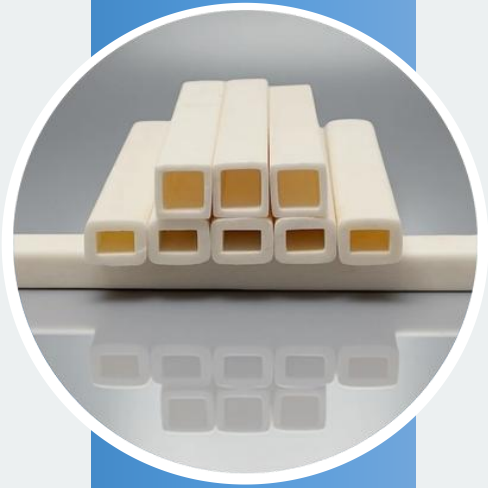
ADCERAX
ADVANCED CERAMICS

Alumina Corundum Square Tube



High-Quality Alumina Ceramic Tube Solutions Expert

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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

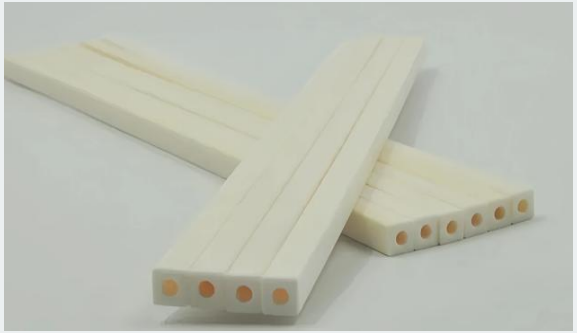
Our Certifications

What is alumina corundum square tube?

An alumina corundum square tube is a high-purity ceramic tube made from aluminum oxide (Al2O3), extruded or moulded into a square or rectangular cross-section. Often preferred in custom furnace designs where space efficiency or alignment matters. “Corundum” refers to crystalline alumina, known for its hardness and thermal stability.

Customization options include:

- Furnace Components – used as furnace liners, sample holders, and protective tubes in high-temperature kilns.
- Thermocouple Protection – insulates and protects thermocouple wires in industrial heating systems.
- Laboratory Equipment – used in controlled atmosphere experiments and material testing.
- Powder Metallurgy & Sintering – acts as channels or containers during high-temperature sintering.
- Electrical Insulation – square geometry provides structural stability for insulating elements in power and sensor devices.



Alumina Corundum Square Tube Process

Raw Material Preparation

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

Forming

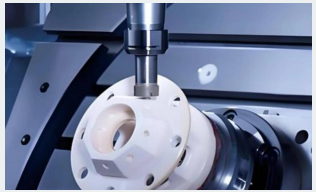
Extrusion: Alumina slurry is extruded through a die into continuous tubular shapes.
Isostatic Pressing: Powder is molded under high pressure to form high-density, uniform tubes.
Slip Casting: Liquid slurry is cast into a mold and solidified.

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 Corundum Square Tube 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

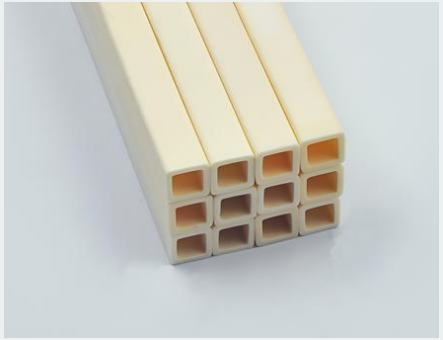
Tolerance up to ±0.1mm, ensuring precise installation and use.

Chemical Stability

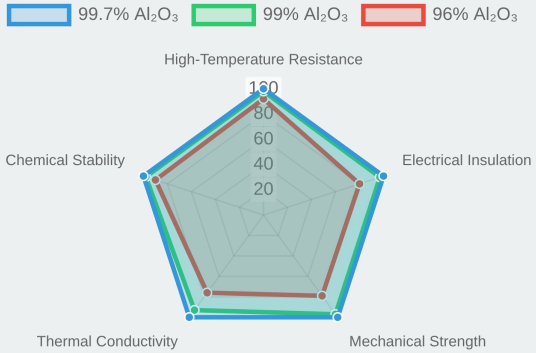
Resistant to acids, alkalis, and corrosive gases, suitable for various harsh environments.

