

Product Data Sheet

Indalloy® Alloys Liquid at Room Temperature

Introduction

Several very low melting point **Indalloy® alloys** are liquid at room temperature. These gallium-based alloys are finding increased use in various applications as a replacement for toxic mercury, which has a high vapor pressure at room temperature. These alloys have reduced toxicity and lower vapor pressure than mercury.

Excellent Thermal and Electrical Conductivity

Liquid metals have a high degree of thermal conductivity, which is far superior to non-metallic liquids. This is why liquid metals are used in specific applications for conducting or dissipating heat. Liquid metals also have inherently high density and electrical conductivity.

Wetting to Metallic and Non-Metallic Surfaces

These alloys will wet most metallic surfaces once oxides have been sufficiently removed from the substrate surface. However, gallium is very reactive with some metals, even at room temperature. At high temperatures, gallium dissolves most metals, although a number, including Na, K, Au, Mg, Pb, Ni and interestingly Hg, are only slightly soluble at moderate temperatures.¹

As stated, gallium is corrosive to all metals except tungsten and tantalum which have a high resistance to corrosion. Columbium, titanium and molybdenum have resistance to corrosion but less than tungsten and tantalum.²

Gallium and the gallium alloys, like indium, have the ability to wet to many non-metallic surfaces such as glass and quartz. Gently rubbing the gallium alloy into the surface may help induce wetting.

Note: These alloys form a thin dull looking oxide skin that is easily dispersed with mild agitation. The oxide-free surfaces are bright and lustrous.



Applications

Typical applications for these materials include thermostats, switches, barometers, heat transfer systems, thermal cooling and heating designs, and TIM2 interfaces.

Uniquely, they can be used to conduct heat and/or electricity between non-metallic and metallic surfaces.

Packaging

Alloys are packaged in polyethylene bottles and 3cc, 5cc, and 6oz. syringes and shipped in accordance with applicable federal regulations. Liquid at room temperature Indalloy alloys are warranted for proper dispense when used on PVA dispensing machines. For more information, contact PVA at www.PVA.net.

Storage and Shelf Life

Unopened bottles and syringes have a guaranteed shelf life of one year. Syringes should be stored in an upright position with the tips down. If stored in polyethylene bottles, it is recommended that as the alloy is removed from the bottle, the volume should be replaced with dry argon. This minimizes the possibility of oxidation at the surface of the alloy. If the alloy has been stored below its melting point and has solidified, it should be re-melted and thoroughly shaken or mixed before use. When reheating the alloy in its original packaging do not exceed 65°C.

1. Pergamon Texts in Inorganic Chemistry Volume 12, The Chemistry of ALUMINUM, GALLIUM, INDIUM, and THALLIUM by K. Wade & A. J. Banister, University of Durham, Pergamon Press, 1975.
2. Lyon, Richard N., ed. *Liquid Metals Handbook*. 2nd ed. Washington DC: 1952

Indalloy Number	Liquidus	Solidus	Composition	Density lb/in ³	Specific Gravity
46L	7.6°C	6.5°C	61.0Ga/25.0In/13.0Sn/1.0Zn	0.2348	6.50
51E	10.7°C	10.7°C	66.5Ga/20.5In/13.0Sn	0.2348	6.50
51	16.3°C	10.7°C	62.5Ga/21.5In/16.0Sn	0.2348	6.50
60	15.7°C	15.7°C	75.5Ga/24.5In	0.2294	6.35
77	25.0°C	15.7°C	95Ga/5In	0.2220	6.15
14	29.78°C	29.78°C	100Ga	0.2131	5.904

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products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices.

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