



THE INDIUM CORPORATION OF AMERICA®\EUROPE®\ASIA-PACIFIC®
INDIUM CORPORATION (SUZHOU)®

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier: INDIUM TIN OXIDE (also referred to as ITO)

SDS Number: SDS- IB011

Revised Date: 5 JANUARY 2014

Product Use: Industrial Use (Mixture) – Indium Tin Oxide, In_2O_3 - SnO_2 (tin doped indium oxide) Potential uses include: thin film coating.

FOR CHEMICAL EMERGENCY ONLY PHONE *:

CHEMTREC 24 hrs.

USA: 1 (800) 424-9300

Outside USA: +1 (703) 527-3887

*** Used only for spill/leak/fire/exposure/accident**

ALL OTHER INQUIRIES: TOLL FREE: +1-800-448-9240 Indium Corporation

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2. HAZARDS IDENTIFICATION**PRIMARY ROUTES OF ENTRY:**

Eye Inhalation Skin Ingestion NTP IARC OSHA Not Listed

Carcinogen listed in**Classification:**

Risk Phrases: R36/37/38



Signal Word: Warning

Hazard statement(s)

H315 Causes skin irritation
 H319 Causes serious eye irritation
 H333 May be harmful if inhaled

Precautionary statement(s)

P233 Keep container tightly closed
 P261 Avoid breathing dust/fume/gas/mist/vapours/spray
 P270 Do not eat, drink or smoke when using this product
 P273 Avoid release to the environment
 P280 Wear protective gloves/protective clothing/eye protection/face protection
 P362 Take off contaminated clothing and wash before reuse
 P301 + P314 IF SWALLOWED: Get Medical advice/attention if you feel unwell
 P302 + P352 IF ON SKIN: Wash with plenty of soap and water
 P304 + 341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
 P305 + 351 IF IN EYES: Rinse continuously with water for several minutes (15 mins)

 Skin irritation (Category 2)

Eye irritation (Category 2A)

Specific target organ toxicity – single exposure (Category 3)

OTHER HAZARDS:**POTENTIAL HEALTH EFFECTS:**

- Eye Contact:** May cause irritation to severe irritation.
- Ingestion:** May be harmful if swallowed. Kidney and liver damage from injected indium compounds has been reported based on limited animal testing
- Inhalation:** May cause respiratory irritation. May be harmful if inhaled.
- Skin Contact:** Causes skin irritation. May be harmful if absorbed through the skin.
- 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.
Target organs: lungs.

3. COMPOSITION / INFORMATION ON INGREDIENTS**3.2 Mixture:**

Components	% wt	CAS Registry #/ EINECS#
<u>INDIUM TIN OXIDE</u>	100	50926-11-9 (NOTE: this is a generic CAS RN)
INDIUM OXIDE		1312-43-2/215-193-9
TIN OXIDE		18282-10-5/242-159-0

THIS PRODUCT DOES NOT CONTAIN ANY EU REPORTABLE SUBSTANCES OF VERY HIGH CONCERN (SVHC).

<http://www.indium.com>

4. FIRST AID MEASURES**Description of 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.
- Skin Contact:** Remove contaminated clothing. Wash affected area with soap and water. Wash clothing before reuse. If irritation persists, obtain medical attention.

Most important symptoms and effect, both acute and delayed:

Skin contact may cause irritation.

Eye exposure may cause serious irritation.

Indication of any immediate medical attention and special treatment needed:

No specific special treatment information is available on this mixture. Review data provided in this document to understand the hazards when working with the product. No other information is available at this time.

Seek medical attention if eye irritation continues after flushing .

If respiratory discomfort is evident seek immediate medical advice.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Use extinguishers appropriate for the surrounding fire conditions. Water, CO2, foam media.

Special hazards arising from the substance or mixture:

May produce toxic tin and indium fumes if burning .

Advice for Firefighters

Fire-fighters must wear approved self-contained breathing apparatus and full protective clothing.

Material product is not flammable. However, dust in the air could generate a hazard. No other information is available.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel:

Keep away from the spill. Remove sources of ignition. Keep exhaust ventilation system running. In the event of a fire evacuate area.

