



## SAFETY DATA SHEET

This safety data sheet represents a family grouping of all metal mixes that contain gallium. To better serve all of our customers Indium Corporation has generated one SDS, 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 products. A chart is provided covering all gallium metal mixes and combinations. Some mixes are considered corrosive while others are non - hazardous.

### 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Identifier:** GALLIUM CONTAINING INDALLOY/NON STANDARD METAL MIXES WITH GALLIUM

**SDS Number:** SDS-IN 000

**Revised Date:** 8 NOVEMBER 2019

**Product Use:** INDUSTRIAL USE ONLY – Metal alloy (mixture) of gallium with other metals. Use is strictly based on the individual company needs and requirements. Some mixtures are general categories rather than specifically listed. See alloy table for metal mixture combinations in solid metal or liquid metal.

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## 2. HAZARDS IDENTIFICATION

### PRIMARY ROUTES OF ENTRY:

\*Eye      \*Inhalation      \*Skin      \*Ingestion

### CARCINOGEN LISTED IN:

NTP      IARC      OSHA      \*Not Listed

GHS: Applies to Gallium and Gallium Mixtures that are in a liquid state:



Signal Word: Warning

#### Hazard Statement(s)

H314 Causes severe skin burns and eye damage (gallium)  
 H315 Causes skin irritation  
 H319 Causes serious eye irritation  
 H335 May cause respiratory irritation  
 H290 May be corrosive to metals

#### Precautionary Statement(s)

P234 Keep only in the original container  
 P261 Avoid breathing dust/fume/gas/mist/vapors/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+P364 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)

Solid metal mixture with gallium:

#### Precautionary Statement(s)

P261 Avoid breathing dust/fume/gas/mist/vapors/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+P364 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)

#### Classification:

Skin corrosion/irritation- Category 2  
 Serious eye damage/eye irritation- Category 2A

Specific target organ toxicity, single exposure; respiratory tract irritation- Category 3

### POTENTIAL HEALTH EFFECTS:

**Eye Contact:** Contact may cause eye irritation or burns. Severe eye damage may result from hot molten metal being splashed into the eyes. Wear proper protection when working with molten metal. Powder form may cause eye irritation. Gallium metal at room temperature may be a splash hazard and cause irritation to eyes.

**Ingestion:** Ingestion may be harmful. Gallium is corrosive to metal in a liquid form.

**Inhalation:** Inhalation of vapors may result in contamination and potential harmful effects. Inhalation of powders may cause irritation.

**Skin Contact:** Contact may cause irritation and dermatitis. GALLIUM metal may be liquid at room temperature and may be absorbed through skin. GALLIUM is corrosive to metal in the liquid state. Hot molten metal may cause burns to the skin. Wear proper protective equipment when handling hot molten metal.

**Chronic:** INDIUM: May cause damage to respiratory system if inhaled over long periods of time.

TIN: Has been shown to increase incidence of sarcoma in animal tests.

ZINC: Fresh fume inhaled may cause a disease known as "brass founders", throat dryness, cough weakness, generalized aching, fever, nausea and vomiting.

COPPER: Overexposure to fumes may cause metal fume fever (chills, muscle aches, nausea, fever; dry throat, cough, weakness, lassitude); metallic or sweet taste; discoloration of skin and hair.

GALLIUM: May cause bone marrow abnormalities with damage to blood forming tissues.



**WARNING:** This product can expose you to chemicals including [trace amounts of lead] which is known to the State of California to cause cancer, and can cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**NOTE:** The Indium Corporation does not recommend, manufacturer, market or endorse any of it's products for human consumption.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

| Components | % wt | CAS Registry #/EINECS# | PEL<br>mg/m <sup>3</sup> | TLV-TWA<br>mg/m <sup>3</sup> | TLV-STEL<br>mg/m <sup>3</sup> |
|------------|------|------------------------|--------------------------|------------------------------|-------------------------------|
| GALLIUM    | *    | 7440-55-3/231-163-8    | N.E.                     | N.E.                         | N.E.                          |
| INDIUM     | *    | 7440-74-6/231-180-0    |                          |                              |                               |
|            |      | (US)                   | 0.1                      | 0.1                          | -                             |
|            |      | (EU)                   | -                        | 0.1                          | 0.3                           |
|            |      | (Canada)               | -                        | 0.1                          | 0.3                           |
|            |      | (Singapore)            | 0.1                      | -                            | -                             |
|            |      | (Mexico)               | -                        | 0.1                          | 0.3                           |

