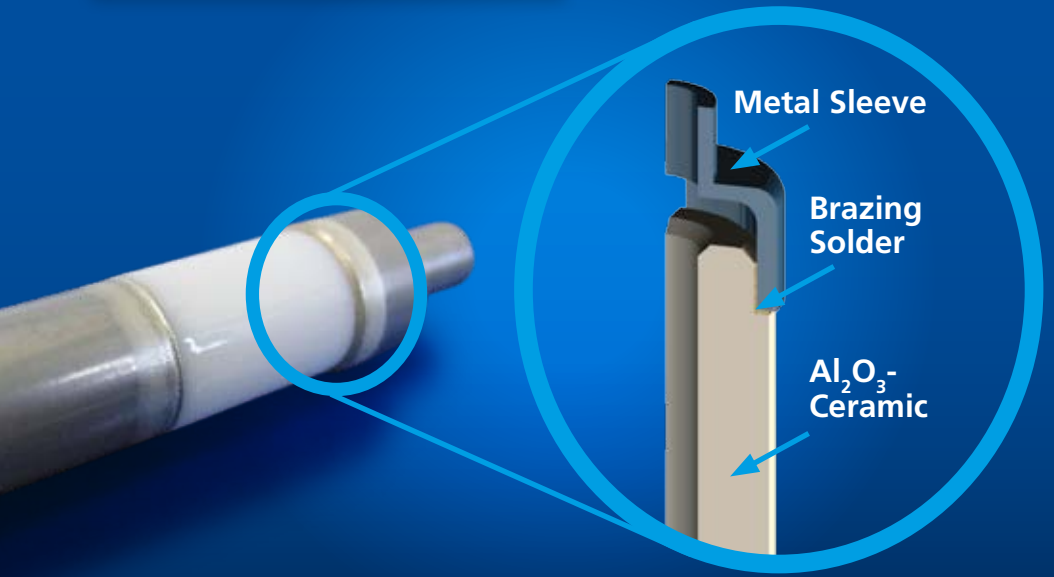
Winner
of the
Best Component Award

Your Expert for Innovative Ceramic-to-Metal Integrated Systems

ALUMINA SYSTEMS

A Brilliant Idea behind Every Product.

Ceramic-to-Metal Joints



Ceramic-to-Metal Integrated Systems with Multifunctional Benefits

Ceramic-to-metal assemblies display a combination of typically ceramic properties (like electrical insulation) and typically metallic attributes (such as weldability) in one part. These composite components offers you multi-functional benefits.

Take advantage of our long-term experience in developing and producing such composite parts. ***Alumina Systems*** supports you to establish your solutions on the market.

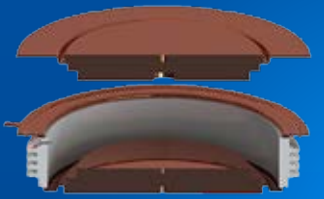
FEA-added Product Development

Mastering Core Technologies, Producing Solutions

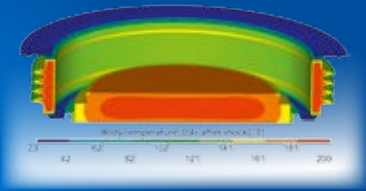
The complete mastery of process technologies, from the initial ceramic powder mix to the final product, the metallization and brazing of the metal components to produce the final composite, is further enhanced at ***Alumina Systems*** by the use of computer aided design engineering techniques. Using the so-called „Finite Element Analysis“ or FEA, we are able to optimize the design from the outset selecting the best alternative. Because of this integration approach our customers save development time and money.

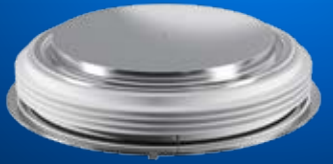
Initial Idea …

… Design …



… FEA Simulation …



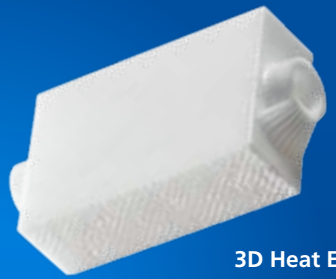


… Finished Product

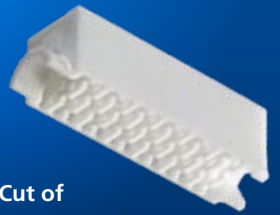
ALUMINA
3D SYSTEMS

Al_2O_3-Parts Made by Additve Manufacturing

Alumina Systems produces dense ceramic parts from prototypes to serial by using a 3D-printing process using Aluminia 99,99 %. Without expensive tools we produce complex components in the shortest time. These parts can often not be produced with any other process like pressing, injection molding or extrusion – without tooling costs. Especially for the milli reaction technology a new product family has been developed.



3D Heat Exchanger



3D Cut of Heat Exchanger

3D Separation Column

3D Heat Exchanger Grooved Surface

3D Condensor Helix Pipe

3D Lab on Chip Plate with Connector (NiFe42)

ALUMINA
SENSOR SYSTEMS

Customized Solutions

Alumina Systems offers customized ceramic-to-metal assemblies for electrical measurement, regulation and control as well as customized solutions for high temperature and high pressure applications.

