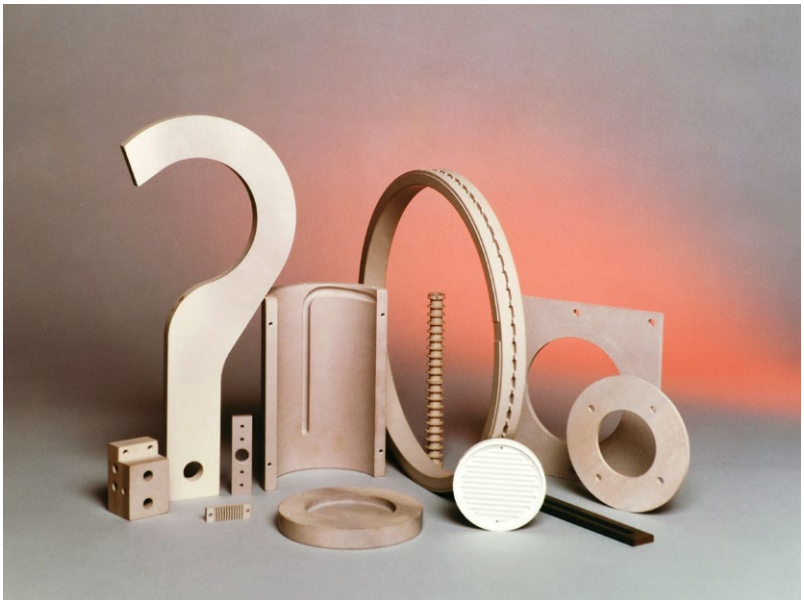
AREMCO

TECHNICAL CERAMICS OVERVIEW

Technical Bulletin A1



Aremco offers a wide range of full-fired and machinable ceramics for applications in the aerospace, automotive, electrical, heat-treating, metallurgical, semiconductor industries, and more.

CERAMIC GRADES

Machinables

502-600	Mica Glass-Ceramic
502-800	Macor Glass-Ceramics
502-1100-UF	Aluminum-Silicate, Un-Fired
502-1400-BF	Aluminum Oxide, Bisque-Fired, 96%
502-1600	Boron Nitride, 99%

Full-Fired, Dense

502-1100-FF	Aluminum-Silicate, Full-Fired
502-1400-96	Aluminum Oxide, 96%
502-1400-998	Aluminum Oxide, 99.8%
502-1835	Aluminum Nitride, 98%
502-1900-MSZ	Zirconium Oxide, Magnesium Stabilized
502-1900-YTZP	Zirconium Oxide, Yttria Stabilized

BN Composites

502-1810	Boron Nitride-Aluminum Oxide
502-1820	Boron Nitride-Aluminum Nitride
502-1830	Boron Nitride-Zirconium Oxide

Additional ceramics including Silicon Carbide and Silicon Nitride and custom ceramic formulations are available upon request. Comprehensive precision production services include isostatic pressing, injection molding, and diamond and laser machining.

TYPICAL APPLICATIONS

Aerospace
Gas Nozzles, Thermal Insulators, Space Mirrors, and Nose Cones.

Automotive
Diesel Port Liners, Manifold Insulation, Catalyst Support Systems, Flow Separator Housings, Regenerator Cores, Turbine Nozzles.

Electrical
Connector Housings, Heater And Resistor Supports, Washers, Inserts & Stand-Offs, Instrument and Appliance Insulators, Coil Forms and Bobbins.

Electronics
Wafer Chucks, Insulators, Vacuum Tube Structures, Microwave Housings, Arc Barriers, X-Ray Equipment, and PVD Applications.

Heat Treating
Brazing and Carburizing Fixtures, Induction Heating Tubes, Furnace and Tooling Insulation, Guides, Kiln Furniture, Welding Jigs, Hot Forming Dies.

Metallurgical
Molten Metal Crucibles, Nozzles, Troughs, Liners, Transfer Rollers, Structural Parts, Filters, Thermocouple Sheaths, Permanent Molds.

Petrochemical
High Temperature Corrosion and Wear-Resistant Components.

Plastics
Hot Die Parts for Thermoplastic Forming Equipment.

MACHINABLE GRADES

502-600 Glass-Ceramic: Recommended for high dielectric and mechanical strength requirements and temperatures to 1100 °F (593 °C). Used for high voltage insulators, lamp housings, insulation sleeves and washers, thermal switches, and radiation parts. Readily machined and no firing required. Plates are available from ⅛″ to 1″ thick; rods from ¼″ to 1″ diameter.

