



**INDIUM CORPORATION OF AMERICA®/ EUROPE®/ ASIA PACIFIC®**  
**INDIUM CORPORATION (SUZHOU)®**

To better serve all of our customers Indium Corporation has generated one MSDS, for this product, to be used within the United States as well as internationally. Some of the regulatory information contained within may not be applicable to the customer's individual state or country. Unless otherwise stated the health and safety information provided within is applicable to all.

## MATERIAL SAFETY DATA SHEET

### 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Identifier:** INDIUM TIN OXIDE (ITO)

**MSDS Number:** MSDS-IB011

**Revised Date:** 08 OCTOBER 2008

**Product :** Indium Tin Oxide,  $\text{In}_2\text{O}_3 - \text{SnO}_2$  (tin doped indium oxide)

#### MANUFACTURER:

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**2. COMPOSITION / INFORMATION ON INGREDIENTS**

| Components        | % wt | CAS Registry # | PEL<br>mg/m <sup>3</sup> | TLV-TWA<br>mg/m <sup>3</sup> | TLV-STEL<br>mg/m <sup>3</sup> |
|-------------------|------|----------------|--------------------------|------------------------------|-------------------------------|
| *INDIUM TIN OXIDE | 100  |                |                          |                              |                               |
| INDIUM OXIDE      |      | 1312-43-2(US)  | 0.1 (as Indium**)        | 0.1                          | N.E.                          |
|                   |      | (EU)           | -                        | 0.1 (as Indium)              | 0.3                           |
|                   |      | (Canada)       | -                        | 0.1 (as Indium)              | 0.3                           |
|                   |      | (Singapore)    | 0.1(as indium)           | -                            | -                             |
|                   |      | (Mexico)       | -                        | 0.1(as indium)               | 0.3                           |
|                   |      | (China)        | -                        | 0.1(as indium)               | 0.3                           |
| TIN OXIDE         |      | 18282-10-5(US) | 2(as tin)                | 2(as tin)                    | -                             |
|                   |      | (EU)           | -                        | 2(as tin)                    | 4                             |
|                   |      | (Canada)       | -                        | 2(as tin)                    | 4                             |
|                   |      | (Singapore)    | 2(as tin)                | -                            | -                             |

\*(Mix of Indium Oxide CAS# 1312-43-2 and Tin Oxide CAS# 18282-10-5)  
 N.E. = Not established    SYMBOL: X<sub>n</sub>    RISK PHRASES: R20/21/22, R36/37/38  
 \*\* Indium CAS# 7440-74-6

**3. HAZARDS IDENTIFICATION**

**PRIMARY ROUTES OF ENTRY:**

√ Eye    √ Inhalation    √ Skin    √ Ingestion

NTP

**CARCINOGEN LISTED IN:**

IARC    OSHA    √ Not Listed

**POTENTIAL HEALTH EFFECTS:**

- Eye Contact:** May cause severe irritation and possible burns.
- Ingestion:** Harmful if swallowed. May cause burns to the gastrointestinal tract. Kidney and liver damage from injected indium compounds has been reported based on limited animal testing.
- Inhalation:** May cause respiratory irritation. Severe exposure could cause pulmonary damage. Mild benign pneumoconiosis may result from chronic long term exposure to tin dust and fumes.
- Skin Contact:** May cause skin irritation or burns.
- Chronic:** Kidney and liver damage from injecting indium compounds has been reported based on limited animal testing but no systematic effects from human exposure has been reported.
- Note:** **The Indium Corporation does not recommend, manufacture, market or endorse any of its products for human consumption.**
- Warning:** **This product contains a chemical known to the State of California to cause cancer and/or birth defects ( or other reproductive harm). (Trace levels of listed metals (lead)).**

#### 4. FIRST AID MEASURES

- Eye Contact:** Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Seek medical attention if irritation persists.
- Ingestion:** If patient is conscious, ONLY induce vomiting as directed by trained personnel. NEVER give anything by mouth to an unconscious person. Seek medical attention immediately.
- Inhalation:** Remove to fresh air. If not breathing, give artificial respiration or oxygen by trained personnel. Seek immediate medical attention. Inhalation of particulate may require medical review.
- Skin Contact:** Remove contaminated clothing. Wash affected area with soap and water. Wash clothing before reuse. If irritation persists, obtain medical attention.

