1 Identification

- **Product name**
  - **Trade name:** Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)

- **Item number:** 77-0030

- **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**
  - ! [GHS07]
  - Skin Irrit. 2 H315 Causes skin irritation.
  - Eye Irrit. 2A H319 Causes serious eye irritation.

- **Label elements**
  - **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
  - **Hazard pictograms**
    - ! [GHS07]

- **Signal word** Warning

- **Hazard statements**
  - H315 Causes skin irritation.
  - H319 Causes serious eye irritation.

- **Precautionary statements**
  - **P262** Do not get in eyes, on skin, or on clothing.
  - **P280** Wear protective gloves/protective clothing/eye protection/face protection.
  - **P305+P351+P338** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - **P321** Specific treatment (see on this label).
  - **P403+P233** Store in a well-ventilated place. Keep container tightly closed.
  - **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 2)
Trade name: Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)

- Classification system:
  - NFPA ratings (scale 0 - 4)
    
    Health = 2
    Fire = 0
    Reactivity = 0

- HMIS-ratings (scale 0 - 4)
  
  HEALTH
  
  Health = 1
  
  FIRE
  
  Fire = 0
  
  REACTIVITY
  
  Reactivity = 0

- Other hazards
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.

3 Composition/Information on ingredients

- Chemical characterization: Mixtures
- Description: Mixture of the substances listed below with nonhazardous additions.

- Dangerous components:

<table>
<thead>
<tr>
<th>Substances</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin(IV) oxide, nanoparticles (30-60 nm), min. 99.7%</td>
<td>89.0%</td>
</tr>
<tr>
<td>1314-60-9 diantimony pentoxide</td>
<td>11.0%</td>
</tr>
</tbody>
</table>

4 First-aid measures

- Description of first aid measures
  - General information: Immediately remove any clothing soiled by the product.
  - After inhalation: 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. If symptoms persist, consult a doctor.
  - After swallowing: If symptoms persist consult 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:
    - CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
  - Special hazards arising from the substance or mixture No further relevant information available.
  - Advice for firefighters
  - Protective equipment: No special measures required.
6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**: Not required.
- **Environmental precautions**: Do not allow to enter sewers/surface or ground water.
- **Methods and material for containment and cleaning up**: Dispose contaminated material as waste according to item 13.
- **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**: No special precautions are necessary if used correctly.
- **Information about protection against explosions and fires**: No special measures required.
- **Conditions for safe storage, including any incompatibilities**: No special requirements.
- **Storage**: Not required.
- **Further information about storage conditions**: Keep receptacle tightly sealed.
- **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**: No further relevant information available.

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

<table>
<thead>
<tr>
<th>Component</th>
<th>REL Long-term value</th>
<th>REL as Sn</th>
<th>TLV Long-term value</th>
<th>TLV as Sn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin(IV) oxide, nanoparticles (30-60 nm), min. 99.7%</td>
<td>2 mg/m³</td>
<td>2 mg/m³</td>
<td>2 mg/m³</td>
<td>2 mg/m³</td>
</tr>
<tr>
<td>1314-60-9 diantimony pentoxide</td>
<td>0.5 mg/m³</td>
<td>0.5 mg/m³</td>
<td>0.5 mg/m³</td>
<td>0.5 mg/m³</td>
</tr>
</tbody>
</table>

- **Additional information**: The lists that were valid during the creation were used as basis.
· Breathing equipment: Not required.
· 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. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

· Penetration time of glove material
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· Eye protection:

Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties
· General Information

· Appearance:
  Form: Powder
  Color: Black
  Odor: Characteristic
  Odor threshold: Not determined.

· pH-value: Not applicable.

· Change in condition
  Melting point/Melting range: Undetermined.
  Boiling point/Boiling range: Undetermined.

· Flash point: Not applicable.

· Flammability (solid, gaseous): Not determined.

· Ignition temperature:
  Decomposition temperature: Not determined.

· Auto igniting: Product is not selfigniting.

