

# LiIO<sub>3</sub> - Lithium Iodate

## Introduction

Lithium Iodate (LiIO<sub>3</sub>) is one of the oldest commercial NLO crystals. With a high NLO coefficient, LiIO<sub>3</sub> is used for frequency-doubling, tripling, and mixing of low and medium power lasers.

CASTECH provides large sizes of LiIO<sub>3</sub> crystals with high optical homogeneity. They can be as-cut or polished, and sealed housing with AR-coated windows is also available.

Table 1. Basic Properties

Crystal Structure	Hexagonal, Point Group 6
Transparency Range	300-5000 nm
Nonlinear Coefficient	$d_{15} = -5.5 \times 10^{-12}$ m/V
Refractive Index	negative uniaxial $n_o = 1.8571$ , $n_e = 1.7165$ ( $\lambda = 1064$ nm)
Sellmeier Equations: ( $\lambda$ in $\mu\text{m}$ )	
$n_o^2 = 3.415716 + 0.047031 / (\lambda^2 - 0.035306) - 0.008801 \lambda^2$	
$n_e^2 = 2.918692 + 0.035145 / (\lambda^2 - 0.028224) - 0.003641 \lambda^2$	

Table 2. Specifications

Dimension Tolerance	$(W \pm 0.2 \text{ mm}) \times (H \pm 0.2 \text{ mm}) \times (L + 0.5/-0.2 \text{ mm})$
Clear Aperture	central 90% of the diameter
Surface Quality (Scratch/Dig)	20/10 to MIL-PRF-13830B
Flatness	$\lambda/4$ @633 nm
Transmitted Wavefront Distortion	$\leq \lambda/4$ @633 nm
Parallelism	$\leq 30$ arc sec
Perpendicularity	$\leq 15$ arc min
Angle Tolerance	$\leq 0.5^\circ$
Quality Warranty Period	one year under proper use.

## Notes

- LiIO<sub>3</sub> is highly hygroscopic. Please keep it in a dry environment, and sealed housing is recommended.
- CASTECH provides both polishing and sealed housing for LiIO<sub>3</sub> crystal.
- LiIO<sub>3</sub> is not recommended for high power applications, because of the low damage threshold.