

## 1 Identification

### Product identifier

**Product name:** Thallium (I) fluoride

**Stock number:** 78111

**CAS Number:**

7789-27-7

**Index number:**

081-002-00-9

**Relevant identified uses of the substance or mixture and uses advised against.**

**Identified use:** SU24 Scientific research and development

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

#### Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

**Information Department:** Health, Safety and Environmental Department

**Emergency telephone number:**

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

## 2 Hazard(s) identification

**Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)**



GHS06 Skull and crossbones

Acute Tox. 2 H300 Fatal if swallowed.

Acute Tox. 2 H330 Fatal if inhaled.



GHS08 Health hazard

STOT RE 2 H373 May cause damage to the blood through prolonged or repeated exposure. Route of exposure: Oral.

**Hazards not otherwise classified** No information known.

### Label elements

**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

### Hazard pictograms



GHS06 GHS08

**Signal word** Danger

### Hazard statements

H300+H330 Fatal if swallowed or if inhaled.

H373 May cause damage to the blood through prolonged or repeated exposure. Route of exposure: Oral.

### Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P284 [In case of inadequate ventilation] wear respiratory protection.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...

P320 Specific treatment is urgent (see on this label).

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

### WHMIS classification

D1A - Very toxic material causing immediate and serious toxic effects



### Classification system

**HMIS ratings (scale 0-4)**

**(Hazardous Materials Identification System)**

HEALTH 3 Health (acute effects) = 3

FIRE 0 Flammability = 0

REACTIVITY 1 Physical Hazard = 1

### Other hazards

### Results of PBT and vPvB assessment

**PBT:** Not applicable.

**vPvB:** Not applicable.

## 3 Composition/information on ingredients

**Chemical characterization:** Substances

**CAS# Description:**

7789-27-7 Thallium (I) fluoride

**Identification number(s):**

**Index number:** 081-002-00-9

## 4 First-aid measures

### Description of first aid measures

### General information

Immediately remove any clothing soiled by the product.

**Product name: Thallium (I) fluoride**

Remove breathing apparatus only after contaminated clothing has been completely removed.  
In case of irregular breathing or respiratory arrest provide artificial respiration.

**After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.  
Seek immediate medical advice.

**After skin contact**

Immediately wash with water and soap and rinse thoroughly.  
Rub in calcium gluconate solution or calcium gluconate gel immediately.  
Seek immediate medical advice.

**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.

**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.

(Contd. of page 1)

**5 Fire-fighting measures**

**Extinguishing media**

**Suitable extinguishing agents** Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

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

If this product is involved in a fire, the following can be released:

Hydrogen fluoride (HF)

Metal oxide fume

**Advice for firefighters**

**Protective equipment:**

Wear self-contained respirator.

Wear fully protective impervious suit.

**6 Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

**Environmental precautions:** Do not allow material to be released to the environment without proper governmental permits.

**Methods and material for containment and cleaning up:**

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

**Prevention of secondary hazards:** No special measures required.

**Reference to other sections**

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

**7 Handling and storage**

**Handling**

**Precautions for safe handling**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Open and handle container with care.

**Information about protection against explosions and fires:** No information known.

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

**Storage**

**Requirements to be met by storerooms and receptacles:** Unsuitable material for container: ceramic, glass

**Information about storage in one common storage facility:** No information known.

**Further information about storage conditions:**

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

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

**8 Exposure controls/personal protection**

**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

**Control parameters**

**Components with limit values that require monitoring at the workplace:**

Fluorides (as F)

mg/m<sup>3</sup>

ACGIH TLV 2.5

Austria MAK 2.5

Belgium TWA 2.5

Finland TWA 2.5

France TWA 2.5

Germany MAK 2.5

Hungary TWA 1; 2-STEL

Netherlands MAC-K 3.5

Norway TWA 0.6

Poland TWA 1; 3-STEL

Sweden NGV 2

Switzerland MAK-W 1.5; 3-KZG-W

United Kingdom TWA 2.5

Russia TWA 2

Denmark TWA 2.5

USA PEL 2.5

Thallium and soluble thallium compounds (as Tl)

mg/m<sup>3</sup>

ACGIH TLV 0.1 (skin)