· Danger of explosion: Product does not present an explosion hazard.

· Explosion limits:
  Lower: Not determined.
  Upper: Not determined.

· Vapor pressure: Not applicable.
Trade name: Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)

- **Density at 20 °C (68 °F):** 7 g/cm³ (58.415 lbs/gal)
- **Relative density:** Not determined.
- **Vapor density:** Not applicable.
- **Evaporation rate:** Not applicable.

- **Solubility in / Miscibility with Water:** Insoluble.
- **Partition coefficient (n-octanol/water):** Not determined.

- **Viscosity:**
  - Dynamic: Not applicable.
  - Kinematic: Not applicable.

- **Solvent content:**
  - Organic solvents: 0.0 %
  - VOC content: 0.0 g/l / 0.00 lb/gl

- **Solids content:** 100.0 %
- **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**
  - No dangerous reactions known.
- **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:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:**
  - No sensitizing effects known.
- **Additional toxicological information:**
  - The product shows the following dangers according to internally approved calculation methods for preparations:
    - Irritant

- **Carcinogenic categories**
- **IARC (International Agency for Research on Cancer)**
  - None of the ingredients is listed.
- **NTP (National Toxicology Program)**
  - None of the ingredients is listed.
- **OSHA-Ca (Occupational Safety & Health Administration)**
  - None of the ingredients is 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:
    Water hazard class 1 (Self-assessment): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  - 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:
  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: UN1549
- UN proper shipping name
  DOT, IATA: Antimony compounds, inorganic, solid, n.o.s.
  IMDG: ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.
- Transport hazard class(es)
  - DOT
    - Class: 6.1 Toxic substances
    - Label: 6.1
  - IMDG, IATA
    - Class: 6.1 Toxic substances
    - Label: 6.1

(Contd. on page 7)
Trade name: Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)

- Packing group
  - DOT, IMDG, IATA
    III
- Environmental hazards:
  Not applicable.
- Special precautions for user
  Warning: Toxic substances
- EMS Number:
  F-A,S-A
- Stowage Category
  A
- 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: 100 kg
      On cargo aircraft only: 200 kg
- IMDG
  - Limited quantities (LQ)
    5 kg
  - Excepted quantities (EQ)
    Code: E1
    Maximum net quantity per inner packaging: 30 g
    Maximum net quantity per outer packaging: 1000 g
- UN "Model Regulation":
  UN 1549 ANTIMONY COMPOUNDS, INORGANIC, SOLID, N.O.S., 6.1, III

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  - Sara
    - Section 355 (extremely hazardous substances):
      None of the ingredients is listed.
    - Section 313 (Specific toxic chemical listings):
      1314-60-9 diantimony pentoxide
  - TSCA (Toxic Substances Control Act):
    All ingredients are listed.
  - Proposition 65
    - Chemicals known to cause cancer:
      None of the ingredients is listed.
    - Chemicals known to cause reproductive toxicity for females:
      None of the ingredients is listed.
    - Chemicals known to cause reproductive toxicity for males:
      None of the ingredients is listed.
    - Chemicals known to cause developmental toxicity:
      None of the ingredients is listed.

- Carcinogenic categories
  - EPA (Environmental Protection Agency)
    None of the ingredients is listed.
Trade name: Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)

- **TLV (Threshold Limit Value established by ACGIH)**
  
  None of the ingredients is listed.

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**
  
  None of the ingredients is listed.

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

  - **Hazard pictograms**

  GHS07

- **Signal word** Warning

- **Hazard statements**
  
  H315 Causes skin irritation.
  
  H319 Causes serious eye irritation.

- **Precautionary statements**

  P262 Do not get in eyes, on skin, or on clothing.
  
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  
  P321 Specific treatment (see on this label).
  
  P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **National regulations:**

- **Water hazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.

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

### 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** 07/30/2016 / -

- **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
  
  ELINCS: European List of Notified Chemical Substances
  
  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
Trade name: Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)

REL: Recommended Exposure Limit
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A