For emergency responders:

Wear safety glasses, gloves when cleaning up any spill. Other equipment may be necessary based on the immediate area and other chemicals unrelated to the product that may be in use. Adequate ventilation should be available. Keep unnecessary personnel away from area during clean up. If on floor wear foot protection to avoid any direct contamination to shoes and boots. Avoid conditions that create fumes or fine dust. DO NOT SWEEP DRY SOLIDS. Do not raise dust levels. Use an approved respirator with particulate cartridge. Dust type masks are not recommended.

Environmental Precautions: Material has reclaim value. Recycle/recover/reuse value. If recycling cannot be done then dispose of material following all applicable governmental regulations. Material is non - hazardous.

Methods and material for containment and cleaning up:

Spill or leak procedures: Clean up by vacuum and not sweeping to avoid dust generation. Place into pail or drum and tightly cap. Recycle.

Reference to other sections: See Section 8 for exposure levels.

7. HANDLING AND STORAGE

Precautions

Keep containers tightly closed when not in use. Use care to avoid spills.

Wear appropriate personal protective equipment (PPE) when working or handling material.

Always thoroughly wash your hands after handling this product. DO NOT touch or rub eyes until

hands are washed. Do not eat, drink or smoke when handling this product. Utilize exhaust ventilation during handling of this product.

Conditions for Safe Storage, including any incompatibilities:

Storage Precautions: Store product in tightly capped original containers in a cool, dry area. Refer to product label and product data sheet for specific storage temperature requirements.
Rotate stock to ensure use before expiration date.

Specific End Use(s): Includes thin film applications.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters:

		<u>TWA</u>	<u>STEL</u>
	<u>CAS#/EINECS#</u>	mg/m ³	mg/m ³
INDIUM OXIDE	1312-43-2/215-193-9	N.E.	N.E.
TIN OXIDE	18282-10-5/242-159-0	N.E.	N.E.
NOTE:			
As INDIUM		0.1	0.3
As TIN		2	4

N.E. = Not established

Exposure Controls:

Engineering Controls: Local and/or Mechanical exhaust ventilation or point source exhaust is required to control any airborne contaminants and to reduce potential exposures to workers. Avoid inhalation of particulate/dust/spray. Use exhaust when there is any doubt in whether the operator/user is getting any exposure. Measurement of exposure may be required. Additional activities such as sintering of product require ventilation for handling and worker protection. It has been observed that sintered particulates may cause inflammation or other damage to the respiratory system.

Personal protection:

Eyes: Chemical safety glasses/goggles. Face shield for splash/grinding/spray/dust hazard.

Respiratory: An approved air-purifying respirator (half or full face) with a HEPA rated particulate filter or HEPA quality dust mask is required under certain circumstances where airborne concentrations are expected to be elevated. Avoid breathing dust. Keep exposures to as low as possible. Grinding and cutting 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 of a high level may be required depending on the use, area where work is performed or application of indium tin oxide. Data shows that this product may cause pulmonary toxicity during certain job tasks and applications. When levels are unknown and dust is evident additional respiratory protection may be required especially in confined areas. Unknown exposure should be measured to determine the proper protection.

Skin: Compatible chemical resistant gloves. Avoid direct skin contact.

Other: Lab coat, eye-wash fountain in work area. Avoid the use of contact lenses in high fume/dust areas. Coverage of hair may be required in dusty areas.

Work/Hygienic Practices: 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. Do not wear work clothes into lunchroom areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties:

Appearance:	Yellow – green powder	Boiling Point/Range:	Sublimes 982C (1800F)
Odor:	Odorless	Melting Point/Freezing Point:	1910C + 10C (3470F + 50F)
Odor Threshold:	Not established	Evaporation Rate:	Not applicable
Specific Gravity:	7.16 (H ₂ O=1).	pH:	Not applicable
Vapour Pressure:	Not applicable.	Solubility in Water:	Insoluble
Vapour Density:	(air=1) Not applicable.	Partition coefficient:	Not established
Relative Density:	Not established	Flammability:	Not applicable
Flash Point:	Not applicable	Method:	Not applicable
Auto-ignition Temperature:	Not applicable	Flammable Limits:	Limits not established
UEL/LEL Limits:	Not applicable	Decomposition Temp:	Not applicable
Viscosity:	Not established	Explosive properties:	Not applicable
Oxidizing Properties:	Not established		