Austria MAK 0.1

Belgium TWA 0.1 (skin)

Denmark TWA 0.1 (skin)

Finland TWA 0.1 (skin)

France VME 0.1

(Contd. on page 3)  
USA

|                                                                                                                                                                                                                                                                                            |                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Product name: <b>Thallium (I) fluoride</b>                                                                                                                                                                                                                                                 |                                                                              |
| <div>Germany MAK 0.1<br/>Ireland TWA 0.1 (skin)<br/>Korea TLV 0.1 (skin)<br/>Netherlands MAC-TGG 0.1 (skin)<br/>Norway TWA 0.1<br/>Poland TWA 0.1; 0.3-STEL<br/>Switzerland MAK-W 0.1 (skin)<br/>United Kingdom LTEL 0.1 (skin)<br/>USA PEL 0.1 (skin)</div> <div>(Contd. of page 2)</div> |                                                                              |
| <b>7789-27-7 Thallium (I) fluoride (100.0%)</b>                                                                                                                                                                                                                                            |                                                                              |
| PEL (USA)                                                                                                                                                                                                                                                                                  | Long-term value: 0.1 mg/m <sup>3</sup><br>as Tl; Skin                        |
| REL (USA)                                                                                                                                                                                                                                                                                  | Long-term value: 0.1 mg/m <sup>3</sup><br>as Tl; Skin                        |
| TLV (USA)                                                                                                                                                                                                                                                                                  | Long-term value: 0.02* mg/m <sup>3</sup><br>as Tl; *inhalable fraction; Skin |
| <b>Additional information:</b> No data                                                                                                                                                                                                                                                     |                                                                              |
| <b>Exposure controls</b>                                                                                                                                                                                                                                                                   |                                                                              |
| <b>Personal protective equipment</b>                                                                                                                                                                                                                                                       |                                                                              |
| <b>General protective and hygienic measures</b>                                                                                                                                                                                                                                            |                                                                              |
| The usual precautionary measures for handling chemicals should be followed.                                                                                                                                                                                                                |                                                                              |
| Keep away from foodstuffs, beverages and feed.                                                                                                                                                                                                                                             |                                                                              |
| Remove all soiled and contaminated clothing immediately.                                                                                                                                                                                                                                   |                                                                              |
| Wash hands before breaks and at the end of work.                                                                                                                                                                                                                                           |                                                                              |
| Store protective clothing separately.                                                                                                                                                                                                                                                      |                                                                              |
| Maintain an ergonomically appropriate working environment.                                                                                                                                                                                                                                 |                                                                              |
| <b>Breathing equipment:</b> Use self-contained respiratory protective device in emergency situations.                                                                                                                                                                                      |                                                                              |
| <b>Protection of hands:</b>                                                                                                                                                                                                                                                                |                                                                              |
| Impervious gloves                                                                                                                                                                                                                                                                          |                                                                              |
| Check protective gloves prior to each use for their proper condition.                                                                                                                                                                                                                      |                                                                              |
| The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.                                                                                                                                               |                                                                              |
| <b>Eye protection:</b> Safety glasses                                                                                                                                                                                                                                                      |                                                                              |
| <b>Body protection:</b> Protective work clothing.                                                                                                                                                                                                                                          |                                                                              |
| <b>9 Physical and chemical properties</b>                                                                                                                                                                                                                                                  |                                                                              |
| <b>Information on basic physical and chemical properties</b>                                                                                                                                                                                                                               |                                                                              |
| <b>General Information</b>                                                                                                                                                                                                                                                                 |                                                                              |
| <b>Appearance:</b>                                                                                                                                                                                                                                                                         |                                                                              |
| Form:                                                                                                                                                                                                                                                                                      | Crystalline                                                                  |
| Color:                                                                                                                                                                                                                                                                                     | White                                                                        |
| Odor:                                                                                                                                                                                                                                                                                      | Not determined                                                               |
| Odor threshold:                                                                                                                                                                                                                                                                            | Not determined.                                                              |
| pH-value:                                                                                                                                                                                                                                                                                  | Not applicable.                                                              |
| <b>Change in condition</b>                                                                                                                                                                                                                                                                 |                                                                              |
| Melting point/Melting range:                                                                                                                                                                                                                                                               | 322 °C (612 °F)                                                              |
| Boiling point/Boiling range:                                                                                                                                                                                                                                                               | 655 °C (1211 °F)                                                             |
| Sublimation temperature / start:                                                                                                                                                                                                                                                           | Not determined                                                               |
| Flash point:                                                                                                                                                                                                                                                                               | Not applicable                                                               |
