ADCERAX
ADVANCED CERAMICS

Multi-Bore Alumina Tube

Customized Multi-Bore Alumina Tube for High-Temperature

Contact Information

- Tel: +86-0731-84428843
- Whatsapp: +86-19311583352
- E-mail: info@adcerax.com
- Website: https://adcerax.com
- Address: Building 108, Industrial Park, Liling city Hunan Province, China

About ADCERAX

Powered by **HUNAN ATCERA CO.,LTD** – A Trusted Innovator in Advanced Ceramics Since 2010 ,**HUNAN ATCERA CO. Ltd** has been deeply engaged in the field of advanced ceramics for 20 years, and has production experience of more than 2000 precision ceramic products. We focus on the material of alumina ceramics, zirconia ceramics, silicon carbide ceramics, silicon nitride ceramics, aluminum nitride ceramics and quartz, etc., and aim to provide you with advanced ceramics one-stop service.

Adcerax delivering bespoke advanced ceramic solutions for industries where precision and durability matter.And has become a leading global China supplier of alumina ceramic tubes, with products exported to the United States, Germany, Japan, South Korea, and many other countries.

Our Expertise

Engineering Support: Professional product engineers providing timely technical assistance from design to production.

Customization Capability: Accepting small-batch custom orders based on customer drawings or samples.

Rapid Delivery: Quick shipping for custom orders and 24-hour dispatch for in-stock standard products.

Supply Chain Integration: One-stop customization and procurement services leveraging China's supply chain advantages.

ADCERAX Promise

Your ROI Starts from Day One

- ↑ 37% Lifespan: Industry Standards Verified by SGS Third-Party Testing in Extreme Thermal Shock Environments
- ↓ 22% Downtime: Reduce unplanned downtime with ceramic component life enhancement
- ⚡15 days fast response: From drawing confirmation to functional prototype delivery
- 🛡️12 months warranty: Unconditional return of quality problems to factory for remanufacturing + process optimization report

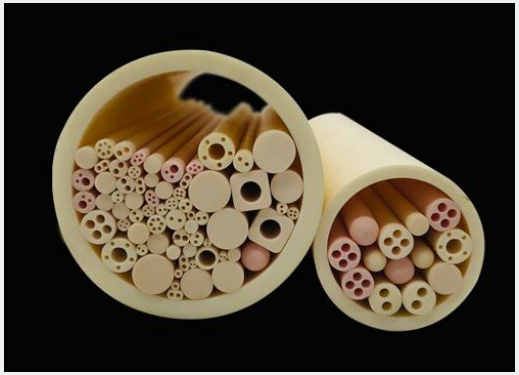
Our Certifications

What is Multi-Bore Alumina Tube?

Multi-Bore Alumina Tube is a high-temperature ceramic component made from high-purity aluminum oxide (Al_2O_3), designed with multiple internal bores (like 6holes,10holes and more)running along its length. These tubes are engineered to meet specific dimensional and structural requirements provided by the customer, including the number of bores, bore diameter, outer diameter, length, and end configurations (open, closed, etc.).

Common Applications:

- Thermocouple protection in high-temperature furnaces
- Gas flow distribution in laboratory reactors
- Electrical insulation in heating systems
- Multi-point temperature sensing in industrial processes



Multi-Bore Alumina Tube Process

Raw Material Preparation

Alumina powder is selected and mixed with binders and plasticizers to form a uniform slurry or paste.

Forming

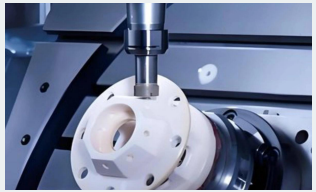
Extrusion: Alumina slurry is extruded through a die into continuous tubular shapes.
Isostatic Pressing: Powder is molded under high pressure to form high-density, uniform tubes.
Slip Casting: Liquid slurry is cast into a mold and solidified.

Drying

The formed tubes are dried slowly to remove moisture and prevent cracking or deformation.

