - Section 355 (extremely hazardous substances): Substance is not listed.  
    - Section 313 (Specific toxic chemical listings): Substance is not listed.  
  - TSCA (Toxic Substances Control Act): Substance is listed.  
  - Proposition 65:  
    - Chemicals known to cause cancer: Substance is not listed.  
    - Chemicals known to cause reproductive toxicity for females: Substance is not listed.  
    - Chemicals known to cause reproductive toxicity for males: Substance is not listed.  
    - Chemicals known to cause developmental toxicity: Substance is not listed.  

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Trade name: Tetrakis(dimethylamino)titanium(IV), 99% TDMAT

- Carcinogenic categories
  - EPA (Environmental Protection Agency)
    Substance is not listed.
  - TLV (Threshold Limit Value established by ACGIH)
    Substance is not listed.
  - NIOSH-Ca (National Institute for Occupational Safety and Health)
    Substance is not listed.

- GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
  - Hazard pictograms
    
    ![GHS02](image)
    ![GHS05](image)
    ![GHS06](image)

- Signal word Danger

- Hazard-determining components of labeling:
  none

- Hazard statements
  H225 Highly flammable liquid and vapor.
  H260 In contact with water releases flammable gases, which may ignite spontaneously.
  H301+H311 Toxic if swallowed or in contact with skin.
  H332 Harmful if inhaled.
  H314 Causes severe skin burns and eye damage.

- Precautionary statements
  P231+P232 Handle under inert gas. Protect from moisture.
  P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  P422 Store contents under inert gas.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

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16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- Department issuing SDS: Technical Department.
- Contact: Technical Director
- Date of preparation / last revision 07/31/2016 /
- 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)
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
Trade name: Tetrakis(dimethylamino)titanium(IV), 99% TDMAT

CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Flam. Liq. 2: Flammable liquids, Hazard Category 2
Water-react. 1: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 1
Acute Tox. 3: Acute toxicity, Hazard Category 3
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1