| Flammability (solid, gaseous)                                                                                                                                                                                                                                                              | Not determined.                                                              |
| Ignition temperature:                                                                                                                                                                                                                                                                      | Not determined                                                               |
| Decomposition temperature:                                                                                                                                                                                                                                                                 | Not determined                                                               |
| Auto igniting:                                                                                                                                                                                                                                                                             | Not determined.                                                              |
| Danger of explosion:                                                                                                                                                                                                                                                                       | Product does not present an explosion hazard.                                |
| <b>Explosion limits:</b>                                                                                                                                                                                                                                                                   |                                                                              |
| Lower:                                                                                                                                                                                                                                                                                     | Not determined                                                               |
| Upper:                                                                                                                                                                                                                                                                                     | Not determined                                                               |
| Vapor pressure:                                                                                                                                                                                                                                                                            | Not applicable.                                                              |
| Density at 20 °C (68 °F):                                                                                                                                                                                                                                                                  | 8.23 g/cm <sup>3</sup> (68.679 lbs/gal)                                      |
| Relative density                                                                                                                                                                                                                                                                           | Not determined.                                                              |
| Vapor density                                                                                                                                                                                                                                                                              | Not applicable.                                                              |
| Evaporation rate                                                                                                                                                                                                                                                                           | Not applicable.                                                              |
| <b>Solubility in / Miscibility with</b>                                                                                                                                                                                                                                                    |                                                                              |
| Water:                                                                                                                                                                                                                                                                                     | Soluble                                                                      |
| Partition coefficient (n-octanol/water):                                                                                                                                                                                                                                                   | Not determined.                                                              |
| <b>Viscosity:</b>                                                                                                                                                                                                                                                                          |                                                                              |
| dynamic:                                                                                                                                                                                                                                                                                   | Not applicable.                                                              |
| kinematic:                                                                                                                                                                                                                                                                                 | Not applicable.                                                              |
| Other information                                                                                                                                                                                                                                                                          | No further relevant information available.                                   |
| <b>10 Stability and reactivity</b>                                                                                                                                                                                                                                                         |                                                                              |
| <b>Reactivity</b> No information known.                                                                                                                                                                                                                                                    |                                                                              |
| <b>Chemical stability</b> Stable under recommended storage conditions.                                                                                                                                                                                                                     |                                                                              |
| <b>Thermal decomposition / conditions to be avoided:</b> Decomposition will not occur if used and stored according to specifications.                                                                                                                                                      |                                                                              |
| <b>Possibility of hazardous reactions</b> No dangerous reactions known                                                                                                                                                                                                                     |                                                                              |
| <b>Conditions to avoid</b> No further relevant information available.                                                                                                                                                                                                                      |                                                                              |
| <b>Incompatible materials:</b>                                                                                                                                                                                                                                                             |                                                                              |
| Oxidizing agents                                                                                                                                                                                                                                                                           |                                                                              |
| No information known.                                                                                                                                                                                                                                                                      |                                                                              |
| <b>Hazardous decomposition products:</b>                                                                                                                                                                                                                                                   |                                                                              |
| Hydrogen fluoride                                                                                                                                                                                                                                                                          |                                                                              |
| Metal oxide fume                                                                                                                                                                                                                                                                           |                                                                              |
| <b>11 Toxicological information</b>                                                                                                                                                                                                                                                        |                                                                              |
| <b>Information on toxicological effects</b>                                                                                                                                                                                                                                                |                                                                              |
| <b>Acute toxicity:</b>                                                                                                                                                                                                                                                                     |                                                                              |
| Fatal if inhaled.                                                                                                                                                                                                                                                                          |                                                                              |
| Fatal if swallowed.                                                                                                                                                                                                                                                                        |                                                                              |
| (Contd. on page 4)                                                                                                                                                                                                                                                                         |                                                                              |