Other Information: MW 264.94

10. STABILITY AND REACTIVITY

<u>Reactivity:</u>	Stable.
<u>Chemical Stability:</u>	Stable
<u>Possibility of Hazardous Reactions:</u>	Not established
<u>Conditions To Avoid:</u>	Not established
<u>Incompatible Materials:</u>	Avoid contact with strong acids, bases or oxidizing agents.
<u>Hazardous Decomposition / Combustion:</u>	Harmful toxic oxide fumes may form at elevated temperatures.
<u>Hazardous Polymerization:</u>	Will not occur.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects:

<u>Acute toxicity:</u>	Not established	<u>Mutagenicity:</u>	Not established
<u>Irritation:</u>	Not established	<u>Toxicity for Reproduction:</u>	Not Established

Corrosivity: Not applicable **Absence of specific data:** None available (not tested)
Sensitization: Not available
Repeated dose toxicity: Not established
Carcinogenicity: Not established
Likely Routes of Entry: eyes(serious irritation) /skin (irritation) /inhalation (irritation)
Interactive effects: None known

Symptoms related to the physical, chemical and toxicological characteristics:

May cause irritation by skin and inhalation. Causes serious eye irritation.

Delayed and immediate effects as well as chronic effects from short and long-term exposure:

Journal of Occupational Health – Japan report on processing of ITO sputtering targets, indicated that inhalation of ITO in some form and use, such as grinding and spraying may result in pulmonary toxicity. Additional information can be found by searching the Division of Respiratory Disease Studies, US National Institute for Occupational Safety and Health (NIOSH) and information can be found in the publication, *Chemical Information Profile for Indium Tin Oxide*, issued by the National Toxicology Program (NTP), June 2009

Mixture verses substance information: None known

Other Information:

Carcinogenicity: **NTP:** No (National Toxicity Program)
Listing **OSHA:** No (US Occupational Safety & Health Administration)
IARC: No (U.N. International Agency for Research on Cancer)

12. ECOLOGICAL INFORMATION

Product mixtures not tested.

Toxicity: No information available

Persistence and degradability: No information available

Bioaccumulative potential: No information available

Mobility in soil: No information available

Results of PBT and vPvB assessments: No data is available

Other adverse effects: No information is available for mixture. Avoid release to environment.

13. DISPOSAL CONSIDERATION

Waste treatment method:

Scrap ITO has reclaim/recycle value. Contact recycler. Otherwise, dispose of in accordance with environmental regulations. Containerize material and classify according to applicable regulations. No pre-treatment on site is recommended. Do not dispose of down any drain or waterway. Utilize the same personal protective equipment as the user when handling for disposal.

RoHS (Restriction of Hazardous Substances): Compliant with RoHS.

14. TRANSPORT INFORMATION

Transport in accordance with applicable regulations and requirements.

Non - hazardous.

Not regulated/non- hazardous under US DOT (United States Department of Transportation).

Not regulated/non - hazardous under international shipping requirements (all modes).

UN proper shipping name: None

Transport hazard class(s): None

Packing group: None

Environmental hazards: None

Special precautions for user: None

Transport in bulk: Not applicable

Marine pollutant: No

15. REGULATORY INFORMATION

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

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.).

All ingredients are listed on the USEPA TSCA Inventory.

All ingredients are listed on EINECS.

Safety data sheet was developed using EC 1907/2006 amended as of 20 May 2010 EU No 453/2010 and information as stated under regulation EC No 1272/2008 CLP Regulation.

GHS = Global Harmonized System

CLP= Classification, labeling and packaging

Product does not contain any substances ozone depleting substances and therefore not subject to EC 2037/2000.

Chemical safety assessment: None performed for mixture.

16. OTHER INFORMATION

NOTE: The Indium Corporation does not recommend, manufacture, market or endorse any of its products for human consumption.

Risk Phrases:

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

Safety Phrases:

S20/21	When using do not eat, drink or smoke
S23	Do not breathe fumes
S24/25	Avoid contact with skin and eyes
S27	Take off immediately all contaminated clothing
S28	After contact with skin wash immediately with plenty of soap and water
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection
S7	Keep container tightly closed

Revised Date: 5 JANUARY 2014

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Changes provided on this SDS were based on the requirements of EU No. 453/2010 of May 20, 2010 regarding amendments to EC No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

The information and recommendations contained herein are, to the best of The Indium Corporation of America's knowledge and belief, accurate and reliable as of the date issued. The Indium Corporation of America does not warrant or guarantee their accuracy or reliability, and The Indium Corporation of America shall not be liable for any loss or damage arising out of the user thereof. The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.