We are able to service even highest demands for mechanical loads (2.000 bar) or electric insulation up to 10^{12} Ω. Together with our customers we develop innovative solutions to satisfy the needs of our customers.

Multilayer Ring with Sensor Connectors

High Pressure Feedthrough
Suitable up to 2.000 bar

Double Feedthrough with NiFe42 Conductor

Multiple Feedthrough

Sensor Ring Ultrasonic Bondable

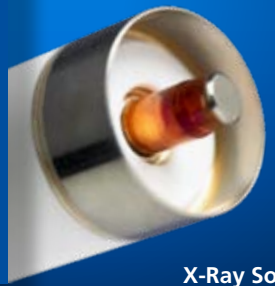
Measuring Block
Insulation Resistance > 10^{12} Ω

ALUMINA
X-RAY SYSTEMS

Metal-to-Ceramic Assemblies for X-Ray Technology

Metal-to-ceramic assemblies have several advantages compared to other materials like glass or plastics for X-Ray applications. In comparison to Glass Alumina shows a much higher mechanical and electrical disruptive strength. Ceramic-to-metal assemblies are suitable for vacuum applications (Helium leakage rate 10^{-8} mbar L/s). If required high vacuum tight joints suitable to Helium leakage rate 10^{-11} mbar L/s can be produced.

Triple Feedthrough for X-Ray Device



X-Ray Source Anodes

X-Ray Insulators

Insulating Bush

Insulator with Pedestal

ALUMINA
LASER SYSTEMS

The Origin of Light

Alumina Systems produces ceramic beam generator tubes whose hallmarks are extreme precision and the special coating process. Alongside the MoMn metallization, glass sealing windows are printed onto the tube to prevent air ionisation and associated arcing. The laser beam is generated inside the tube at CO_2 wavelength of 10,6 µm – the origin of light. Many more complex ceramic bodies, featuring multidirectional metallization layers, have been developed in close cooperation with our customers for laser applications.

Multidirectional Metallized Ceramic

Laser Beam Generator Tube with MoMn Window and Glass Insulation

Plasma Substrate with Line Pattern

All over Metallized Plasma Substrate

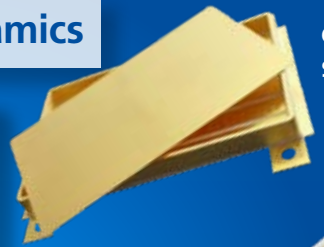
ALUMINA
PLASMA SYSTEMS

Material composites of alumina and metals are widely used in plasma and measurement technologies. In both branches the metallization in combination with the insulating alumina substrate represents the core technology, utilising the benefits of the composite properties. In plasma systems the aim is to ionize air; in electronic measurement systems typically in monitoring resistance values. Both require strong, durable ceramic-to-metal composites connected to the extended system, using solder and braze solutions from ***Alumina Systems***.

Bondable Metallized Ceramics

All That Glitters Is Gold

The requirement for connecting semiconductor components with ceramic-to-metal assemblies e.g. in sensor technology is the ultrasonic bondability of the metallized ceramic. Therefore the bond layer is protected in our galvanic process by an anti-corrosive Flash-Gold layer of ca. 100 nm. Additional processes like ENIG or ENAG are available in-house. The bondability of our metallized ceramics was tested for Al-thin wire (up to 20 µm) and Al-thick wire (~300 µm).

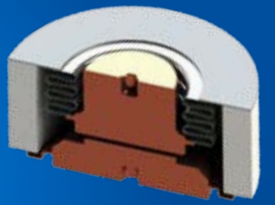


Gold-plated Sensor Housing

Bondable Al_2O_3-Substrate with 100 nm Flash-gold

Multilayer Ceramic Gold-plated

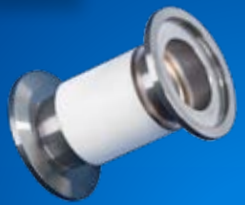
ALUMINA
HVDC SYSTEMS



Semiconductor Housings

- Dimensions: 1" to 6" diameter, nickel plated
- Thyristors, diodes and rock-tops
- Materials: Al_2O_3 96 % and OFHC Copper/NiFe42
- Assembly technique: passive braze
- external ceramic surface glazed
- Vacuum-tightness up to 10^{-9} mbar L/s
- Metallization tensile stength > 300 N/mm² (mean value)