|               |   |                     |           |                      |      |
|---------------|---|---------------------|-----------|----------------------|------|
|               |   | (China)             | -         | 0.1                  | 0.3  |
| <b>TIN</b>    | * | 7440-31-5/231-141-8 |           |                      |      |
|               |   | (US)                | 2         | 2                    | -    |
|               |   | (EU)                | -         | 2                    | 4    |
|               |   | (Canada)            | -         | 2                    | 4    |
|               |   | (Singapore)         | 2         | -                    | -    |
| <b>ZINC</b>   | * | 7440-66-6/231-175-3 | N.E.      | N.E.                 | N.E. |
| <b>GOLD</b>   | * | 7440-57-5/231-165-9 | N.E.      | N.E.                 | N.E. |
| <b>COPPER</b> | * | 7440-50-8/231-159-6 |           |                      |      |
|               |   | (US)                | 0.1       | 0.1                  | -    |
|               |   | (EU)                | -         | 0.1                  | -    |
|               |   | (Canada)            | -         | 0.2                  | 0.6  |
|               |   | (Singapore)         | 0.2(fume) | 1(dust)              | -    |
|               |   | (Mexico)            | -         | 0.2(fume)<br>1(dust) | 2    |
|               |   | (China)             | -         | 1(dust)              | 2.5  |
|               |   |                     | 0.2(fume) | 0.6                  |      |

N.E. = Not established

\* See Alloy Chart on last page

#### 4. FIRST AID MEASURES

- Eye Contact:** Hold eyelids apart and flush eyes with plenty of tepid 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. Gallium may be in concentrations to be corrosive.

#### 5. FIRE FIGHTING MEASURES

- Flash Point:** Not established.      **Method:** Not established.
- Auto-ignition Temperature:** Not established.
- Flammable Limits:** Limits not established. Massive metal is not flammable.
- Extinguishing Media:** Use extinguishers appropriate for the surrounding fire conditions. Do Not Direct Water at or onto the heated metal.
- Special Fire Fighting Procedures:** Firefighters must wear NIOSH approved self-contained breathing apparatus and full protective clothing.

Thermal decomposition can lead to release of irritating gases and vapors.

## 6. ACCIDENTAL RELEASE MEASURES

**Spill or Leak Procedures:** Contain spill. Gallium metal may be liquid at room temperature. As Gallium is corrosive to metal, it may be absorbed through skin, wear appropriate personal protection when containing spills. If possible, cool metal to below melting point, to solidify. Otherwise, remove by pushing pool of molten metal into a plastic dustpan and place it into a plastic container. Solid metal should be clean up without generating dust. Do not sweep. Dispose of following all Federal, State and Local regulations. Metal may have reclaim value. Wear personal protective equipment and avoid breathing any dust or fume.

## 7. HANDLING AND STORAGE

**Handling Precautions:** If working with molten metals, or exposed to fume or dust, use appropriate personal protective equipment. Gallium is liquid at room temperature and should be properly handled.

The following are general procedures for handling gallium. User should review their own workplace situations and uses and determine the best guidelines for handling. PPE should be assessed based on the particular use or uses. Melting or grinding of gallium mixed alloys should be reviewed. Ventilation is recommended when there is a potential for work place exposures to metal fume or particulate. Permissible exposure levels in high fume or particulate tasks should be assessed so that they are not exceeded. Ensure engineering controls are used to protect the worker.

Gallium has a melting point of (29C) 84F. Personal protective equipment (PPE) must be worn when handling the metal. Safety glasses or goggles shall be worn. A face shield should be added when handling metal where there is a potential for splash hazards. Additional personal protective equipment should be used when handling molten metals: face shield, hot gloves for handling hot metals, sleeve protector for splash hazards if handling large volumes where there is a potential for splash and burns from hot metal. Additional protection includes apron.

Keep unauthorized personnel away when handling molten metals.

Exhaust ventilation should be provided for any metal fume when heating is being conducted.

Store materials in the proper container. Hot metals should be placed into a compatible container. Gallium is corrosive to metals.

**Storage Precautions:** Store product in a cool, dry area away from incompatible materials (metals and moisture). Close container when not in use, where applicable.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering Controls:** Exhaust ventilation is recommended to control any air contaminants and keep exposures as low as possible.

### Personal protection:

**Eyes:** Chemical safety glasses/goggles and face shield with molten metal. Gallium metal is liquid at room temperature. Face shield may need to be worn when handling liquid metal at any temperature for splash protection.

**Respirator:** An authority approved or compliant marked air-purifying respirator with a fume/dust chemical cartridge is recommended under certain circumstances where airborne concentrations are expected to be elevated.

**Skin:** Wear rubber or vinyl gloves when handling gallium metal. Gloves-leather or impervious (vinyl) type. Heat resistant gloves if handling hot metal. Safety type boots. Personal protective equipment is

recommended when working with molten metal to avoid burns. Room temperature gallium is corrosive.

