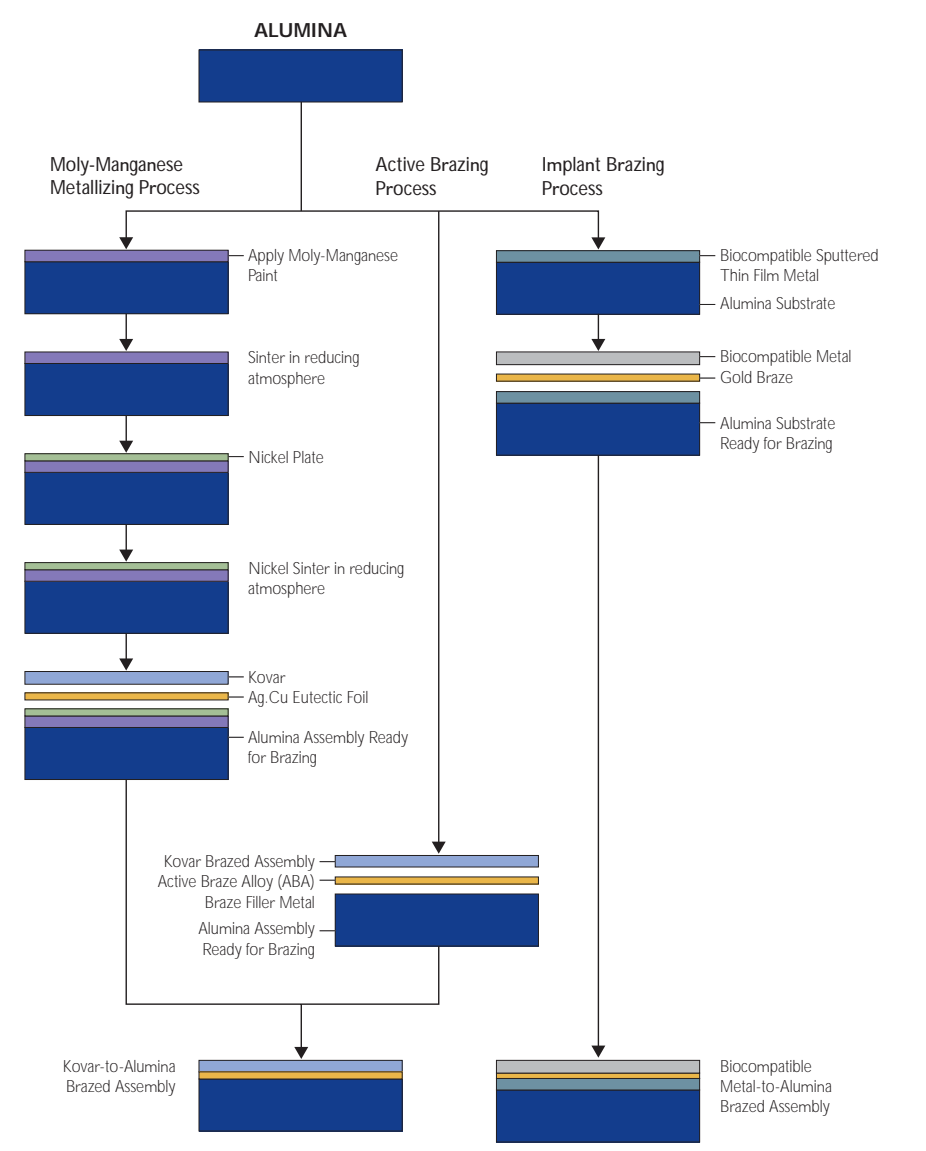


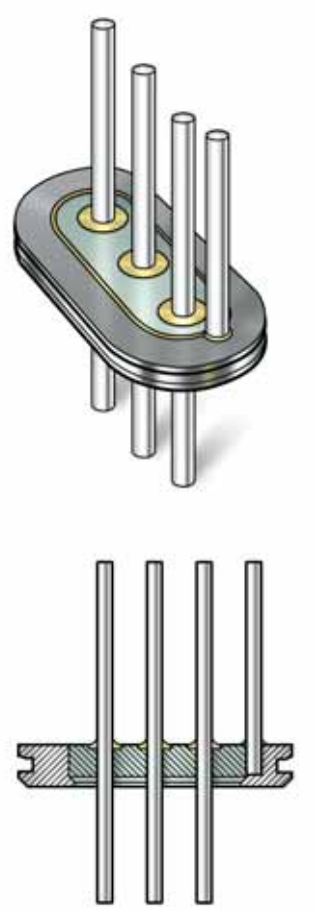
Medical Products

Joining Alumina Ceramic



Implantable Feed-thrus

MAC's experience in feed-thru design, including biocompatible metal-to-alumina ceramic assemblies, allows our customers more flexibility in their product development. Our engineering capabilities in ceramics, braze alloys, precious metals, and hermetic sealing allow us to continually reduce the dimensions of our feed-thrus.



