

LASER CRYSTALS

Nd:YAG Laser Crystal

Product Brochure & Technical Reference

Nd:YAG rods, slabs and drawing-defined laser components. Specify dopant concentration, pump and laser wavelengths, crystal geometry, orientation, optical quality and AR/HR coatings.



Reference product image. Shown geometry is illustrative.

Material reference properties / options

Parameter	Typical Value / Option
Material	Nd:YAG
Nd dopant level	0.1-2.5 at%, tolerance to be confirmed by order requirement
Dimensions	Diameter 1-50 mm, length 0.3-220 mm; custom size available upon request
Diameter tolerance	+0/-0.04 mm
Length tolerance	+0.5/-0 mm
Wavefront distortion	$< \lambda / 10$ per inch at 632.8 nm
Anti-reflection coating	R < 0.15% at 1064 nm per surface
High-reflection coating	Standard HR coating with R > 99.8% at 1064 nm and R < 5% at 808 nm

Reference values and options for selection. Confirm the material grade, geometry, test conditions and acceptance criteria for the quoted configuration.

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Configuration & quotation

Define the component around your application

Application examples: 1064 nm CW and pulsed solid-state laser systems; Q-switched lasers for marking, engraving, and range finding; Industrial cutting, welding, drilling, and material processing

Specifications of Nd:YAG Laser Crystal

Parameter	Typical Value / Option
Chamfer	<0.1 mm at 45 degrees
Damage threshold	>750 MW/cm ² at 1064 nm, 10 ns, 10 Hz
Clear aperture	>95%
Flatness	$\lambda/10$ at 632.8 nm
Scratch / dig	10-5, MIL-O-13830A
Barrel finish	50-80 micro-inch RMS
Chips	<0.1 mm
Extinction ratio	>30 dB, depending on actual size
Perpendicularity	<5 arcmin
Parallelism	<10 arcsec

Specifications of Nd:YAG Laser Crystal

Property	Typical Value
Chemical formula	Nd:Y ₃ Al ₅ O ₁₂
Crystal structure	Cubic
Lattice constant	12.01 Å
Melting point	Approx. 1970 °C
Rupture stress	Approx. $1.3\text{--}2.6 \times 10^3 \text{ kg/cm}^2$
Density	Approx. 4.55 g/cm^3
Mohs hardness	8.5
Thermal expansion coefficient	[100]: $8.2 \times 10^{-6}/\text{C}$; [110]: $7.7 \times 10^{-6}/\text{C}$; [111]: $7.8 \times 10^{-6}/\text{C}$, 0-250 °C
Laser transition	4F _{3/2} to 4I _{11/2}
Laser wavelength	1064 nm
Photon energy	Approx. $1.86 \times 10^{-19} \text{ J}$
Emission linewidth	Approx. 4.5 Å at 1064 nm
Stimulated emission cross section	Typical value around $2.8 \times 10^{-19} \text{ cm}^2$ at 1064 nm for Nd 1at%; final value depends on source and test conditions
Fluorescence lifetime	Approx. 230 µs
Refractive index	Approx. 1.8197 at 1064 nm

Prepare your quotation

RFQ Item	Information to Provide
Material and doping	Nd dopant level, target wavelength, pump method, and application.
Geometry	Rod diameter and length, slab dimensions, chamfer, clear aperture, and drawing if available.
Optical specification	Orientation, surface quality, flatness, wavefront distortion, parallelism, and perpendicularity.
Coating requirement	AR coating, HR coating, pump wavelength coating, dual-band coating, or other coating design.
Laser system details	CW, pulsed, Q-switched, mode-locked, pump source, output target, cooling method, and cavity layout.
Order information	Prototype quantity, recurring demand, inspection criteria, packaging requirement, and delivery schedule.

Reference values and options for selection. Confirm the material grade, geometry, test conditions and acceptance criteria for the quoted configuration.

Send drawings for engineering review

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