- Other:** Lab coat, safety shower and eyewash fountain in work area. Avoid the use of contact lenses.
- 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.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance:** Lustrous, silvery liquid or gray solid metal or Gallium containing product is a corrosive liquid to metal at room temperature, otherwise solid state.
- Boiling Point:** See chart
- Odor:** Odorless
- Melting Point:** See chart
- Specific Gravity:** See chart
- Vapor Pressure:** 1 mmHG@1350C (gallium)
- Solubility in Water:** Insoluble
- Vapor Density:** 5.9@25C (gallium)
- Molecular Weight:** gallium 69.72

## 10. STABILITY AND REACTIVITY

- General:** Stable in dry air. Gallium will tarnish in moist air.
- Conditions to Avoid:** Dusts, metals, exposure to moisture
- Incompatible Materials:** Potentially explosive reaction with hydrogen peroxide and hydrochloric acid. Violent or vigorous reaction with halogens.
- Hazardous Decomposition / Combustion:** Corrosive and/or toxic gases
- Hazardous Polymerization:** Will not occur.

## 11. TOXICOLOGICAL INFORMATION

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

RTECS# LW8600000 (gallium)

## 12. ECOLOGICAL INFORMATION

Product mixtures not tested.

## 13. DISPOSAL CONSIDERATION

- Waste Disposal Method:** Scrap metal alloy usually has value. Contact a commercial reclaimer for recycling. Otherwise, dispose of in accordance with all Federal, State and Local

environmental regulations.

## 14. TRANSPORT INFORMATION

Transport in accordance with applicable international regulations and requirements.

Special shipping information please review based on the exact product purchased. Must know product and must review alloy chart before determining proper shipping information.

### **NOTICE:**

Shipping Name: **UN2803, Gallium, 8, PG III** [only for Indalloy's 14/46L/51/51E/60/77/check any Non - Standard alloy mix that may apply].

**Must follow the gallium proper packaging requirements as stated in 49 CFR 173.162 (Department of Transportation regulations).**

See Alloy Chart, Page 8, for assistance.

North America Emergency Guide 2012 – Guide# 172 (gallium)



**OTHERWISE:** not regulated as a corrosive for transportation and is therefore: Non - hazardous under all shipping regulations. UN – none Marine Pollutant - none

Know which product is being used in order to properly assess the risks.

**Important: Review alloy chart.**

## 15. REGULATORY INFORMATION

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

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



Canadian WHMIS: Only for applicable products. Review listing.

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



**WARNING:** This product can expose you to chemicals including [trace amounts of lead] which is known to the State of California to cause cancer, and can cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

SARA 313 Listing - 40 CFR 372.65: Zinc CAS# 7440-66-6 Copper CAS# 7440-50-8

All ingredients are listed on the EPA TSCA Inventory, Philippines Inventory, Japan Existing and New Chemical Substances, China Inventory of Existing Chemical Substances, Canadian Domestic Substances List

This product has been classified in accordance with Mexican regulations NOM-018-STPS-2015 and NOM-010-STPS-2014.

Malaysia:

This product has been classified in accordance with: Malaysian – OCCUPATIONAL SAFETY AND HEALTH (CLASSIFICATION, LABELING AND SAFETY DATA SHEET OF HAZARDOUS CHEMICALS) REGULATION OCTOBER 2013 – (CLASS). (GHS)

In China:

Decree No. 591: Regulations on the Control over Safety of Hazardous Chemicals

GB 30000.2-29-2013, Rules for classification and labeling of chemicals. (GHS)

GB/T 16483-2008, GB/T 17517-2013

This product has been classified using the Chinese Occupational Limit for Hazardous Agents in the Workplace, GBZ2-2007

## 16. OTHER INFORMATION

|                            |                         |   |
|----------------------------|-------------------------|---|
| <b>HMIS Hazard Rating:</b> | <b>Health:</b>          | 2 |
|                            | <b>Fire:</b>            | 0 |
|                            | <b>Physical Hazard:</b> | 1 |