Product name: **Thallium (I) fluoride**

The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance. (Contd. of page 3)

**LD/LC50 values that are relevant for classification:** No data

**Skin irritation or corrosion:** Irritant to skin and mucous membranes.

**Eye irritation or corrosion:** Irritating effect.

**Sensitization:** No sensitizing effects known.

**Germ cell mutagenicity:** No effects known.

**Carcinogenicity:**  
IARC-3: Not classifiable as to carcinogenicity to humans.  
ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

**Reproductive toxicity:** No effects known.

**Specific target organ system toxicity - repeated exposure:** May cause damage to the blood through prolonged or repeated exposure. Route of exposure: Oral.

**Specific target organ system toxicity - single exposure:** No effects known.

**Aspiration hazard:** No effects known.

**Subacute to chronic toxicity:**  
The main symptoms of thallium poisoning are peripheral neuropathy and loss of hair. Acute poisoning causes paresthesias, ataxia, alopecia, fever, coryza, abdominal pain, nausea and vomiting. Symptoms may progress to lethargy, speech disorders, tremors, convulsions, cyanosis, pulmonary edema, bronchopneumonia and death. Kidney, liver and brain damage can occur. Thallium poisoning during the first trimester of pregnancy can cause skeletal deformities, alopecia, low birth weight and premature birth. Chronic thallium poisoning may produce alopecia, salivation and a blue line on the gums. Damage to the gastrointestinal, endocrine system and kidneys may also occur.  
Fluorides may cause salivation, nausea, vomiting, diarrhea and abdominal pain, followed by weakness, tremors, shallow respiration, convulsions and coma. May cause brain and kidney damage. Chronic fluoride poisoning can cause severe bone changes, loss of weight, anorexia, anemia and dental defects.

**Subacute to chronic toxicity:** No effects known.

**Additional toxicological information:** To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

**Toxicity**  
**Aquatic toxicity:** No further relevant information available.  
**Persistence and degradability** No further relevant information available.  
**Bioaccumulative potential** No further relevant information available.  
**Mobility in soil** No further relevant information available.

**Ecotoxicological effects:**  
**Remark:** Toxic for aquatic organisms

**Additional ecological information:**  
**General notes:**  
Do not allow material to be released to the environment without proper governmental permits.  
Toxic for aquatic organisms  
Do not allow product to reach ground water, water course or sewage system, even in small quantities.  
Danger to drinking water if even extremely small quantities leak into the ground.  
Also poisonous for fish and plankton in water bodies.  
Toxic to aquatic life.  
May cause long lasting harmful effects to aquatic life.  
Avoid transfer into the environment.

**Results of PBT and vPvB assessment**  
**PBT:** Not applicable.  
**vPvB:** Not applicable.  
**Other adverse effects** No further relevant information available.

13 Disposal considerations

**Waste treatment methods**  
**Recommendation** Consult state, local or national regulations to ensure proper disposal.  
**Uncleaned packagings:**  
**Recommendation:** Disposal must be made according to official regulations.  
**Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