Structural Integrity

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



Performance Comparison of Alumina Ceramics with Different Purity



Alumina Corundum Square Tube Specifications

ADCERAX supply alumina corundum square tube 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.

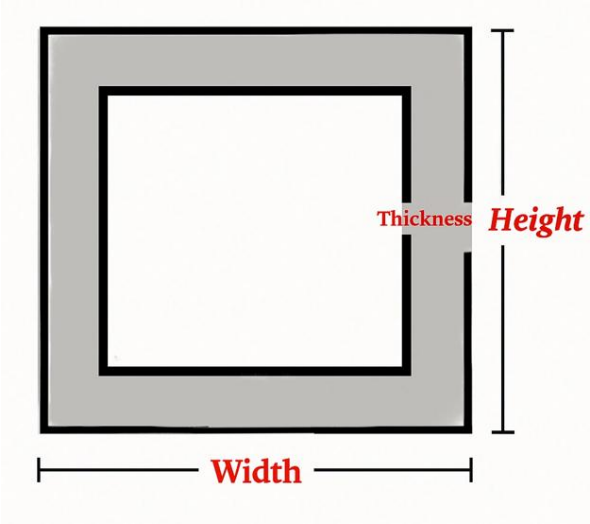
Specification Parameter	Details
Product No.	TE-AT-50001
Material	Al2O3(Alumina)
Purity Options	96% / 99% / 99.5% / 99.7%
Max. Working Temp.	1450° C (95%) - 1730° C (99.7%)
Tolerance	±0.05mm to ±5mm (depending on dimensions)
Surface Finish	Raw, Polished, or Glazed
End Types	Open Both Ends (standard), Closed One End (optional)
Dimensions	1mm - 160mm (diameter)
Standard Length	≤3000mm

Alumina Corundum Square Tube Features

- High Temperature Stability
- Excellent Electrical Insulation
- High Dimensional Accuracy
- Good Chemical Stability

Alumina Corundum Square Tube Size:

Type1-Al2O3 Corundum Square Tubes

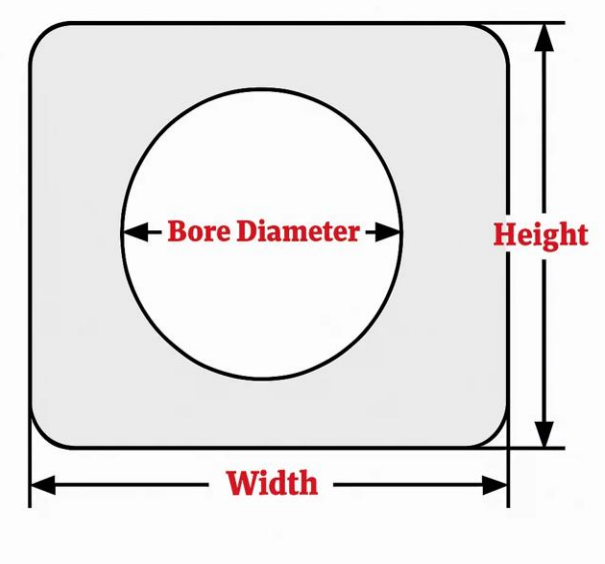


Item No.	Width (mm)	Height (mm)	Thickness (mm)	Length (mm)
TE-AT-50001	7	7	1.5	≤2000
TE-AT-50002	8	6	1	≤2000
TE-AT-50003	8.7	6.3	1.1	≤2000
TE-AT-50004	9.5	9.5	2	≤2000
TE-AT-50005	10	10	5	≤2000
TE-AT-50006	11	8	2.5	≤2000
TE-AT-50007	13	10	2	≤2000
TE-AT-50008	15	15	4	≤2000
TE-AT-50009	16.5	16.5	5	≤2000
TE-AT-50010	23	16	3	≤2000
TE-AT-50011	25	25	3.5	≤2000
TE-AT-50012	32	27	3.5	≤2000
TE-AT-50013	36	30	3	≤2000
TE-AT-50014	40	30	3	≤2000

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

Alumina Corundum Square Tube Size:

Type2-Al2O3 Corundum Square Tubes with Round Bore



Item No.	Width (mm)	Height (mm)	Bore Dia (mm)	Length (mm)
TE-AT-50015	6	6	2.3	≤2000
TE-AT-50016	8	8	4.5	≤2000
TE-AT-50017	8	8	4	≤2000
TE-AT-50018	9.5	9.5	5.2	≤2000
TE-AT-50019	10	10	4.5	≤2000
TE-AT-50020	10	10	7	≤2000
TE-AT-50021	18	18	6	≤2000
TE-AT-50022	23	23	8	≤2000
TE-AT-50023	27	27	5.5	≤2000
TE-AT-50024	32	32	10	≤2000
TE-AT-50025	40	40	9	≤2000

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

Alumina Corundum Square Tube Applications

Industrial Kilns

Key Advantages

1.Expanded internal flow capacity
— A 30×30 mm square tube provides roughly 27% more usable cross-sectional area compared to a circular tube of equal outer span, allowing higher gas throughput without enlarging the kiln chamber.

2.Predictable flow regime control
— For a 30 mm side length, the hydraulic diameter equals 30 mm; using Re < 2300 ensures nitrogen or hydrogen purge stays laminar, which stabilizes gas residence time and atmosphere uniformity.

3.Improved sealing at interfaces
— Flat external faces support tight contact with graphite or metallic gaskets, enabling leak rates below 1×10^{-6} mbar·L/s in standard helium tests, a benchmark suitable for controlled-atmosphere sintering.

Solution

One ceramics manufacturer running atmosphere kilns for powder metallurgy struggled with unstable purge efficiency and repeated seal failures when using round ceramic conduits. By adopting 30×30 mm alumina corundum square tubes, the gas channel area increased by about 27%, enabling faster nitrogen purge while keeping the flow laminar at Re < 2300. Flat outer faces allowed gasket compression that held helium leak rates below 1×10^{-6} mbar·L/s, eliminating atmosphere loss during 1200 °C cycles. The same square conduit also carried $MoSi_2$ heating elements while maintaining isolation from the process gas, which reduced purge stabilization time by 25% and extended seal life across multiple firing runs.

Laboratory Furnace

Key Advantages

1. Controlled thermal expansion for accurate setups
— With a coefficient of thermal expansion around $8.1–8.4\times10^{-6}$/K, a 300 mm span expands only about 2.4 mm when heated from room temperature to 1000 °C, allowing researchers to calculate fixture tolerances precisely.

2. High elastic modulus retained at elevated temperature
— Alumina maintains a Young's modulus above 300 GPa at 1000 °C, ensuring that the supporting tube does not deform under load during extended furnace cycles.

3. Square geometry improves alignment accuracy
— The flat outer surfaces of the tube allow secure indexing within furnace jigs, helping operators keep coaxial alignment error below 5% in dimensional-change measurements.

Solution

In high-temperature shrinkage experiments, a materials research lab encountered inconsistent results due to uncontrolled thermal growth and shifting of specimen holders. By replacing round tubes with square alumina corundum tubes, they could predetermine a 2.4 mm expansion allowance for a 300 mm length and lock stages against flat tube walls. This adjustment reduced alignment error to under 5% during 1000 °C cycles, and the tube's stiffness above 300 GPa prevented deflection over two-hour dwells. The outcome was a measurable reduction in data scatter across repeat runs, improving the reliability of dimensional-change reporting.

Powder Metallurgy

Key Advantages

1. Higher conduit capacity in tight hot zones
— Square geometry yields ≈27% more internal area than a circular tube of the same outside span, enabling parallel routing of purge gas and heating-element leads within one passage.

2. Predictable laminar purge design
— For a square tube the hydraulic diameter equals the side length (Dh = a); with Re < 2300, a 30×30 mm conduit keeps nitrogen purge laminar at ~1.1 m/s average velocity at 25 °C, stabilizing residence time.

3. Atmosphere integrity verified at the joint
— Flat external faces mate to graphite/metal gaskets and routinely pass helium leak tests below 1×10^{-6} mbar·L/s, supporting dew point targets ≤ −40 °C for reducing H_2 atmospheres used in PM sintering.

Solution

Powder-metallurgy debind/sinter line processing stainless parts in hydrogen at 1340 °C faced long purge stabilization and intermittent atmosphere loss. Switching the round manifold to a 30×30 mm alumina corundum square tube increased the available flow area by ~27% and set Dh to 30 mm; purge was re-sized to keep Re < 2300 (laminar) with ~1.1 m/s start-of-line velocity at 25 °C, then adjusted for hot-gas density. Flat-face seals were qualified < 1×10^{-6} mbar·L/s in helium testing and furnace dew point held at ≤ −40 °C during cycles. The resulting setup cut purge-to-spec time by roughly one-fifth while maintaining stable reducing conditions across the heating zone.

Alumina Corundum Square Tube Customized

ADCERAX offers comprehensive customization services based on your technical drawings or specifications to meet your specific needs.These tubes are available in standard sizes or can be customized in terms of length, diameter, wall thickness.

Customizable Parameters

Dimensional Accuracy
OD:3-220mm ID: 1-200mm(±0.05-5mm tolerance) contact us for other sizes.

Length
Up to 3000mm

Colour
Red, Black, Blue and more colours

Processing type
CNC, plane grinding, drilling, cutting

Surface Finish
Raw, polished, or Glazed

Material Purity
96%, 99%, 99.5%, or 99.7%

Special Processing Options

- Cutting
- Drilling
- Threading
- Slotting
- Custom Shapes
- Grinding

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

Alumina Corundum Ceramic Square Tube Usage Guide:

Installation & Operation Tips

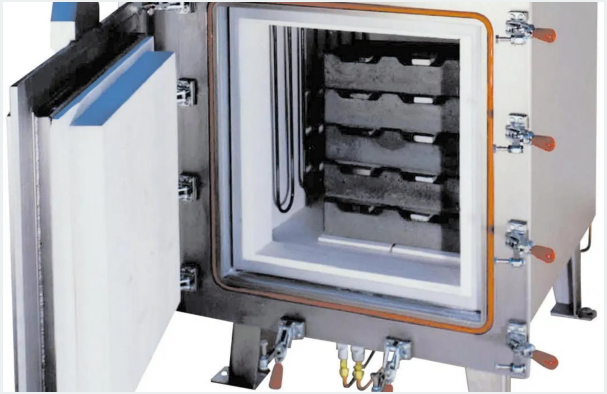
- Ensure ceramic tubes and connecting parts are clean before installation.
- Use appropriate support devices to fix the ceramic tube.
- Control heating and cooling rates at 3-5° C/minute.
- Use specialized ceramic flanges or sealing rings for connections.

Maintenance & Care

- Regularly check ceramic tube surfaces for cracks or damage.
- Clean with a soft cloth and neutral detergent.
- Store in a dry environment when not in use for long periods.

Common Mistakes

- Over-tightening clamps can cause cracking
- Rapid heating without preheating may lead to thermal stress



Technical Support

Technical Inquiry: info@adcerax.com

Service Hotline: +86-0731-84428843

Whatsapp: +86-19311583352

Alumina Corundum Square Tube FAQ:

- **Q: Can I order custom-sized or custom-machined alumina corundum square tube?**
  A: Absolutely. Beyond our standard offerings, we specialize in providing custom alumina corundum square tube. This includes custom outer dimensions, inner dimensions (or wall thickness),lengths, and additional machining features like holes, slots, or specific end finishes to meet your unique design specifications for your alumina corundum Square Tube.

- **Q: What are some common industrial applications for Technical Ceramic Square Tubes like these?**
  A:Technical Ceramic Square Tubes, particularly those made from alumina, are used in numerous industrial applications. These include furnace components (like element supports or protection tubes), electrical insulators, thermocouple sheaths, laser cavities, wear-resistant liners or guides, and components for semiconductor processing equipment that require robust alumina corundum square tube.

- **Q: How do alumina corundum square tube compare to metal tubes for high-temperature or electrically insulating applications?**
  A: Absolutely. We specialize in alumina single bore tubes customized to meet specific technical drawings or performance requirements.

- **Q: What information do I need to provide to get an accurate quote for alumina corundum square tube?**
  A: To receive an accurate quote for your alumina corundum square tube, please provide the desired alumina purity (e.g., 99.7% Al2O3), outer dimensions, wall thickness (or inner dimensions), length, quantity, any specific tolerance requirements, and a brief description of your application or operating environment. Drawings are helpful for custom-machined Al2O3 corundum square Tubes.

- **Q: Do you provide wholesale alumina corundum square tubes?**
  A: Yes. We support wholesale orders for standard sizes and customized designs. OEMs and distributors often purchase in bulk for a stable supply.

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

Supporting Products

- Ceramic Flanges
- Ceramic Plugs
- Ceramic Brackets
- Thermocouple Protection Tubes

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 alumina corundum tube solutions. Our team is dedicated to serving you with any questions or needs you may have.

Contact Information

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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 a Quote Now

We promise to respond to your inquiry within 24 hours.

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

Get A Quote