

# GGG crystals

Gallium Gadolinium Garnet ( $Gd_3Ga_5O_{12}$  or GGG) single crystal is material with good optical, mechanical and thermal properties which make it promising for use in fabrication of various optical components as well as substrate material for magneto-optical films and high-temperature superconductors. It is the best substrate material for infrared optical isolator (1.3 and 1.5 $\mu$ m), which is a very important device in optical communication. It is made of YIG or BIG film on the GGG substrate plus birefringence parts. Also GGG is an important substrate for microwave isolator and other devices. Its physical, mechanical and chemical properties are all good for the above applications.



- Large dimensions, from 2.8 to 76mm.
- Low optical losses (<0.1%/cm)
- High thermal conductivity (7.4W m<sup>-1</sup>K<sup>-1</sup>).
- High laser damage threshold (>1GW/cm<sup>2</sup>)

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Main Properties	
Chemical Formula	$Gd_3Ga_5O_{12}$
Lattice Parameter	$a=12.376\text{\AA}$
Growth Method	Czochralski
Density	$7.13\text{g/cm}^3$
Mohs Hardness	8.0
Melting Point	$1725^\circ\text{C}$
Refractive Index	1.954 at 1064nm

Technical Parameters	
Orientation	[111] within $\pm 15$ arc min
Wave Front Distortion	$< 1/4$ wave@632
Diameter Tolerance	$\pm 0.05\text{mm}$
Length Tolerance	$\pm 0.2\text{mm}$
Chamfer	$0.10\text{mm}@45^\circ$
Flatness	$< 1/10$ wave at 633nm
Parallelism	$< 30$ arc Seconds
Perpendicularity	$< 15$ arc min
Surface Quality	10/5 Scratch/Dig
Clear Apereture	$> 90\%$
Large Dimensions of Crystals	.8-76 mm in diameter