#### 5. FIRE FIGHTING MEASURES

- Flash Point:** Not established. **Method:** Not established.
- Auto-ignition Temperature:** Not established.
- Flammable Limits:** Limits not established. Not flammable. Will not burn.
- Extinguishing Media:** Use extinguishers appropriate for the surrounding fire conditions.
- Special Fire Fighting Procedures:** Firefighters must wear NIOSH approved or equivalent self-contained breathing apparatus and full protective clothing.

#### 6. ACCIDENTAL RELEASE MEASURES

- Spill or Leak Procedures:** Isolate spill and clean up with vacuum. Avoid conditions, which create fumes or fine dust. DO NOT SWEEP SOLIDS. Do not raise dust levels. Place material in proper waste container. An approved air purifying respirator with particulate cartridge and other personal protective equipment such as gloves is recommended. Dispose of in accordance with Federal, State and Local regulations. In Europe dispose of following the Special Waste Regulations. Indium metal has reclaim value.

#### 7. HANDLING AND STORAGE

- Handling:** Keep containers tightly closed when not in use. Use care to avoid spills. Wear appropriate personal protective equipment including recommended respiratory protection. Always thoroughly wash your hands after handling this product. DO NOT touch or rub eyes until hands are washed.
- Storage Precautions:** Store product in tightly capped original containers in a cool, well ventilated and dry area.

#### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- Engineering Controls:** Local and/or Mechanical (general) exhaust ventilation or point source exhaust is recommended to control any airborne contaminants and to reduce potential exposure. Avoid inhalation of particulate/dust/spray.
- Personal protection:**
- Eyes:** Wear chemical safety glasses/goggles.
- Respirator:** An approved air-purifying respirator (half or full face) with a HEPA rated particulate filter or HEPA quality dust mask is recommended under certain circumstances where airborne concentrations are expected to be elevated. Avoid breathing dust. Keep exposures to as low as possible. Grinding applications require a full-face respirator

for adequate protection. Dust mask is not recommended in high exposure applications or when measurements or concentration levels are unknown. Additional respiratory protection may be required depending on the use or application of indium tin oxide.

- Skin:** Gloves are recommended when handling solids. Avoid skin contact with powders.
- Other:** Lab coat, apron, eyewash fountain in work area. Avoid the use of contact lenses in high fume or dusty areas.
- Work/Hygienic** Maintain good housekeeping. Clean up spills immediately. Good personal hygiene is essential. Avoid eating, smoking or drinking in the work area. Wash hands thoroughly with soap and water immediately upon leaving the work area.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                          |                           |                             |                               |
|--------------------------|---------------------------|-----------------------------|-------------------------------|
| <b>Appearance:</b>       | Yellow-green powder       | <b>Boiling Point:</b>       | Sublimes @982 C (1800 F)      |
| <b>Odor:</b>             | Odorless                  | <b>Melting Point:</b>       | 1910 C + 10 C (3470 F + 50 F) |
| <b>Specific Gravity:</b> | 7.16 (H <sub>2</sub> O=1) | <b>pH:</b>                  | Not applicable                |
| <b>Vapor Pressure:</b>   | Not applicable            | <b>Solubility in Water:</b> | Insoluble                     |
| <b>Vapor Density:</b>    | Not applicable            | <b>MW:</b>                  | 264.94                        |

## 10. STABILITY AND REACTIVITY

|  |  |
|--|--|
| <b>General:</b>                              | Stable.  |
| <b>Conditions to Avoid:</b>                  | Not established.                               |
| <b>Incompatible Materials:</b>               | Not established                                |
| <b>Hazardous Decomposition / Combustion:</b> | Toxic fumes may form at elevated temperatures. |
| <b>Hazardous Polymerization:</b>             | Will not occur.                                |