**Revised Date:** 8 NOVEMBER 2019

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

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**CHART****ALLOY TABLE MIX- REVIEW MIXTURES FOR HAZARD CLASS**

| INDALLOY<br>(metal)             | RoHS 2<br>Compliance | HAZARD<br>CLASS<br>CATEGORY | % GALLIUM<br>Ga | % GOLD<br>Au | % INDIUM<br>In | % TIN<br>Sn | % ZINC<br>Zn | % COPPER<br>Cu | MELTING<br>POINT | MASS<br>DENSITY<br>(gm/cm <sup>3</sup> ) |
|---------------------------------|----------------------|-----------------------------|-----------------|--------------|----------------|-------------|--------------|----------------|------------------|--|
| 14<br>(Ga100)                   | YES                  | Corrosive                   | 100             | -            | -              | -           | -            | -              | 29.8C/86 F       | 5.90                                     |
| 46L<br>(Ga61/In25/<br>Sn13/Zn1) | YES                  | Corrosive                   | 61              | -            | 25             | 13          | 1            | -              | 7.6C/46 F        | 6.50                                     |
| 51<br>(Ga62.5/In2<br>1.5/Sn16)  | YES                  | Corrosive                   | 62.5            | -            | 21.5           | 16          | -            | -              | 10.7C/51F        | 6.50                                     |
| 51E<br>(Ga66.5/In2<br>0.5/Sn13) | YES                  | Corrosive                   | 66.5            | -            | 20.5           | 13          | -            | -              | 11C/52F          | 6.32                                     |
| 60<br>(Ga75.5/In2<br>4.5)       | YES                  | Corrosive                   | 75.5            | -            | 24.5           | -           | -            | -              | 15.7C/60 F       | 6.35                                     |
| 77<br>(Ga95/In5)                | YES                  | Corrosive                   | 95              | -            | 5              | -           | -            | -              | 25C/77F          | 6.15                                     |
| 88<br>(Ga0.7/In99.<br>3)        | YES                  | Non Haz                     | 0.7             | -            | 99.3           | -           | -            | -              | 150C/302F        | 7.31                                     |
| 90<br>(Ga0.6/In99.<br>4)        | YES                  | Non Haz                     | 0.6             | -            | 99.4           | -           | -            | -              | 152C/306F        | 7.31                                     |
| 91<br>(Ga0.4/In99.<br>6)        | YES                  | Non Haz                     | 0.4             | -            | 99.6           | -           | -            | -              | 153C/307F        | 7.31                                     |
| 92<br>(Gs0.5/In99.<br>5)        | YES                  | Non Haz                     | 0.5             | -            | 99.5           | -           | -            | -              | 154C/309F        | 7.31                                     |
| 222<br>(Ga1.0/In99.<br>5)       | YES                  | Non Haz                     | 1               | 99           | -              | -           | -            | -              | 1030C/1886F      | 18.87                                    |
| NS<br>(Ga68.7/Cu3<br>1.3)       | YES                  | Corrosive                   | 68.7            | -            | -              | -           | -            | 31.3           | -                | 6.61                                     |
| NS<br>(Ga2/In98)                | YES                  | Non Haz                     | 2               | -            | 98             | -           | -            | -              | -                | 7.27                                     |
| NS<br>(Ga1/In99)                | YES                  | Non Haz                     | 1               | -            | 99             | -           | -            | -              | -                | 7.28                                     |

| INDALLOY<br>(metal)            | RoHS 2<br>Compliance | CLASS<br>CATEGORY | % GALLIUM<br>Ga | % GOLD<br>Au | % INDIUM<br>In | % TIN<br>Sn | % ZINC<br>Zn | % COPPER<br>Cu | MELTING<br>POINT | MASS<br>DENSITY<br>(gm/cm <sup>3</sup> ) |
|--------------------------------|----------------------|-------------------|-----------------|--------------|----------------|-------------|--------------|----------------|------------------|--|
| NS<br>(Ga0.10/In9<br>9.9)      | YES                  | Non Haz           | 0.10            |              | 99.9           | -           | -            | -              | -                | 7.30                                     |
| NS<br>(Ga5.11/Sn9<br>4.89)     | YES                  | Non Haz           | 5.11            | -            | -              | 94.89       | -            | -              | -                | 7.19                                     |
| NS<br>Range for<br>Ga/In/Cu    | YES                  | Non Haz           | 0.1-40          | -            | 0.1-90         | -           | -            | 0-75           | -                | varies                                   |
| NS<br>Range for<br>Cu/Ga       | YES                  | Non Haz           | 10-35           | -            | -              | -           | -            | 65-90          | -                | varies                                   |
| NS<br>Range for<br>Ga/Cu       | YES                  | Non Haz           | 50-75           | -            | -              | -           | -            | 25-50          | -                | varies                                   |
| NS<br>(Ga66.5/In2<br>0.5/Sn13) | YES                  | Corrosive         | 66.5            | -            | 20.5           | 13          | -            | -              | -                | 6.30                                     |

**RoHS 2 = Restriction of Hazardous Substances EU Directive 2011/65/EU**  
**NS = Non Standard Alloy Mixture**

Please note that some metal categories are listed as RANGE. This is because exact disclosure is customer confidential.