

Section 1: Product and Company Identification:

1.1 Product Identifier

Product Form: Mixture
 Identification of Substance: Indium Tin Oxide
 Product Name: NYACOL® ITO
 Synonym: ITO
 CAS Number: 1312-43-2 and 18282-10-5
 Index Number: Not available.
 EINECS Number: 215-193-9 and 242-159-0
 REACH Registration Number: Refer to section 3.
 Formula: In₂O₅Sn

1.2 Relevant identified uses of the substance or mixture and uses advised against

Recommended Use: Polymer additive; transparent conductive coatings.
 Restrictions on Use: For industrial use only, not for food, drug or home use.

1.3 Details of the supplier of the safety data sheet

Company Identification: Nyacol Nano Technologies, Incorporated
 Megunko Road, P.O. Box 349, Ashland, MA 01721 U.S.A.
 508-881-2220
 Email Contact: info@nyacol.com
 Internet: www.nyacol.com

1.4 Emergency telephone number

In Case of Emergency: USA/Canada CHEMTREC: +1 (703) 527-3887
 International CHEMTREC: +1 (703) 741-5970
 24 Hours/Day: 7 Days/Week

Section 2: Hazard(s) Identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

STOT RE Category 1 H372 Causes damage to lungs through prolonged or repeated exposure by inhalation.
 Aquatic Chronic Category 3 H412 Harmful to aquatic life with long lasting effects.

Classification according to Regulation (EC) No. 1272/2008 (CLP)

STOT RE Category 1 H372 Causes damage to lungs through prolonged or repeated exposure by inhalation.
 Aquatic Chronic Category 3 H412 Harmful to aquatic life with long lasting effects.

2.2 Label Elements – Labelling according to Regulation (EC) No. 1272/2008



Signal Word: Danger

Hazard determining components of labelling:

Hazard Statement(s): Indium trioxide
 H372: Causes damage to lungs through prolonged or repeated exposure by inhalation.
 H412: Harmful to aquatic life with long lasting effects.

Precautionary Statement(s):

P260: Do not breathe dust.
 P264: Wash hands thoroughly after use.
 P270: Do not eat, drink or smoke when using this product.
 P273: Avoid release to the environment.
 P314: Get medical advice/attention if you feel unwell.
 P501: Dispose of contents/container to an authorized waste contractor.

2.3 Other Hazards

No further relevant information available.

2.4 Unknown acute toxicity (GHS US)

No further relevant information available.

Section 3: Composition / Information on Ingredients

3.1 Chemical characterization: Mixtures

Description: Mixture consisting of the following components.

Component Name:	Product Identifier	GHS Classification	Percent By Weight
Indium Oxide:	CAS: 1312-43-2 EINECS: 215-193-9 Index: Not available	STOT RE, 1 – H372 Aquatic Chronic 3 – H412	80-92
Tin Oxide: REACH: 05-2117294622-39-0000	CAS: 18282-10-5 EINECS: 242-159-0 Index: Not available	Not classified	8-20

Impurities: Present at a level below that to be taken into account for classification.
 The supplier currently has no knowledge on additional ingredients that are classified and that contribute to the classification of this substance.

See Section 16 for a list of hazards if identified above.

Section 4: First-Aid Measures

4.1 Description of first aid measures

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of the eye and lids with water. Get medical attention.

Skin Contact: Wash skin with plenty of soap and water for several minutes. Remove contaminated clothing. Wash clothing prior to reuse. Get medical attention if skin irritation develops or persists.

Inhalation: If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention.

Ingestion: Do NOT induce vomiting. If a person is conscious and can swallow, immediately give two glasses of water (16 oz. or 500 ml.); however, stop if person feels sick as vomiting should be avoided. If vomiting occurs, avoid vomit entering the lungs. Have physician determine if condition of person will permit induction of vomiting or evacuation of stomach. Do not give anything by mouth to an unconscious or convulsing person. Get medical attention.

First Aid Facilities: Eye wash station.

Advice to Physicians: No further relevant information available.

4.2 Most important symptoms and effects, both acute and delayed

Causes skin irritation, causes serious eye irritation, may cause respiratory irritation.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

Section 5: Fire-Fighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media: All are acceptable. Cool containers with water spray.
Unsuitable extinguishing media: None known.