Sintering

The dried tubes are fired in a high-temperature kiln (typically 1600–1700°C) to achieve full densification and develop the final ceramic properties.



Machining

After sintering, the tubes may be ground or machined to achieve precise dimensions, surface finish, or special features such as chamfered ends or holes.

Alumina Ceramic Multiple-Bore Tubes Properties

Property	Unit	99.7% Al2O3	99.5% Al2O3	99% Al2O3	96% Al2O3
Color		Ivory White	Ivory White	Ivory White	Ivory White
Density	g/cm³	3.94	3.9	3.83	3.6-3.75
Water Absorption	%	0	0	0	0
Hardness	Mohs Hardness	9.1	9	9	8.8
Flexural Strength (20°C)	Mpa	330	320	300	260
Compressive Strength (20°C)	Mpa	2300	2300	2210	1910
Maximum Operating Temperature	°C	1730	1700	1680	1450
Thermal Expansion Coefficient (25°C to 800°C)	10^{-6}/°C	7.6	7.6	7.6	7.6
Thermal Conductivity (25°C)	W/(m·K)	29	27	24	22
Dielectric Strength (5mm thickness)	AC-kv/mm	22	21	19	15
Dielectric Loss at 25°C@1MHz	---	< 0.0001	< 0.0001	0.0003	0.0004
Dielectric Constant at 25°C@1MHz	---	9.8	9.7	9.5	9.2
Volume Resistivity (20°C)	Ω·cm³	$>10^{14}$	$>10^{14}$	$>10^{14}$	$>10^{14}$
Volume Resistivity (300°C)	Ω·cm³	$2*10^{12}$	$2*10^{12}$	$4*10^{11}$	$2*10^{11}$

Technical Advantages

Excellent High-Temperature Resistance

Maximum operating temperature up to 1730° C (99.7% Al2o3), meeting extreme high-temperature environment demands.

Superior Electrical Insulation

Volume resistivity >10^{14} Ω·cm^3, dielectric strength up to 22 AC-kv/mm (5mm thickness).

High Dimensional Accuracy

Tolerance up to ±0.2mm, ensuring precise installation and use.

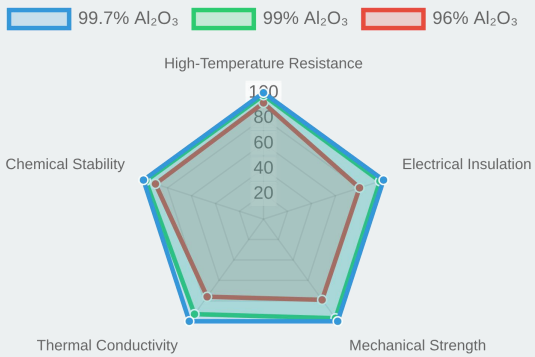
Chemical Stability

Resistant to acids, alkalis, and corrosive gases, suitable for various harsh environments.

Structural Integrity

Flexural strength 330 Mpa, compressive strength 2300 Mpa, with excellent mechanical properties.

Performance Comparison of Alumina Ceramics with Different Purity



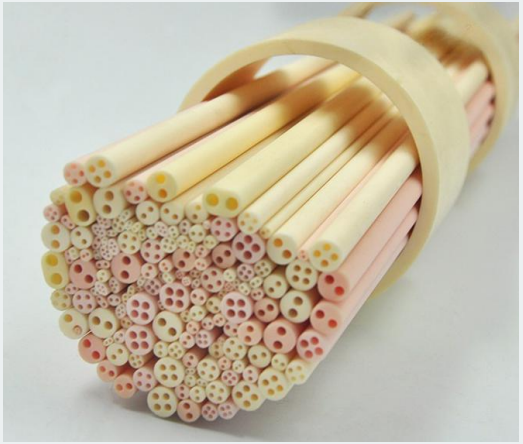
Performance Comparison

1. Higher temperature resistance than quartz glass
2. Better electrical insulation than zirconia ceramics
3. More cost-effective than silicon nitride
4. Longer service life in corrosive environments

Multi-Bore Alumina Tube Specifications

ADCERAX supply multi-bore alumina tubes are improving space efficiency and system integration. These tubes are available in standard sizes or can be customized in terms of outer diameter, hole diameter, length, and end configuration.

