

APPLICATION NOTE

Use of Indalloy® Low-Temperature Alloys for Lens Blocking

Introduction

Lens blocking alloys are used to attach optical lens blanks to surfacing blocks. This work holding action enables the cutting of lenses to fit to the frame, and the grinding of the lens according to its optical prescription.

The advantage of using low melting temperature alloys is that they conform to any lens configuration, are easy to use, and are recyclable.

Plastic Lenses

The low melting temperature alloy used for plastic lenses is Indalloy®117, with a melting temperature of 117°F (47°C). Due to the popularity of plastic lens, it is the most common alloy for lens blocking and can also be used for glass lenses. This is because plastic lenses will warp if a higher temperature alloy is used. In many facilities, Indalloy®117 is used exclusively to prevent the accidental use of a higher temperature alloy on plastic lenses.

Glass Lenses

In addition to Indalloy®117, Indalloy®158, with a melting temperature of 158°F (70°C), is another commonly used alloy. However, Indalloy®158 has a better bond strength and is used only for glass lenses.

Two other alloys that can be used for glass lenses are Indalloy®19 and Indalloy®136. Indalloy®19 has a melting point of 140°F (60°C) and is both lead- and cadmium-free. Indalloy®136 has a melting point of 136°F (58°C) and is cadmium-free. These offer the advantage of reduced environmental and health concerns, but have reduced bond strengths compared to Indalloy®158. Also, their higher temperatures are prohibitive for use with plastic lenses.

Lens Blocking

A protective plastic tape is placed over the lens blank prior to mounting the lens blank and surfacing block into the blocker. The blocker contains the molten alloy (approximately 5°F above the liquidus temperature of the alloy) until it is forced, by air pressure or manual hand pump, between the tape on the lens blank and surfacing block. The alloy is cooled until it solidifies and bonds the lens blank tape to the surfacing block.



The surfacing block is then mounted in a chuck and is used to protect the lens during the grinding operation. After the grinding operation, plastic lenses are removed from the surfacing block by the inertia of knocking the surfacing block on a solid surface. Glass lenses are removed by dipping them into a hot water bath. When the alloy melts and the lens is separated from the surfacing block, the alloy settles to the bottom and is recovered by draining through a valve.

Indalloy® No.	Composition	Melting Point (°F)	Melting Point (°C)
117	44.7Bi/22.6Pb/19.1In/8.3Sn/5.3Cd	117	47
136	49Bi/21In/18Pb/12Sn	136	58
19	51In/32.5Bi/16.5Sn	140	60
158	50Bi/26.7Pb/13.3Sn/10Cd	158	70

Note: all alloys in this table are eutectic, i.e. liquidus and solidus coincide.

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