ADCERAX
ADVANCED CERAMICS

ENGINEERING PRODUCT CATALOG / REV 01

Zirconia Ceramic Flange

Custom geometry for pipe and sealing interfaces

Match the bore, bolt circle and sealing face to the mating part before selecting the ceramic grade or defining joint acceptance.



Product photograph: representative flange and ring forms. This catalog covers flange interfaces; the project drawing defines the ordered geometry and material grade.

AT-YHG-FL1001 | Custom by drawing

ADCERAX reviews flange geometry, mating components and operating conditions before quotation. No universal flange pressure, temperature or leak rating is assigned by this catalog.

Drawing fields 03 • Material comparison 04 • Joint review 05 • Acceptance 06 • RFQ 07

ADCERAX is a China-based advanced ceramics manufacturer for custom precision ceramic components.

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Define the part and its mating interface

A replacement flange must match more than the outside diameter. Identify the ceramic component, the sealing boundary and the parts included in the order before comparing grades.



Product photograph: bores, holes and peripheral slots in representative ceramic parts. The photograph illustrates visible forms; it does not establish FL1001 dimensions, tolerances or stock.

Project configuration	What to define with the drawing
Solid ceramic flange	Ceramic body, bore, hole pattern, sealing face, edge condition and the mating flange.
Ceramic insert or lining	Ceramic contact surface, retention, fit, support and the metal housing. State which parts are to be supplied.
Ceramic-to-metal assembly	Ceramic and metal parts, joining concept, thermal movement, sealing boundary and assembly acceptance.

A clear scope for quotation

Use AT-YHG-FL1001 as the product inquiry reference. It identifies custom flange work; it is not a standard size, a stock item or an equipment interchangeability code.

Gaskets, bolts, washers, mating metal flanges and joining materials are included only when explicitly listed in the quotation. Ordinary rings, discs, tubes and complete piping systems are outside this catalog.

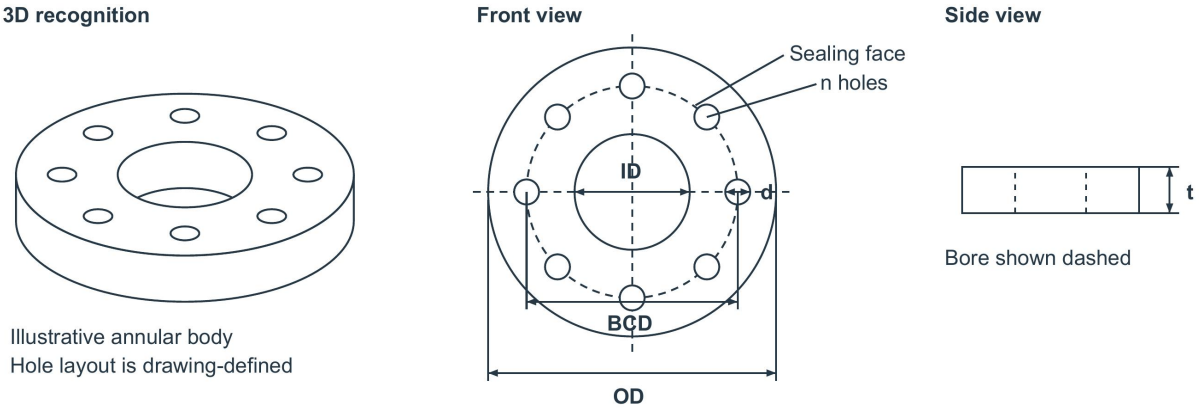
Choose the starting point

Existing part: send the drawing revision or old-part photographs and the mating-component details. New design: send the flange and assembly drawings, material requirement and operating conditions. Both routes lead to the drawing fields on page 3.

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Drawing fields for a custom flange

AT-YHG-FL1001 is drawing-defined. State dimensions in mm, or identify another unit system consistently. Tolerances, sealing-face requirements and acceptance limits are agreed for the ordered drawing.



Dimension key only | Not to scale | Project drawing controls the ordered geometry

Generic RFQ key, not an FL1001 manufacturing drawing. The shown hole count and simple flat profile are illustrative. Add the actual neck, steps, grooves or slots on your project drawing.