Specification Parameter	Details
Product No.	TE-AT-6001
Material	Al2O3(Alumina)
Purity Options	96% / 99% / 99.5% / 99.7%
Max. Working Temp.	1450° C (96%) - 1730° C (99.7%)
Bore Options	2 /4 / 6 / 8 / 9 / 10 / more (Customizable Layout)
Standard Outer Diameter	1mm - 30mm
Standard Holes	0.2mm - 3mm
Standard Length	≤3000mm



Multi-Bore Alumina Tube Benefits

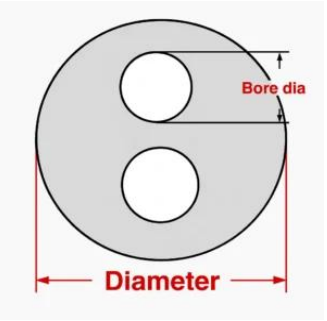
- High dimensional accuracy for reliable assembly
- Multi-channel design for simultaneous gas flow
- High electrical insulation prevents signal interference
- Corrosion resistance in aggressive environments

2-Hole Alumina Tube Size

Item No.	Diameter (mm)	Bore Dia.(mm)	Length Available	Purity Available
TE-AT-112	1.0	0.3	≤2500mm	95%,99%, 99.5%
TE-AT-113	1.2	0.3		
TE-AT-114	1.4	0.4		
TE-AT-115	1.5	0.4		
TE-AT-116	2.0	0.3		
TE-AT-117	2.0	0.5		
TE-AT-118	2.0	0.6		
TE-AT-119	2.5	0.7		
TE-AT-120	3.0	0.7		
TE-AT-121	3.5	0.8		
TE-AT-122	3.5	1.0		
TE-AT-123	4.0	1.2		
TE-AT-124	4.0	1.5		
TE-AT-125	4.5	1.2		
TE-AT-126	5.0	1.2		

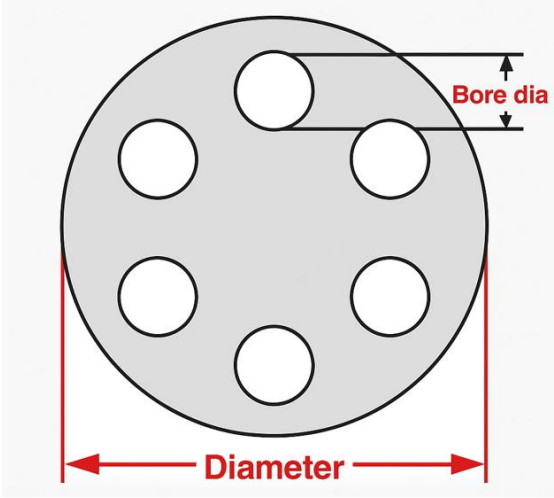
Item No.	Diameter (mm)	Bore Dia.(mm)	Length Available	Purity Available
TE-AT-127	5.0	1.5	≤2500mm	95%,99%, 99.5%
TE-AT-128	5.5	1.5		
TE-AT-129	5.5	1.8		
TE-AT-130	6.0	1.8		
TE-AT-131	6.5	1.8		
TE-AT-132	6.5	2.0		
TE-AT-133	8.0	2.0		
TE-AT-134	8.0	2.4		
TE-AT-135	8.5	2.6		
TE-AT-136	10.0	2.7		
TE-AT-137	16.0	4.9		

Note: The table above shows only some standard specifications. For more specifications, please contact us.



