

PRODUCT DATA SHEET

Commercial Indium Metal

Introduction

Indium Corporation is the leading global supplier of commercial indium, high purity indium, indium fabrications, alloys, and chemicals. Indium metal is extracted from indium-bearing ore and is refined to various grades in high volume utilizing state of the art SPC controlled refining technologies. Rigorous quality standards and advanced analytical instrumentation such as ICP and GDMS, ensures consistent product quality lot to lot.

General Properties and Applications of Commercial Grade Indium

Indium is a versatile metal with unique physical properties. Following are some of the unique properties of indium and a sampling of innovative applications for the metal:

- Indium has a low melting point of 157 °C but a high boiling point of 2080 °C, one of the highest liquidus temperature range of any metal.
- Indium has a low vapor pressure making it ideal for use in high vacuum applications.
- Indium is soft, pliable, and malleable, even down to cryogenic temperatures approaching absolute zero. It will form a hermetic gasket seal between two mating metal parts. Being soft, indium deforms and fills in the microstructure of two mating parts, pressed together using moderate pressure. Similarly, indium can be used as an efficient thermal conductive interface in electronics.
- Indium has relatively low toxicity.
- Indium is a bright shiny metal that forms a thin (80-100 angstroms) protective oxide layer. It is used as a decorative trim coating metallization on plastics used in appliance and automobile trim.
- Indium will cold weld to itself, making it useful for bonding parts or assemblies together.
- Indium effectively reduces the melting point in solder alloys and fusible alloys.
- Indium in small percentages improves the thermal fatigue performance of solders used in electronics assembly.
- Indium will bond to glass, quartz, and certain ceramics and oxides.
- Indium will compensate for differing thermal coefficients of expansion of mating parts.
- Used in small amounts, indium hardens certain metals and alloys; it hardens gold used in electronics and dental alloys.
- Indium coatings provide lubricity in sleeve bearings such as those used in aircraft piston engines and industrial machinery.
- Indium is a neutron absorber and is used in radiation detection badges.

Available Physical Forms of Indium

- Ingot
- Wire
- Tubing
- Foil
- Ribbon
- Plating anodes
- Sacrificial anodes
- Sheet
- Shot
- Powder
- Custom preforms



Grades Available

- 3N (99.9%)
- 4N (99.99%)
- 5N (99.999%)

For higher grades, please refer to the High Purity Indium Metal product data sheet.

Typical Impurities

Please note that these ppm levels are calculated averages from past production lots and do not represent the maximum, minimum, or lot specific levels. The ppm levels in the table should not be used in designing product specifications.

Impurities will vary in different lots of indium, but the total impurities will be below the maximum allowed in each grade:

- 3N grade: total impurities < 1000 ppm
- 4N grade: total impurities < 100 ppm
- 5N grade: total impurities < 10 ppm

If you have specific requirements for one or two elemental impurities, Indium Corporation may be able to accommodate your specifications for these impurities.

| Element | 3N Grade (ppm) | 4N Grade (ppm) | 5N Grade (ppm) |
|---------|----------------|----------------|----------------|
| Ag | 1 | Not Found | Not Found |
| Bi | 60 | 4 | 2 |
| Cd | 60 | 10 | 2 |
| Cu | 50 | 5 | 2 |
| Fe | 3 | 5 | 2 |
| Ni | 5 | 5 | 2 |
| Pb | 90 | 15 | 2 |
| Sn | 185 | 20 | 2 |
| Tl | 10 | 5 | 2 |

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Form No. 98339 R3

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Oxidation and Shelf Life

Compared to most metals, indium oxidizes quite slowly. Immediately after fabrication, there is initial rapid oxide growth for a few days until the oxide thickness reaches 80-100 angstroms. If stored in air, the oxide thickness slowly increases over several months depending on storage conditions and the physical form of indium. For physical forms of indium that have a high surface area such as powder, storage in an inert gas such as argon with a desiccant will greatly reduce oxidation formation.

Following are the shelf lives depending on the physical form of indium:

- Indium ingot – 12 months
- Indium fabrications (wire, ribbon, sheet, tubing, and foil) – 6 months
- Indium shot – 6 months
- Indium powder – 3 months

In some cases, excessive oxidation can be removed by immersion in dilute mineral acids. Please contact technical support for more information.

Technical and Customer Support

Indium Corporation's internationally experienced engineers, material scientists and metallurgists provide in-depth technical assistance to our customers. Thoroughly knowledgeable on all aspects of material science and metallurgy as it pertains to indium metal, its uses and applications, our technical service staff is available to provide rapid response to all technical inquiries. We believe that our long-standing emphasis on providing our customers with superior technical service clearly differentiates Indium Corporation from our competitors.

Safety Data Sheets

The SDS for this product can be found online at <http://www.indium.com/sds>

This product data sheet is provided for general information only. It is not intended, and shall not be construed, to warrant or guarantee the performance of the products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices. All Indium Corporation's products and solutions are designed to be commercially available unless specifically stated otherwise.

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