## 11. TOXICOLOGICAL INFORMATION

|                                  |   |                              |                  |
|----------------------------------|---|------------------------------|------------------|
| <b>Carcinogenicity:</b>          | <b>National Toxicology Program (NTP):</b>                       | No                           |                  |
|                                  | <b>Occupational Safety &amp; Health Administration (OSHA):</b>  | No                           |                  |
|                                  | <b>U.N. International Agency for Research on Cancer (IARC):</b> | No                           |                  |
| <b>LD50:</b>                     | Not established.  | <b>LC50:</b>                 | Not established. |
| <b>Irritancy of Product:</b>     | May be an irritant  | <b>Mutagenicity:</b>         | Not established  |
| <b>Sensitization to Product:</b> | Not established   | <b>Teratogenicity:</b>       | Not established  |
| <b>Reproductive Toxicity:</b>    | Not established   | <b>Synergistic Products:</b> | Not established  |

Journal of Occupational Health – Japan indicated that inhalation of ITO in some form and use, such as grinding and spraying may result in pulmonary toxicity. Information is limited and no further information is available. The Indium Corporation has no information or testing data to provide regarding exposures to ITO.

## 12. ECOLOGICAL INFORMATION

This section is subject to future development.

**Biodegradability:** Data not established.

Aquatic Toxicity: Data not established.

WGK Germany – Water Hazard Class -3

### 13. DISPOSAL CONSIDERATION

**Waste Disposal Method:** Scrap indium metal has reclaim value. Contact a commercial reclaimer for recycling. Otherwise, dispose of in accordance with all Federal, State and Local environmental regulations. In Europe follow the Special Waste Regulations.

### 14. TRANSPORT INFORMATION

Transport in accordance with applicable regulations and requirements.

Not regulated under the US Department of Transportation.

Not regulated under IATA Dangerous Goods air transport guidelines.

Classified as non hazardous material for shipping under all modes of transport.

North America Emergency Guide Book – Not applicable

### 15. REGULATORY INFORMATION

The information in this Material Safety Data Sheet meets the requirements of the United States Occupational Safety and Health Act and regulations promulgated hereunder (29 CFR 1910.1200 ET. SEQ.).

The information in this Material Safety Data Sheet meets the requirements of the EU under Chemicals (Hazard Information and Packaging for Supply) Regulations 1994 (CHIP 2) Regulation 6.

This product has been classified in accordance with the hazard criteria of the Commission Directive 91/155/EEC and EH40.

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation (CPR).



WHMIS: Class D2B

Materials Causing Other Toxic Effects (irritant)

This product has been classified in accordance with the guidelines set by the Dept of Industrial Health of the Republic of Singapore.

This product has been classified using the Chinese Occupational Exposure Limit of Hazardous Agents in the Workplace, GBZ2-2002.

This product has been classified in accordance with Mexican regulations NOM-018-STPS-2000 and NOM-010-STPS-1999.

This product complies with EU Directive 2002/95/EC, Restriction of Hazardous Substances (RoHS).

**State of California:**

California Prop 65: Warning: This product contains a chemical known to the State of California to cause cancer and/or birth defects (or other reproductive harm). (Trace levels of other listed metals (lead)).

SARA 313 listing - 40 CFR 372.65: None

All ingredients are listed on the EPA TSCA Inventory and Canadian Domestic Substance List.

**EC Classification, Packaging and Labeling Requirements:**

Symbol and Hazard Classification of Product X<sub>n</sub>

**Risk Phrases:**

R20/21/22 Harmful by inhalation, in contact with skin and if swallowed

R36/37/38 Irritating to eyes, respiratory system and skin

**Safety Phrases:**

S20/21 When using do not eat, drink or smoke

S24/25 Avoid contact with skin and eyes

S36/37/39 Wear suitable protective clothing, gloves and eye/face protection

**16. OTHER INFORMATION**

|                            |                    |          |
|----------------------------|--------------------|----------|
| <b>HMIS Hazard Rating:</b> | <b>Health:</b>     | 2        |
|                            | <b>Fire:</b>       | 1 (dust) |
|                            | <b>Reactivity:</b> | 0        |

**Revised Date:** 08 OCTOBER 2008

**Prepared by:** Nancy Swarts, Indium Corporation of America

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