Field	Definition	Provide on the drawing
OD / ID / t	Outside diameter / bore diameter / body thickness	Nominal value and tolerance; include neck or step dimensions where present.
BCD	Bolt circle diameter, also called PCD	Diameter through the bolt-hole centers; state the datum and orientation.
n / d	Number of holes / individual hole diameter	Count, diameter, angular locations and positional tolerance; define slots or counterbores separately.
Sealing face	Face profile and gasket contact area	Flat, raised or grooved profile; contact width, flatness, parallelism and surface finish.
Edges and features	Bore, OD, hole and groove edges	Chamfers or radii, minimum wall / edge distances and permissible chip limits.
Datums and mating parts	Position and fit in the assembly	Datum system, coaxiality / runout where required, orientation and mating-part drawing.

A standard designation is only a starting point

If you specify DN, PN, NPS or ASME Class, include the standard edition and mating drawing. Matching the interface does not give a ceramic flange the pressure rating of a metal-flange standard.

A worn or damaged sample can help identify the part. Establish nominal geometry from the original drawing or sound reference features before approving a replacement.

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Compare zirconia grades by test condition

AD-ZRO-3Y is the primary structural candidate for review. AD-ZRO-MG and AD-ZRO-CA are separate stabilized-zirconia alternatives. Specify the exact grade; the table does not assign a grade to every FL1001 order.

Property	Unit and basis	3Y-TZP AD-ZRO-3Y	Mg-PSZ AD-ZRO-MG	Ca-PSZ AD-ZRO-CA
ZrO_2 + HfO_2 content	wt%; basis in each cell	94.4; nominal	95–99; grade range	95–99; grade range
Stabilizer	Composition basis	Y_2O_3, 5.0–5.5 wt% (about 3 mol%)	MgO, grade-specific	CaO, grade-specific
Bulk density	g/cm^3; typical	6.00–6.08	5.70–5.80	5.60–5.75
Flexural strength	MPa; 20 °C; typical	800–1000	500–755	400–600
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	Dimensionless; typical	0.3	0.28	0.30
Vickers hardness	GPa; typical	12.5	11.5	10–11
Fracture toughness K_{IC}	MPa·m$^{1/2}$; 20 °C; typical	7.2–9.0	6–12	5–8
Linear thermal 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 capacity	J/(g·K); typical	0.46	0.45	0.44–0.46
Volume resistivity	Ω·cm; 20 °C	>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
Water absorption	%; dense material; typical	0	0	0
Color	Visual	White	Ivory	White

Material reference: ADCERAX Zirconia Ceramic Grade Comparison, Rev 06, pp. 1–3. Values describe the specified dense material, not finished-flange acceptance limits.

Keep material data separate from joint ratings

Material strength is not an allowable flange stress or pressure. Density and zero typical water absorption do not prove a sealed assembly is leak-tight. Resistivity does not establish a component working voltage.

The expansion values apply only to 40–80 °C. Thermal-fit calculations require data over the actual design interval. Fracture toughness and hardness depend on the test method; specify the method and specimen conditions for purchase acceptance.

Grade selection remains specific to the application

Review water or steam exposure for 3Y-TZP, including hydrothermal aging. AD-ZRO-8Y is a distinct fully stabilized grade and is outside this structural comparison; it is not a default substitute. Modified or colored zirconia requires its own formulation data.

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Review the complete joint under service conditions

The ceramic body, gasket, bolts and mating part act together. Define the operating envelope and acceptance test for that assembly; a material name alone cannot settle sealing or load capacity.

Application or concern	Information that changes the selection
Chemical or fluid connection	Medium, concentration, impurities, pH, temperature, exposure time, flow, particles and cleaning fluids. Check ceramic, gasket and joining materials together.
Pump or valve interface	Mating geometry, seal arrangement, pressure cycling, pipe loads, vibration, installation impact and alignment.
Pressure or vacuum boundary	Internal/external pressure, differential direction, temperature, fixture, test medium, hold time and allowable leak rate.
Thermal process connection	Continuous/peak temperature, gradients, heating/cooling rate, dwell, cycling, atmosphere and expansion of adjoining parts.
Electrical isolation	Working/test voltage, AC/DC or pulse, frequency, temperature, atmosphere, creepage/clearance, electrodes and acceptance criteria.

Control the features most exposed to assembly damage

Bore and bolt-hole edges: specify chamfers or radii and allowable chips. Confirm alignment before inserting or loading the fasteners. Do not pull the ceramic into place with bolts.

