TOQUARTZ

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Tech Specifications

Quartz Tube

Integrated Engineering & Agile Production

for Demanded Specifications

LASER QUARTZ CAVITY FILTERS

- Enhanced mechanical durability: Abrasion-resistant surfaces withstand 10,000+ high-frequency operational cycles.
- Ultra-low optical distortion: >99% transmittance consistency across 190-2700nm wavelengths for laser coherence.
- Chemical corrosion immunity: Full pH stability (0-14) with zero reactivity to acidic/caustic process environments.
- Thermal drift elimination: Coefficient of thermal expansion (5.0×10^{-7}/°C) ensures micron-scale dimensional stability up to 1,250°C.
- Maintenance-optimized design: Non-porous surfaces reduce cleaning frequency by 60% through hydrophobic anti-contamination treatment.



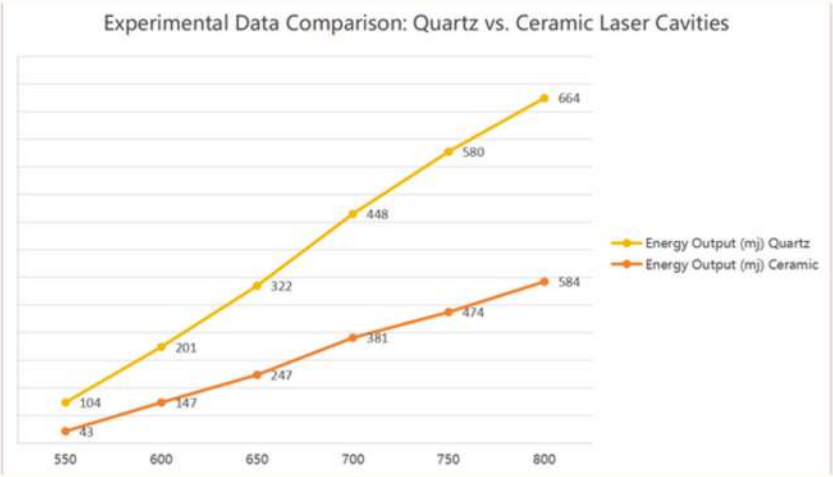
High-purity laser quartz cavity filters serve as mission-critical optical solutions across advanced technology sectors, with key implementations in:

- **Industrial material processing lasers**
  Cutting/welding system light path stabilization
- **Laboratory analytical instruments**
  Spectroscopic detection excitation cavity assemblies
- **Non-implantable medical laser devices**
  Dermatology/Ophthalmology light source encapsulation

WHY CHOOSE QUARTZ CAVITY FILTER OVER CERAMIC?

Optic-grade quartz cavity modules achieve higher energy efficiency and stable pulse management compared to ceramic counterparts.

Input Voltage (V)	Energy Output (mj)		Energy Ratio (Ceramic : Quartz)	Pulse Width (ns)	
	Ceramic	Quartz		Ceramic	Quartz
550	43	104	1:2.374	44	40
600	147	201	1:1.371	23	22
650	247	322	1:1.304	18	18
700	381	448	1:1.177	13	13
750	474	580	1:1.222	12	12
800	584	664	1:1.138	11	11



TECHNICAL DATA SHEET

Engineered laser quartz cavity filters exhibit uncompromising material performance, enabling precise adaptation to custom optical system requirements.

I. Mechanical & Physical Properties

Parameter	Value	Parameter	Value
Density	2.203 g/cm³	Modulus of Rigidity	31,000 MPa
Compressive Strength	1,100 MPa	Mohs Hardness	5.5–6.5
Flexural Strength	67 MPa	Poisson's Ratio	0.14–0.17
Tensile Strength	48.3 MPa	Young's Modulus	72,000 MPa
Optical Performance	Refractive index: 1.456–1.460, dielectric constant: 3.75–6.0 @1MHz		

TECHNICAL DATA SHEET

II. Thermal Properties

Parameter	Value	Parameter	Value
Softening Point	1,680°C	Thermal Conductivity (20°C)	1.4 W/m·°C
Annealing Point	1,210°C	Thermal Expansion Coefficient	5.5×10^{-7} cm/cm·°C
Short-Term Service Temp.	1,300°C	Hot Work Temp. Range	1,700–2,000°C
Long-Term Service Temp.	1,100°C	Specific Heat (20–350°C)	670 J/kg·°C

III. Electrical Properties

Parameter	Value	Parameter	Value
Resistivity	7×10^{7} Ω·cm	Dielectric Constant (ε)	3.7–3.9
Dielectric Strength	250–400 kV/cm	Dielectric Loss Coefficient	$<1\times10^{-4}$

TECHNICAL DATA SHEET

IV. Chemical Resistance (Corrosion Rate in g/cm²)

Solution	Conditions	Corrosion Rate
98% H_2SO_4	20°C, 2h	**1.4×10^{-8}**
60% HNO_3	20°C, 2h	**5.0×10^{-8}**
36% HCl	20°C, 2h	**15×10^{-8}**
5% NaOH	100°C, 10h	**1.35×10^{-3}**

CUSTOM SOLUTIONS

High-precision quartz cavity filters support tailored configurations for optimized lasing performance across industrial, analytical, and medical systems.

I. Laser Cavity Structures

Cavity Configuration	Applications	Material Recommendation
Single Lamp + Single Rod	Low-power medical dermatology devices	**Synthetic quartz, Ce-doped quartz**
Dual Lamp + Dual Rod	Industrial sheet metal cutting lasers	**Fused silica, Ti-doped quartz**
Triple Lamp + Triple Rod (Elliptical)	Laboratory fluorescence spectrophotometry	**Eu-doped quartz, Sm-doped quartz**
Pentagonal Array (Cylindrical)	High-throughput material engraving systems	Borosilicate glass with AR coating

CUSTOM SOLUTIONS

II. Material Selection Matrix

Material Type	Key Properties	Ideal Use Cases
Fused Silica	CTE: 5.5×10^{-7}/°C, >99% UV transmittance	**Extreme thermal stability systems**
Ce-doped Quartz	Radiation hardening, 280-350nm absorption cutoff	**MRI-guided surgical lasers**
Ti-doped Quartz	Enhanced IR filtration (1,200-2,500nm)	**Industrial CO_2 laser cutting**

III. Specialty Coatings

Gold Film

- Reflectivity: >98% @ 1,064nm
- Operational lifespan: 15,000+ hours

Silver Film

- Cost efficiency: 30% lower vs. gold
- Recommended for prototype development