6 Bore Alumina Tube Size

Item No.	Outer Diameter (mm)	Bore Dia.(mm)	Length(mm)
TE-AT-60001	1.85	0.2	≤3000
TE-AT-60002	4.5	0.8	≤3000
TE-AT-60003	4.6	0.8	≤3000
TE-AT-60004	4.7	0.8	≤3000
TE-AT-60005	5.8	1	≤3000
TE-AT-60006	6	1	≤3000
TE-AT-60007	7.8	1.25	≤3000
TE-AT-60008	7.8	1.1	≤3000
TE-AT-60009	8	0.8	≤3000
TE-AT-60010	8	1.15	≤3000
TE-AT-60011	8.2	1.15	≤3000
TE-AT-60012	10	1.3	≤3000
TE-AT-60013	15	1	≤3000
TE-AT-60014	20	1.5	≤3000



Note: The table above shows only some standard specifications. For more specifications, please refer to the complete product catalog or contact us for customization.

Alumina Ceramic 9-Hole Tube

High-Density Multi-Channel Insulator

SPECIFICATIONS

Al_2O_3 Purity	**96% – 99.7%**
Max Temperature	**1450°C – 1730°C**
Outer Diameter	**10 mm – 35 mm**
Length	**Up to 1500 mm**
Tolerance	**±0.15 mm**

APPLICATIONS

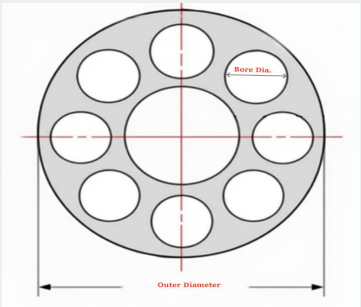
Gas Analysis · RF/Plasma Systems · Environmental Monitoring · Lab OEM

KEY FEATURES

1. 9 isolated internal channels for high-density wiring or sensing arrays
2. Supports up to 9 thermocouple wires in a single compact housing
3. Reduces instrument port complexity by up to 80% in industrial setups
4. Alumina permittivity (εr ≈ 9.8) minimizes capacitive coupling at MHz range

Alumina Ceramic 9-Hole Tube Size:

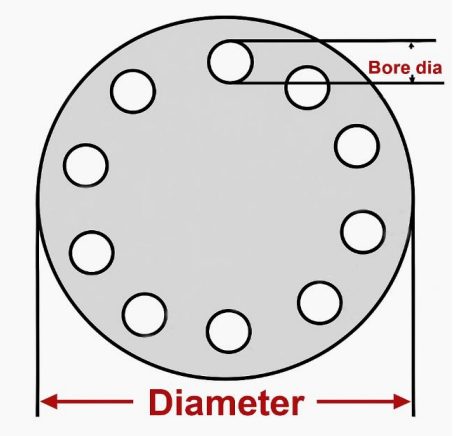
Item No.	Outer Diameter (mm)	Bore Dia.(mm)	Length Available	Purity Available
TE-AT-90001	13	0.6	≤3000mm	95%,99%, 99.5%
TE-AT-90002	16	0.6		

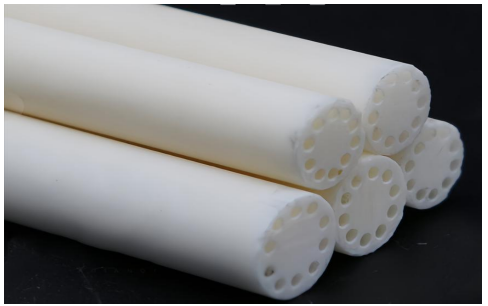


🎯 10 Bore Alumina Tube Size

Item No.	Outer Diameter (mm)	Bore Dia.(mm)	Length(mm)
TE-AT-70015	6	0.8	≤3000
TE-AT-70016	6.5	0.8	≤3000
TE-AT-70017	6.5	0.9	≤3000
TE-AT-70018	7	0.9	≤3000
TE-AT-70019	7	1	≤3000
TE-AT-70020	8	1.1	≤3000
TE-AT-70021	14	1.5	≤3000
TE-AT-70022	16	1.5	≤3000
TE-AT-70023	20	1.5	≤3000

Note: The table above shows only some standard specifications. contact us for customize more size.