502-800 Macor Glass-Ceramic: Recommended for temperatures to 1472 °F (800 °C) and peaks up to 1832 °F (1000 °C). Demonstrates low thermal conductivity, high strength, high electrical insulation, zero porosity, non-wetting, and coefficient of thermal expansion similar to most metals and sealing glasses. Machines to tight tolerances up to 0.0005″, surface finish of less than 20µin, and polishes to a smoothness of 0.5µin. Used for ultra high vacuum, aerospace, nuclear, welding, fixturing, and medical applications. Readily machined and no firing required. Bars, disks, rods and plates are available from ⅛″ thick up to 12″ diameter.

502-1100-UF Alumino-Silicate, Unfired (Lava): Machined easily to close tolerances and can be used as-is or fired to increase temperature resistance and improve mechanical strength. Used for prototyping and small production runs of electrical and thermal insulators and brazing and heat-treating fixtures. Standard plates from ¼″ to 1″ thick × 12″ × 12″; rods from ¼″ to 4″ diameter × 12″; bars from 1″ × 1″ to 4″ × 4″ × 12″.

502-1400-BF Aluminum Oxide, 96%, Partially Fired: Partially Fired alumina is machined easily to close tolerances and can be used as-is or fired to increase mechanical and thermal properties. This ceramic offers excellent corrosion, abrasion, wear, and electrical and thermal shock resistance. Used for producing guides, fixtures, nozzles, pump liners, shafts, valve seats, and more. Plates are available from ¼″ to ¾″ thick × 6″ × 6″; rods from ¼″ to 3″ diameter × 10″ long.

502-1600 Boron Nitride, 99%: Hot-pressed boron nitride provides high thermal conductivity, electrical insulation, and low coefficient of thermal expansion. Grades are non-reactive with molten salts, aluminum and other metals. Easily machined and available in plates from ¼″ to 1″ thick; rods from ¼″ to 3″ diameter by 12″ long, and bars from ¼″ × ¼″ to 2″ × 2″.

FULL-FIRED, DENSE CERAMICS

502-1100-FF Alumino-Silicate, Full-Fired (Lava): Offers higher temperature resistance and improved mechanical strength over 502-1100-UF. Used for prototyping and small production runs of electrical and thermal insulators, such as sleeves and washers, and brazing and heat-treating fixtures. Recommended for producing insulators, standoffs, feed-thrus, furnace carriers, and brazing fixtures.

502-1400-96 Alumina, Full-Fired, 96%: High strength aluminum oxide offers excellent corrosion, abrasion, wear, and electrical and thermal shock resistance. Used for producing guides, fixtures, nozzles, pump liners, shafts, valve seats, and more.

502-1400-998 Alumina, Full-Fired, 99.8%: Higher strength, higher purity aluminum oxide ideal for metallurgical applications in which sensitivity to impurities may exist.

502-1835 Aluminum Nitride, Full-Fired, 98%: High purity aluminum nitride offers extremely high thermal conductivity and excellent electrical insulation properties. Offers a low thermal expansion similar to silicon and excellent thermal shock, oxidation, corrosion, and abrasion resistance. Ideal for use in thermal management and electrical applications.

502-1900-MSZ Magnesia Partially Stabilized Zirconia: This grade offers the highest level of fracture toughness of all the zirconia materials and far exceeds that of aluminum oxide. Features include excellent fracture, corrosion, thermal shock, and wear resistance. Used for pump parts, valve components, bearings, and wear linings.

502-1900-YTZP Yttria Stabilized Zirconia: This grade offers the highest flexural strength of all the zirconia materials. The fine grain size lends itself to be used in cutting tools where a very sharp edge can be achieved and maintained due to its high wear resistance. Also provides excellent mechanical strength, corrosion and thermal shock resistance, impact toughness, and very low thermal conductivity. Used for structural components, wear parts, fiber optic ferrules and sleeves, oxygen sensors, solid oxide fuel cells.

BORON NITRIDE COMPOSITES

502-1810 BN-Al_2O_3: Hot-pressed BN-Al_2O_3 demonstrates good mechanical, thermal conductivity and electrical properties compared to BN. For use at temperatures to 1000 °C in air and 1700 °C in a vacuum or inert atmosphere. Ideal for producing gas atomization nozzles for the thermal spray industry.

502-1820 BN-AlN: Hot-pressed BN-AlN demonstrates high thermal conductivity and electrical resistivity, and good mechanical properties compared to BN. For use at temperatures to 1000 °C in air and 1800 °C in a vacuum or inert atmosphere. Ideal for applications requiring high thermal conductivity and electrical insulation in the semiconductor industry.

502-1830 BN-ZrO_2: Hot-pressed BN-ZrO_2 demonstrates the highest mechanical strength of all BN composites. Ideal for metallurgical/foundry applications for producing molds, molten liquid nozzles, and continuous casting separation rings.