5.2 Special hazards arising from the substance or mixture

Flammability of the product: Not flammable.
Special Hazard Arising from the Chemical: No further relevant information available.
Fire Hazard: No further relevant information available.
Explosion Hazard: No further relevant information available.
Reactivity: No further relevant information available.

5.3 Advice for firefighters

Special Protective Equipment for Fire-fighters: Wear standard full firefighter turn-out gear (full bunker gear) and respiratory protection (SCBA).

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment (PPE) and emergency procedures

Eye protection and impervious gloves. An approved air-purifying respirator should be worn if dust present. Ensure adequate ventilation. Avoid formation of dust.

6.1.1 For non-emergency personnel

Wear protective equipment. Keep unprotected persons away. Avoid formation of dust.

6.2 Environmental precautions

Prevent entry of product into sewers and waterways.

6.3 Methods and material for containment and cleaning up

Ensure adequate ventilation. Prevent dusting. Cover spill if windy. Do not allow spills into sewers or surface waters. Vacuum or shovel into containers for reuse or disposal. Place absorbents, waste products and contaminated soil into containers for disposal. Dispose of spilled material in an appropriate and approved waste disposal facility in accordance with relevant regulations. Processing, use or contamination of this product may change the waste management options.

6.4 Reference to other sections

For more information on exposure controls and personal protection or disposal considerations, check section 8 and 13 of this SDS.

Section 7: Handling and Storage

7.1 Precautions for safe handling

Wear appropriate personal protective equipment (PPE). Minimum feasible handling, and temperatures should be maintained. Avoid generating dust during use. Use only in well ventilated area. Thoroughly wash hands after handling.

7.1.1 Protective measures

Use only in well ventilated areas. As a precautionary measure, the wearing of standard work gear is suggested. Do not smoke. Protect from heat. Protect against electrostatic charges.

7.1.2 Advice on general occupational hygiene

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating, drinking and smoking at the workplace and wearing standard working clothes and shoes unless otherwise stated. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool, dry area and keep container tightly sealed. Provide sufficient ventilation in storerooms and workrooms.

7.3 Specific end use(s)

No additional information available. Refer to Section 1.2 of this SDS.

Section 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Indium oxide, CAS #1312-43-2

Inhalation:	Workplace Exposure Limits	
	0.1 mg/M ³ as In	Long-term exposure limit (8 hour TWA reference period)
	0.3 mg/M ³ as In	Short-term exposure limit (15-minute reference period)

Tin oxide, CAS #18282-10-5

Inhalation:	Workplace Exposure Limits	
	2 mg/M ³ as Sn	Long-term exposure limit (8 hour TWA reference period)
	4 mg/M ³ as Sn	Short-term exposure limit (15-minute reference period)

8.2 Exposure Controls

Engineering Controls:

Do not breathe dust. Use local exhaust ventilation or adequate respiratory protective equipment to maintain exposure below workplace exposure limits. Wear protective gloves, protective clothing and eye protection.

Hygiene Measures:

Workers should wash exposed skin several times daily with soap and water. Soiled work clothing should be laundered or dry-cleaned. Clean up spills immediately.

Respiratory:	Airborne concentrations should be kept to lowest levels possible. If dust or mist is generated and the occupational exposure limit of the product, or any component of the product, is exceeded, use appropriate NIOSH or MSHA approved air purifying or air supplied respirator after determining the airborne concentration of the contaminant. Air-supplied respirators should always be worn when airborne concentrations of the contaminant or oxygen content is
Hands:	Wear impervious gloves such as neoprene.
Eyes:	Safety glasses, chemical type goggles, or face shield recommended to prevent eye contact.
Skin:	Wear clean body-covering clothing; impervious gloves such as neoprene. Workers should wash exposed skin several times daily with soap and water. Soiled work clothing should be laundered or dry-cleaned.
Environmental Exposure Controls:	Adverse effects of this material on the environment have not been evaluated. Proper disposal techniques to isolate and recover material should be implemented.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance (Physical State, Color):	Blue powder.
Upper/lower flammability or explosive limits:	Not determined.
Volatile by Weight:	Not applicable.
Odor:	Odorless
Vapor Pressure:	Not applicable for indium oxide and tin oxide.
Odor Threshold:	Not determined.
Density:	7.1 kg/m ³
pH:	Not applicable.
Relative Density:	Not determined.
Melting point/freezing point:	>1000 °C
Solubility in Water:	Not determined.
Initial boiling point and boiling range:	Not determined.
Flashpoint:	None.
Evaporation Rate:	Not applicable.
Flammability (solid, gas):	Not flammable.
Partition Coefficient:	Not determined.
Auto-ignition temperature:	Not determined.
Decomposition temperature:	Not determined.
Viscosity:	Not applicable.
Specific Gravity:	Not determined.
Freezing Point:	Not determined.
Explosion Limits:	Not determined.
Oxidizing Properties:	Not an oxidizer.