Multi-Bore Alumina Tube Applications

Thermocouple Protection in High-Temperature Furnaces

Key Advantages

1. Multi-point sensing in confined space
Allows up to 8 thermocouple wires in a single tube with OD ≤ 12mm, reducing port usage by 60%.

2. Consistent thermal response across channels
Uniform wall thickness and bore spacing ensure <3° C deviation between adjacent thermocouple readings at 1200° C.

3. Simplified furnace wall penetration
Single-sheath design reduces feedthrough complexity by 70%, minimizing thermal leakage and mechanical stress.

Solution

In a German materials lab using a 4-zone tube furnace, switching from four single-bore tubes to one 4-bore alumina tube reduced wall penetrations from 4 to 1, cutting installation time by 50% and improving thermal uniformity by 12°C across zones. This upgrade enabled more accurate sintering profiles and reduced sensor failure rate by 30% over 6 months of continuous operation.

Sensor Housing in Analytical Instruments

Key Advantages

1.Channel-to-channel electrical isolation
$\geq 10^6$ Ω·cm resistivity between bores ensures signal integrity in multi-sensor configurations.

2. Compact multi-sensor integration
Supports up to 6 isolated sensor wires in a single 10mm OD tube, reducing housing footprint by 40%.

3. Cross-talk suppression in high-sensitivity systems
Bore wall thickness ≥1.2mm minimizes electromagnetic interference between adjacent signal lines.

Solution

In a U.S.-based environmental monitoring system, replacing three separate alumina tubes with one 6-bore tube enabled integration of six optical sensors in a 12mm OD housing. This reduced enclosure size by 35%, eliminated internal cross-talk issues, and improved the signal-to-noise ratio by 18% in field tests over a 3-month deployment in high-humidity conditions.

Electrical Insulation in High-Voltage Systems

Key Advantages

1. Independent conductor isolation in compact form
Up to 6 conductors can be routed in a single 14mm OD tube with ≥2mm wall separation between bores.

2. High dielectric strength across bore walls
Withstands >15 kV/mm between adjacent channels, preventing arc-over in RF and HV systems.

3. Reduced parasitic capacitance in signal routing
Bore-to-bore spacing and alumina permittivity (εr ≈ 9.8) minimize capacitive coupling in MHz–GHz ranges.

Solution

In a South Korean RF plasma generator project, switching from three single-channel insulators to one 3-bore alumina tube reduced internal wiring volume by 45% and eliminated arc-over events at 12 kV. The redesign improved system uptime by 22% over a 4-month production cycle and enabled safer integration of high-frequency signal and power lines within a single ceramic housing.

Customize Multi-Bore Alumina Tube

ADCERAX supply alumina multi-bore tubes designed for precise gas shielding and thermocouple protection under high-temperature and corrosive conditions. Available in standard and custom dimensions, these tubes support continuous operation at 1600° C, making them suitable for use in laboratory furnaces, sensors, and analytical systems.

Customizable Parameters

Outer Diameter
OD 3-220mm, ID 1-200mm ±0.05mm tolerance
contact us for other sizes.

Inner Bore Diameter
0.25–10.0 mm ±0.05mm tolerance,
contact us for other sizes

Length
Up to 3000mm, meeting various application needs.

Processing type
CNC, plane grinding, internal grinding, drilling, cutting

End Detail
Open, closed, and other end treatments.

Cross-Sectional Shape
round, square, rectangular, triangle ,custom cavity or other shapes customized upon request.

Customization Process

1. **Inquiry & Design** — Submit your **detailed** requirements
2. **Mold & Samples** — Proceed with mold/sample creation
3. **Confirmation** — Confirm specifications and contract
4. **Delivery** — Safe and efficient shipping

Fast Response Commitment

From drawing confirmation to functional prototype delivery

15 Days

Multi-Bore Alumina Tube Usage Guide

How To Use

- ✓ Insert thermocouple wires or gas lines into each bore.
- ✓ Secure the tube using ceramic holders or clamps.
- ✓ Avoid sudden temperature changes to prevent thermal shock.