ALUMINA
VACUUM SYSTEMS



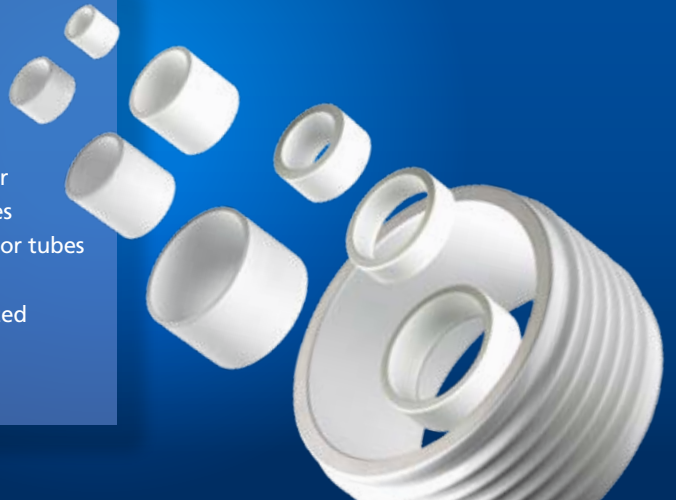
Vacuum Breaks Standard Products

- Vacuum-thightness up to 10^{-9} mbar L/s
- Insulation resistance > 10^{9} Ω, tested at 5 kV DC
- Versions: weldable, with CF-flanges, with ISO KF-flanges
- Flange sizes up to CF DN160 (standard program)
- Other versions available upon request

MoMn Metallized, Nickel-plated Ceramic Tubes for Vacuum Interruptors, Adjustable Capacitors and Step Switches

Vacuum Interrupter Tubes

- Dimensions: up to Ø 300 mm
- Type range: vacuum tubes for interrupters and step switches
- Voltage up to 42 kV, condensor tubes
- Material: Al_2O_3 96 %
- External ceramic surface glazed
- Metallization tensile stength > 300 N/mm² (mean value)



ALUMINA
VACUUM SYSTEMS

Vacuum Feedthroughs

Vacuum Feedthroughs

Our power and instrumentation feedthroughs are available as single and multi-versions with different flanges e.g. ISO-KF or CF. Conductor material, conductor length and conductor cross section can be individually adjusted.

Our New Web Shop

Simply order our standard products online

Our new web shop offers you about 160 standard products. Soon more than 600 will be available online. Even special offer will be regularly presented.
If the right product for you requirements is not available we would be happy to receive your individual inquiry.
More details:

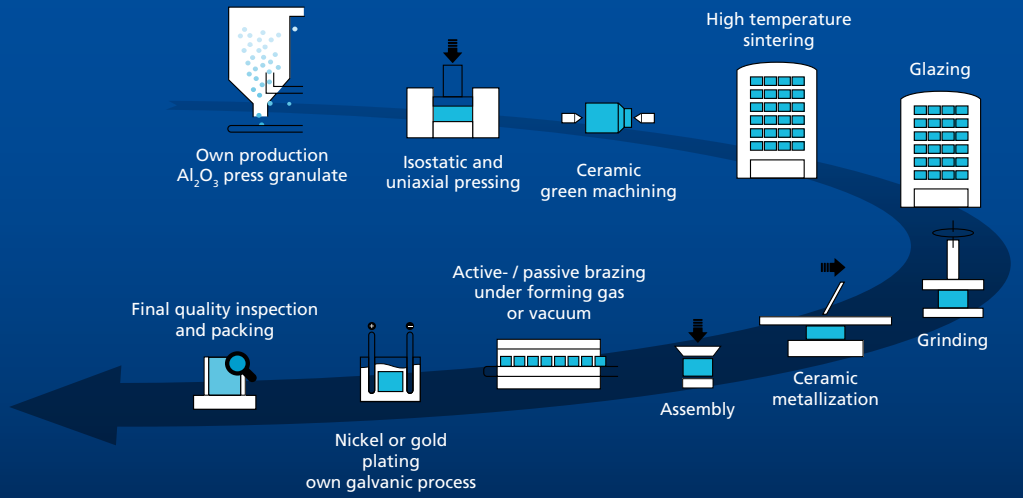
http://alumina.systems/shop

Quality and Enviromental Management

Our corporate aim is to supply products and services addressing the needs of our customers, while meeting the imperatives of safety, reliability and environmental considerations. Using the latest production techniques absolutely minimises any impact on people and on the environment. Our products and services simultaneously provide maximum functionality and economic benefit to our customers. We also strive to continously maximise the effectiviness and efficiency of our processes – always monitoring societal benefits like environmental protection and safety at work. ***Alumina Systems*** is certified to ISO 9001, ISO 14001, SPA-REF and OHRIS Occupation Health and Risk Management.

Our Process Flow Diagram

A One-Stop Shop for Ceramic-to-Metal Assemblies



Alumina Systems GmbH

Alumina Systems produces customized ceramic-to-metal composites. For power semi-conductors we produce housings up to six inches in diameter, meeting around 60 % of the world's demand – some 200.000 components per year from mass production brazing processes. Core technologies like dry pressing, metallization, active and passive brazing on belt and batch furnaces. And galvanic finishing are also used to produce components for myriad other cutting-edge industries such as vacuum, laser, X-Ray and measurement systems.

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Since 2012 *Alumina Systems GmbH* has integrated a 100 % Czech subsidiary in Hradec Kralove. Here we produce components for high power electronics and special applications.

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