9.2 Other information

Not applicable.

Section 10: Stability and Reactivity

10.1 Reactivity

Stable under recommended storage and use conditions.

10.2 Chemical Stability

Stable under recommended storage and use conditions.

10.3 Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4 Conditions to avoid

No recommendation.

10.5 Incompatible materials

Not determined.

10.6 Hazardous decomposition products

Not determined.

Section 11: Toxicological Information

11.1 Information on toxicological effects

Acute toxicity:

LD50, Rat, Oral Values for classification:

Tin oxide: >20 gm/kg
 Indium oxide: >10 gm/kg

Skin corrosion/irritation:

Avoid contact with skin. Causes skin irritation.

Eye damage/irritation:

Avoid contact with eyes. Causes serious eye irritation.

Inhalation:

Dusting in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material or from exposure in poorly ventilated areas or confined spaces may cause respiratory irritation. Prolonged over-exposure may result in absorbance of potentially harmful amounts of material.

Ingestion:

May be harmful if swallowed.

Sensitization:

No further relevant information available.

Chronic Effects:

Chronic exposure may cause lung damage. May result in stannosis.

Carcinogenicity

No data indicating any concern for carcinogenicity.

Section 12: Ecological Information

12.1 Toxicity

No further relevant information available.

12.2 Persistence and degradability

No further relevant information available.

12.3 Bioaccumulative potential

No further relevant information available.

12.4 Mobility in soil

No further relevant information available.

12.5 Results of PBT and vPvB Assessment

No further relevant information available.

12.6 Other adverse effects

No further relevant information available.

Section 13: Disposal Considerations

This information presented only applies to the materials as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

Disposal Considerations:

The product should be disposed through an authorized waste contractor.

United States:

The product is not a RCRA hazardous waste.

Section 14: Transport Information

The product is not restricted for transportation.

Sections 14.1 – 14.4

Regulations

U.S. D.O.T.: Not regulated.

ICAO/IATA: Not regulated.

IMO/IMDG: Not regulated.

ADR: Not regulated.

14.5 Environmental hazards:

No further relevant information available.

14.6 Special precautions for users:

No further relevant information available.

14.7 Transport bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

Transport/Additional Information:

No further relevant information available.

Section 15: Regulatory Information

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

Worldwide Chemical Inventories

EINECS (EU):	All ingredients listed
TSCA (USA):	All ingredients listed
DSL (Canada):	All ingredients listed
AICS (Australia):	All ingredients listed
ENCS (Japan):	All ingredients listed
ECL (Korea):	All ingredients listed
PICCS (Philippines):	All ingredients listed
IECSC (China):	All ingredients listed

State Right-to-Know Laws:

SARA Section 311/312 (29 CFR 1910.1200) Hazards:

SARA 313, 304 and CERCLA 102 (A):

California Proposition 65:

Section 3 of this SDS lists all components of the product.

Specific target organ toxicity, repeated exposure.

No ingredients listed.

No ingredients listed.

Section 16: Other Information

List of relevant hazard phrases:

H372: Causes damage to lungs through prolonged or repeated exposure by inhalation.

H412: Harmful to aquatic life with long lasting effects.

National Fire Protection Association (U.S.A.) 704 Hazard
 HMIS® Hazard Rating:

Health-1, Flammability-0, Reactivity-0, Special-None

Health-1, Flammability-0, Reactivity-0, Protective Equipment – E; safety glasses, gloves, dust respirator.

Recommended Use:

The product is recommended for use as a polymer additive and transparent conductive coatings. Other uses have not been investigated and may have other hazards. For industrial use only, not for food, drug or home use.

Work Alert:

Workers using the product should read and understand this SDS and be trained in the proper use of this material.

Other Special Considerations:

None known.

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