Storage

- ✓ Store in a dry, vibration-free environment.
- ✓ Avoid stacking without protective layers.

Cleaning

- ✓ Use compressed air or mild ultrasonic cleaning.
- ✓ Do not use acidic or alkaline solutions that may degrade the surface.

Common Mistakes

- ✓ Forcing oversized wires into bores may cause cracking.
- ✓ Using in environments above 1650°C may lead to structural failure.
- ✓ Using in reducing atmospheres may degrade alumina over time.

Common Misuse of Solutions

★ Issue: Cracks appear after the first use
→ Cause: Thermal shock due to rapid heating
→ Solution: Preheat gradually at ⩽200° C/hour up to 800° C, then increase rate

★ Issue: Bore blockage or contamination
→ Cause: Residue buildup from previous use
→ Solution: Use ultrasonic cleaning or soft mechanical cleaning tools

★ Issue: Misfit with equipment
→ Cause: Dimensional mismatch
→ Solution: Confirm tolerance requirements before ordering; request drawing support

Technical Support

Technical Inquiry: info@adcerax.com
Service Hotline: +86-0731-84428843
Whatsapp: +86-19311583352

Alumina Ceramic 9-hole Tube FAQ

- **Q: Can I customize the inner bore layout or spacing?**
  A: Yes. ADCERAX supports client drawings or CAD file definition of bore layout, spacing, and concentricity.

- **Q: Do the tubes maintain insulation when exposed to hydrogen or aggressive gases?**
  A: Yes. The dielectric properties of 99.7% alumina remain high even under reducing and corrosive atmospheres.

- **Q: Is it possible to get closed-ended tubes with four bores?**
  A:Yes. Closed-end is supported for 2-10 or more bores variants via slip casting or CNC trimming.

- **Q: What surface finish options do you offer?**
  A: As-fired (raw), matte-polished, or smooth-blasted surfaces per application need.

- **Q: Can I get a sample before a bulk order?**
  A: Yes, sample orders are accepted for evaluation.

- **Q: What is the tolerance on bore diameter?**
  A: Typical tolerance is ±0.1mm; tighter tolerances can be discussed.

Service Support

ADCERAX is committed to providing comprehensive service support to customers, from product selection to after-sales maintenance.

Pre-Sales Support

- Expert technical team provides custom design advice
- Sample testing and performance verification
- Technical parameter consultation

Sales Support

- Order tracking and production progress updates
- Professional packaging and logistics solutions

After-Sales Service

- Product quality assurance and problem resolution
- Technical consultation and application support
- 24-hour response commitment

Quality Assurance

- Strict quality control system
- Product performance testing and verification

Related Products

- Ceramic End Caps
- Ceramic Heating Rods
- Ceramic Insulators
- Thermocouple Assemblies

Contact Our Specialist Team

Customer Service: info@adcerax.com

Service Hotline: +86-0731-84428843

Online Support: adcerax.com/support

Contact Us

ADCERAX looks forward to cooperating with you and providing high-quality multi-bore alumina tube solutions. Our team is dedicated to serving you with any questions or needs you may have.

Contact Information

+86-0731-84428843
info@adcerax.com
+86-19311583352
adcerax.com
Building 108, Industrial Park, Liling city Hunan Province, China

Inquiry Process

1. **Submit Inquiry**
   Submit your requirements via email, phone, or website form.
2. **Technical Evaluation**
   Our expert team evaluates your needs and provides solutions.
3. **Quotation Confirmation**
   Provide detailed quotation and delivery time based on your requirements.
4. **Order Confirmation**
   Confirm order and arrange production and delivery.

Get in touch with us

We promise to respond to your inquiry within 24 hours.

Ready to enhance your product performance with multi-bore alumina tube? Contact our team for personalized consultation, technical support, and competitive quotations.

Get A Quote