|                                                                                                                                                                         |                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>UN-Number</b><br><b>DOT, IMDG, IATA</b>                                                                                                                              | UN1707                                                                                                  |
| <b>UN proper shipping name</b><br><b>DOT</b><br><b>IMDG, IATA</b>                                                                                                       | Thallium compounds, n.o.s. (Thallium (I) fluoride)<br>THALLIUM COMPOUND, N.O.S. (Thallium (I) fluoride) |
| <b>Transport hazard class(es)</b><br><b>DOT</b><br>                                   |                                                                                                         |
| <b>Class</b><br><b>Label</b><br><b>Class</b><br><b>Label</b><br><b>IMDG, IATA</b><br> | 6.1 Toxic substances.<br>6.1<br>6.1 (T5) Toxic substances<br>6.1                                        |
| <b>Class</b><br><b>Label</b>                                                                                                                                            | 6.1 Toxic substances.<br>6.1                                                                            |
| <b>Packing group</b><br><b>DOT, IMDG, IATA</b>                                                                                                                          | II                                                                                                      |
| <b>Environmental hazards:</b>                                                                                                                                           | Environmentally hazardous substance, solid                                                              |
| <b>Special precautions for user</b>                                                                                                                                     | Warning: Toxic substances                                                                               |
| <b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b>                                                                                          | Not applicable.                                                                                         |
| <b>Transport/Additional information:</b><br><b>DOT</b><br><b>Marine Pollutant (DOT):</b>                                                                                | No                                                                                                      |

|                                            |                                                                     |
|--------------------------------------------|---------------------------------------------------------------------|
| Product name: <b>Thallium (I) fluoride</b> |                                                                     |
| (Contd. of page 4)                         |                                                                     |
| UN "Model Regulation":                     | UN1707, Thallium compounds, n.o.s. (Thallium (I) fluoride), 6.1, II |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>15 Regulatory information</b><br><b>Safety, health and environmental regulations/legislation specific for the substance or mixture</b><br><b>GHS label elements</b> The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)<br><b>Hazard pictograms</b><br> <br>GHS06 GHS08<br><b>Signal word</b> Danger<br><b>Hazard statements</b><br>H300+H330 Fatal if swallowed or if inhaled.<br>H373 May cause damage to the blood through prolonged or repeated exposure. Route of exposure: Oral.<br><b>Precautionary statements</b><br>P260 Do not breathe dust/fume/gas/mist/vapours/spray.<br>P284 [In case of inadequate ventilation] wear respiratory protection.<br>P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...<br>P320 Specific treatment is urgent (see on this label).<br>P405 Store locked up.<br>P501 Dispose of contents/container in accordance with local/regional/national/international regulations.<br><b>National regulations</b><br>All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.<br><b>SARA Section 313 (specific toxic chemical listings)</b><br>7789-27-7 Thallium (I) fluoride<br><b>California Proposition 65</b><br><b>Prop 65 - Chemicals known to cause cancer</b> Substance is not listed.<br><b>Prop 65 - Developmental toxicity</b> Substance is not listed.<br><b>Prop 65 - Developmental toxicity, female</b> Substance is not listed.<br><b>Prop 65 - Developmental toxicity, male</b> Substance is not listed.<br><b>Information about limitation of use:</b><br>For use only by technically qualified individuals.<br>This product contains thallium and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.<br><b>Other regulations, limitations and prohibitive regulations</b><br><b>Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.</b> Substance is not listed.<br><b>The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.</b><br>Substance is not listed.<br><b>Annex XIV of the REACH Regulations (requiring Authorisation for use)</b> Substance is not listed.<br><b>Chemical safety assessment:</b> A Chemical Safety Assessment has not been carried out. |  |
| <b>16 Other information</b><br>Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.<br><b>Department issuing SDS:</b> Global Marketing Department<br><b>Date of preparation / last revision</b> 11/24/2015 / -<br><b>Abbreviations and acronyms:</b><br>ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)<br>IMDG: International Maritime Code for Dangerous Goods<br>DOT: US Department of Transportation<br>IATA: International Air Transport Association<br>CAS: Chemical Abstracts Service (division of the American Chemical Society)<br>HMIS: Hazardous Materials Identification System (USA)<br>WHMIS: Workplace Hazardous Materials Information System (Canada)<br>LC50: Lethal concentration, 50 percent<br>LD50: Lethal dose, 50 percent<br>vPvB: very Persistent and very Bioaccumulative<br>ACGIH: American Conference of Governmental Industrial Hygienists (USA)<br>OSHA: Occupational Safety and Health Administration (USA)<br>NTP: National Toxicology Program (USA)<br>IARC: International Agency for Research on Cancer<br>EPA: Environmental Protection Agency (USA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |