ADCERAX®

ENGINEERING PRODUCT CATALOG

Engineering Zirconia Ceramic Blocks

For fixtures, support faces and wear interfaces

Select a published block size, compare the material systems and define the finished part for engineering review and quotation.

3D envelope



Overall rectangular envelope

No hole or recess pattern implied

Governing views



Technical illustration of the dimension convention. Actual holes, slots, recesses and surface details are drawing-defined.

Find the information you need

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Scope

Dense engineering zirconia block specifications and drawing inputs. Dental CAD/CAM blanks, black zirconia formulations, porous refractory bodies and complete equipment require separate specifications.

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Published AT-ZB block sizes

Use an AT-ZB reference to start an inquiry. Each row is one published size; the rows do not define an unrestricted range of length, width and thickness combinations.

3D envelope



Overall rectangular envelope

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Governing views



Envelope dimension key • Not to scale. L = length; W = width; T = thickness. The project drawing controls all features and tolerances.

Catalog reference	L (mm)	W (mm)	T (mm)
AT-ZB-0001	35	20	3
AT-ZB-0002	48	24	3.5
AT-ZB-0003	52	30	5
AT-ZB-0004	57	25	12
AT-ZB-0005	60	21	15
AT-ZB-0006	63	40	8
AT-ZB-0007	70	36	8
AT-ZB-0008	75	45	5
AT-ZB-0009	80	22	4
AT-ZB-0010	85	46	5
AT-ZB-0011	92	50	7
AT-ZB-0012	100	43	10

Size status: catalog references. Final geometry, tolerances, material, delivery condition and availability are confirmed with the drawing and quotation.

Confirm the material separately

An AT-ZB reference identifies the published envelope. Specify the required stabilization system and exact grade separately; it does not follow from the item number.

A matching envelope alone does not establish the hole pattern, datum scheme, functional finish, equipment fit or load capacity. For a replacement, attach the current part drawing and revision.

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Choose the zirconia system

Start with the block duty and the acceptance requirements. The four stabilization systems below are distinct material routes; values cannot be transferred between them.

Material route	Selection focus	Material state
3Y-TZP / AD-ZRO-3Y	Structural and wear-oriented designs	Yttria stabilized; tetragonal-dominant
8Y-FSZ / AD-ZRO-8Y	Functional designs requiring defined electrical tests	Yttria stabilized; fully stabilized, cubic-rich
Mg-PSZ / AD-ZRO-MG	Project-specific structural selection	Magnesia stabilized; partially stabilized
Ca-PSZ / AD-ZRO-CA	Selection with the part configuration	Calcia stabilized; partially stabilized / multiphase

Typical material selection values

Property and basis	3Y-TZP	8Y-FSZ	Mg-PSZ	Ca-PSZ
Bulk density (g/cm³)	6.00–6.08	5.90	5.70–5.80	5.60–5.75
Flexural strength at 20 °C (MPa)	800–1000	300	500–755	400–600
Vickers hardness (GPa)	12.5	12.3	11.5	10–11
Fracture toughness KIC at 20 °C (MPa·m^0.5)	7.2–9.0	3.5–4.0	6–12	5–8

Source basis: ADCERAX Zirconia Ceramic Grade Comparison, Rev 06, p. 1. Typical material values support initial selection; they are not finished-block acceptance limits or guaranteed loads.

Read the values with their test basis

Strength depends on specimen geometry, surface condition and test arrangement. Specify the bending method, span and sample count when strength testing is required. Hardness and fracture toughness are method-sensitive; agree the method and specimen preparation.

3Y-TZP is a starting route for structural selection. Toughness ranges overlap, so do not rank the systems by a single number. For 8Y functional work, specify operating temperature, atmosphere, electrodes and frequency or DC method.

Composition is grade-specific. Confirm the oxide basis and stabilizer content on the material specification; a generic purity label does not identify 3Y, 8Y, Mg-PSZ or Ca-PSZ.

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Structural material data

The values below apply to dense sintered 3Y-TZP, Mg-PSZ and Ca-PSZ material families. Select the exact grade and qualification conditions with the finished block.

Property	Condition or basis	3Y-TZP	Mg-PSZ	Ca-PSZ
Compressive strength (MPa)	20 °C; typical	2000–3500	2100	2000–2500
Young's modulus (GPa)	20 °C; typical	200–220	200	180–200
Poisson's ratio	Typical	0.30	0.28	0.30
Linear expansion (10^-6/K)	40–80 °C only	11	10.5	10.0–10.5
Thermal conductivity (W/(m·K))	20 °C; typical	3	2.5	2
Specific heat (J/(g·K))	Typical; temperature not specified	0.46	0.45	0.44–0.46
Volume resistivity (Ω·cm)	20 °C; reported material value	$>10^{14}$	$>10^{14}$	$>10^{14}$
Volume resistivity (Ω·cm)	300 °C; typical	10^{6}–10^{8}	10^{8}–10^{10}	10^{7}–10^{9}

Source basis: ADCERAX Zirconia Ceramic Grade Comparison, Rev 06, pp. 2–3. 8Y-FSZ is outside this structural matrix; do not fill its missing values from another system.

Temperature and assembly

Use an expansion curve or mean coefficient for the full design interval. The 40–80 °C coefficient cannot define a complete high-temperature fit. Qualify service temperature with load, atmosphere, dwell, gradients, cycling and retained properties.

Electrical and sealing functions

Material resistivity does not establish the working voltage of a block or assembly. Define thickness, electrodes, AC/DC conditions, medium and the acceptance test. A material water-absorption result does not establish gas tightness; specify leakage and pressure conditions separately.

Strength is a selection input

Material strength cannot be used directly as an allowable block load. Support span, contact area, holes, edge condition, preload and thermal stresses must be assessed for the finished geometry.

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Define the finished block

The published envelope is only the starting point. Provide a controlled drawing with the features that determine assembly fit, functional contact and inspection.

3D envelope



Overall rectangular envelope

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Governing views



Envelope dimension key • Not to scale. L = length; W = width; T = thickness. The project drawing controls all features and tolerances.

Drawing input	What to define
Envelope	L, W and T, dimensional tolerances, units and measurement temperature. For another overall form, supply its complete drawing.
Holes slots and recesses	Diameter or width, depth, position, axis direction, edge distance, minimum remaining wall and any counterbore or recess.
Datum scheme	Reference faces or holes; flatness on the named surface; parallelism, perpendicularity and position relative to applicable datums.
Functional surfaces	Identify each support, locating or sliding face. State Ra or Rz, measurement direction, area and final processing condition.
Edges and weak regions	Chamfers or radii, thin walls, slot roots and overhangs; define permitted chips and surface defects by location and size.
Material and delivery state	Exact grade and stabilization system; dense sintered blank or finished component; remaining machining allowance when applicable.

All entries are RFQ inputs, not universal machining limits. Hole patterns and interfaces are defined by the project drawing; the envelope key does not represent a particular AT-ZB part.

A revised design needs a controlled reference

Identify the drawing revision and changes to grade, features, working faces or mounting. Recheck the affected dimensions and functions before accepting the revised block into the assembly.

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Application and service review

Choose the review route by what the block does in the assembly. The following are engineering decision paths, not claims of qualification for a particular machine.

Block task	Inputs that change the selection
Fixture or support	Datum transfer, supported face, span, contact width, load direction, preload and mating-face flatness.
Wear-contact insert or pad	Mating material, sliding or particle exposure, load and speed, surface requirement and wear acceptance criterion.
Fluid-equipment support or guide	Confirm the actual component function and wetted areas; state medium, concentration, particles, temperature, pressure and cleaning process.
Functional zirconia development	Identify the electrical function, exact grade, support geometry, electrodes, atmosphere and measurement method.

Control the principal failure risks

Edge chipping. Define edge condition and protect thin walls and finished faces during handling. Avoid concentrated contact at corners or unsupported edges.

Holes and slots. Assess stress concentration with feature positions, edge distances, internal corners and the actual load path. A material strength value does not qualify a drilled block.

Clamping and thermal restraint. Match support faces, distribute contact and allow the movement required by the assembly. Define preload and contact pressure; avoid local hard points.

Water or steam exposure. Include hydrothermal ageing in the evaluation of 3Y-TZP. State temperature, pressure, duration and cycling, then define the properties or surface condition to inspect.

Chemical or abrasive service. Verify the selected grade and finished surface in the actual medium and contact system. Specify an exposure or wear test with an acceptance criterion.

For an existing failed part, include photographs of the working face and fracture or wear region, its installation location, and the observed operating conditions. Equipment identity alone does not confirm interchangeability.

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Acceptance and supply definition

Agree the inspection and supply requirements with the part definition. These fields define the order; specific tests and documents are confirmed in the quotation.

Acceptance area	Agree with the drawing and order
Material identity	Exact grade, stabilizer and composition basis; material lot reference and any required certificate or test report.
Dimensions and geometry	Controlled drawing revision, datums, support during measurement, critical characteristics, sampling and acceptance limits.
Surface and edges	Named functional faces; roughness method and area; limits for chips, cracks, scratches, pores or other relevant defects.
First article	Trial assembly or fit checks, functional tests where needed, results to record and approval before repeat supply.
Part and lot identification	Required markings, package labels and traceability records linked to the accepted drawing and material grade.
Protective packing	Separate functional faces; protect edges and drilled features; define individual or set packing, cleanliness and identification.

From drawing review to repeat order

1 Define the block. Establish material, delivery condition, geometry, contact faces and operating inputs.

2 Agree the quotation. Confirm manufacturability, inspection scope, sample quantity, packing and target schedule.

3 Accept the first article. Check the agreed dimensions and functions against the controlled revision.

4 Control repeat supply. Reference the accepted grade and drawing; review changes to material, features or assembly.

Handling and maintenance

Use clean handling methods and padded storage. Keep finished faces apart. Select cleaning methods compatible with the grade, finish and service medium. Inspect contact areas and edges against agreed criteria at intervals appropriate to the duty.

Availability, MOQ, price, lead time and supplied inspection documents are quotation-controlled. No stock or delivery commitment is implied by an AT-ZB reference.

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Request an engineering quotation

Send the part information you already have. An AT-ZB reference, drawing, sample photographs or a short use case is enough to start the discussion.

Existing AT-ZB reference

Cite the catalog reference and this document revision. Add the required grade, quantity, finished condition, drawing or feature details, application, destination and target schedule. Identify any deviation from the published envelope.

New or modified block

Attach the drawing or model and revision. Define overall dimensions and tolerances, datums, holes or slots, critical faces, edge details and inspection requirements. Include the support arrangement and operating conditions that affect selection.

Technical brief to include with your inquiry

Information	Your requirement
Part reference	AT-ZB reference or drawing / model / sample identifier and revision
Material and condition	Required grade, stabilizer and finished state; note if selection support is needed
Critical features	Functional faces, tolerances, surface finish, hole / slot details and edge criteria
Operating context	Application, support and load, temperature / cycling, medium and mating material
Quantity and acceptance	Initial and repeat quantity; first-article checks, sampling and documents
Delivery	Destination, target schedule, packing and identification requirements

Send your drawing for review and quotation

info@adcerax.com

adcerax.com/product/zirconia-ceramic-block/

Telephone +86-0731-84428843

ADCERAX reviews the block definition and clarifies the remaining quotation inputs. Final material, geometry, acceptance and supply terms follow the agreed quotation and controlled drawing.

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Reference for your inquiry: ADC-CAT-ZRB-001, Rev 01.