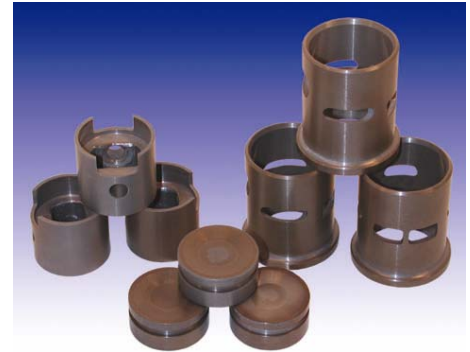


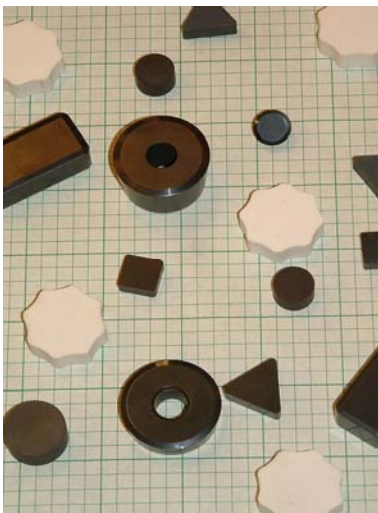
Non-Aqueous Gel-Casting Process

Advanced Ceramics Manufacturing (ACM), an Arizona based Native American owned small business, has demonstrated a direct manufacturing technique for fabricating complex ceramic and cermet component geometries. Gel-Casting offers a cost effective and productive alternative to hot pressing, cold-press and sinter, and other ceramic forming methods. ACM has demonstrated this process technology; fabricating Si₃N₄ two stroke engine components, Al₂O₃ based metal cutting inserts and various wear parts.



Custom Development

ACM provides a range of ceramic materials already tailored to the gel-cast process; however, a development partner may provide a proprietary raw material which can be engineered into the gel-casting process. The powders are suspended in a high-solids-load, non-aqueous slurry with a good working viscosity. The non-aqueous slurry is thermally gelled in a permanent or sacrificial mold based on the quantity and complexity of the desired final components. Permanent molds can be economically fabricated from inexpensive materials, such as aluminum. Sacrificial molds can be created using our patented Wax Dip Molding (WDM) technique. WDM uses CNC machining of a proprietary water soluble polymer material to create the desired geometry. Dipping the water soluble component in a wax bath, and removing the water soluble polymer from the solidified wax by washing in water completes the sacrificial mold. The gelled green part is typically removed from the mold by melting the wax. Green parts are then processed through a consolidation process.



Gel-Cast Benefits

Cost and time saving advantages include:

1. Rapid transition from prototype to production
2. Rapid production of net or near-net shape components with complex geometries
3. Eliminate costly finishing operations
4. Eliminate costly hard tooling for high pressure cold pressing
5. Environmentally safe, water soluble & wax materials produce sacrificial molds
6. Multiple, water-soluble WDM components can be joined to create extremely complex geometries which can not be manufactured by any other method

Available Materials

The following gel-cast grades of ceramic are available from ACM for complex geometries;

- Zirconia (ZrO)
- Zirconia toughened Alumina (Al₂O₃-ZrO)
- Aluminum Nitride (AlN)
- Silicon Carbide (SiC)
- Alumina (Al₂O₃)
- Alumina Titanium Carbo-Nitride (Al₂O₃-TiCN)
- Silicon Nitride (Si₃N₄)
- Barium Titanate (BaTiO₃)

We look forward to answering any questions about the Gel-Casting or WDM processes. Please feel free to contact ACM at 520-547-0850 or info@acmtucson.com. To learn more visit our website www.acmtucson.com