Sealing face: define flatness, finish and gasket contact. Inspect for scratches, debris and local contact. Additional bolt load cannot substitute for correcting damaged or mismatched sealing surfaces.

Bolt loading: specify fasteners, washers, lubrication, tightening sequence and stages, and the design-approved torque or preload. Torque is not a known preload without the friction and joint-stiffness basis.

Ceramic-to-metal transition: define fit, restraint, joining materials and thermal movement. Compare expansion over the operating interval; do not extrapolate the 40–80 °C material value.

Qualification is specific to the ordered joint

This catalog specifies no universal pressure class, operating-temperature limit, pH compatibility range, leak rate, bolt torque or service life. State the required values and verification conditions in the RFQ.

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Agree acceptance and delivery before production

ADCERAX coordinates the drawing review, production and inspection requirements against the agreed specification. For a flange, acceptance must cover the mating geometry and sealing surfaces as well as the material.

Acceptance area	Define for the purchase specification
Material identity	Exact ADCERAX grade, stabilizer system, color/formulation, batch identity and requested material documentation.
Critical geometry	Drawing revision and datums; OD, bore, thickness, hole location and fit; flatness, parallelism, coaxiality or runout where required.
Surface and edges	Sealing-face finish and measurement basis; permitted scratches, chips and other defects; edge treatment and visual acceptance.
Joint qualification	If required: pressure/leak/electrical tests, specimen or assembly, fixture, medium, temperature, hold/cycle, method and pass criteria.
Sampling and records	First-article scope, sample quantities, measurement methods, report format and the inspection documents included in delivery.
Packaging and repeat supply	Face and edge protection, individual separation, marking position, part/lot identification, quantity per pack and change control.

From drawing review to repeat orders

1 Define the design. Review the flange, mating part, seal, fasteners and operating conditions. Resolve critical geometry and material questions before quotation.

2 Confirm the quotation. Agree the drawing revision, grade, acceptance plan, supplied parts, quantity, packaging, price and schedule. Any feasibility limitation belongs here.

3 Review the first article when required. Use the agreed dimensional and surface checks; complete the specified joint qualification before application acceptance.

4 Control repeat supply. Reorder against the accepted drawing and grade. Review changes to materials, mating components, operating conditions and test criteria.

Protect the sealing face through delivery and handling

Specify protection for the sealing face, bore and hole edges, and separation between ceramic parts. Agree the cushioning, outer package and marking for the actual order. Keep labels and packing contact away from critical sealing surfaces.

Inspection, testing and packaging entries are requirements to agree for the order. They do not describe a completed test, a certified flange or a shipment record.

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Send the drawing and mating-part details

Start with a drawing, a 3D model, or clear photographs of the existing flange and its mating part, plus the quantity. Include the reason for replacement or the problem the new design must solve.

Choose the appropriate inquiry path

Repeat order: cite the previous order and accepted drawing revision, exact grade and quantity. Identify any changes to the mating part, service conditions or acceptance plan.

New or replacement design: cite AT-YHG-FL1001 and attach the flange and mating-part details. A photograph helps recognition; the approved drawing sets the final dimensions and interfaces.

RFQ information	Include what is known at the start
Part and supply scope	Solid ceramic body, insert/lining or ceramic-to-metal assembly; required accompanying parts; equipment and function.
Drawing and material	Drawing/model revision, units, exact grade or grade-selection request, critical dimensions, tolerances, face finish and edge limits.
Mating joint	Mating-part drawing or standard and edition, gasket/seal, bolts/washers, joining method and planned tightening basis.
Operating conditions	Pressure/vacuum, continuous and peak temperature, gradients/cycles, medium/concentration, vibration/pipe loads and electrical duty if relevant.
Acceptance	Dimensional/visual requirements, first-article and sampling plan, pressure/leak/electrical test conditions and required reports.
Commercial and delivery	Prototype and repeat quantities, delivery destination, target schedule, packaging and marking needs.

Request a drawing-based flange quotation

Email subject: AT-YHG-FL1001 | Zirconia flange | Drawing revision | Quantity

info@adcerax.com

View the zirconia ceramic flange product page

ADCERAX reviews the supplied information and confirms the next engineering step and quotation scope. Final specification, availability, minimum quantity and lead time are quotation-controlled.

ADCERAX Advanced Ceramics

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Quote reference: ADC-CAT-ZCF-001, Rev 01. Keep this reference with the drawing and inquiry.