U.S. Patent No. 6,586,675 and European Patent No. 1107264 B1

All Morgan Technical Ceramics manufacturing sites hold ISO 9000 approvals

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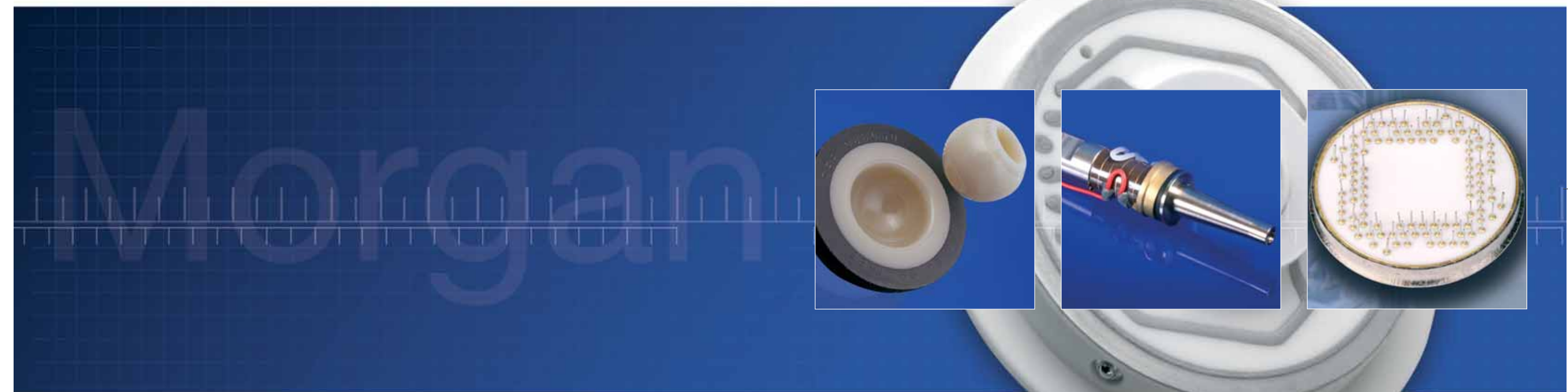
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ADVANCED MATERIALS
 AND ASSEMBLIES FOR NEXT-GENERATION MEDICAL PRODUCTS

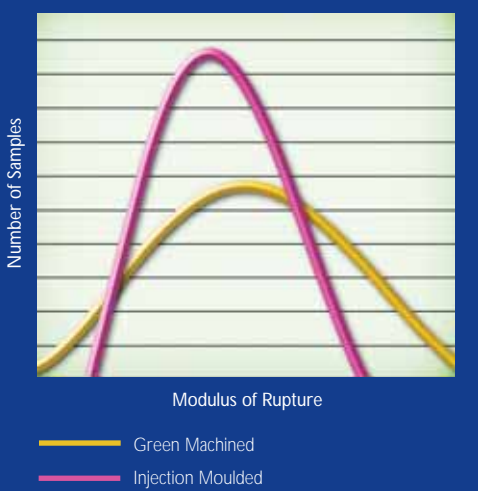


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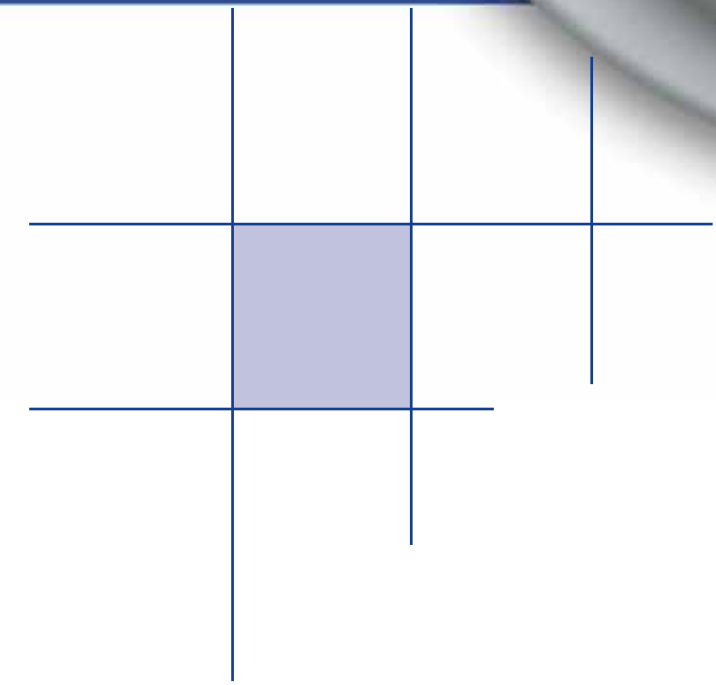
Process Normal MOR Distribution Green Machine vs. CIM

Internal MAC testing of Ceramic Injection Moulded (CIM) MOR bars vs. Green Machined MOR bars has shown net-shaped as moulded parts produced less flexural strength variation than green machined parts of the same formulation. The broader MOR distribution of the green machined parts can be attributed to a variability in surface finish that occurs with a machined surface. Sub-surface and surface flaws are created as the cutting efficiency of the tool decreases. The graph suggests that consideration of current product failure modes and sample lot sizes should be taken into account before changing production methods. MAC CIM processing offers a cost effective solution to projects requiring robust assembly and high confidence in service.



Morgan Morgan Technical Ceramics, a Member of MorganTechnicalCeramics The Morgan Crucible Company Plc
www.morganadvancedceramics.com
www.morganelectroceramics.com
www.morgantechnicalceramics.com

Engineered components to enhance your life



Medical Products

Advanced Materials

Morgan Technical Ceramics

(MTC) is a division of the Morgan Crucible Company plc, comprising Morgan Advanced Ceramics (MAC) and Morgan Electro Ceramics (MEC). The group manufactures components and assemblies from a broad range of materials including ceramics, metal alloys, engineered coatings and piezo ceramics at its ISO9001:2000 certified manufacturing sites. Working closely with each individual customer from prototype to production, MTC has the expertise to engineer your optimal solution.



Surgical Tools

MTC's superior powder injection moulding (PIM) capability is ideal for the engineering of intricate features on small hand tool components. Diamonex® diamond-like carbon (DLC) coatings provide a biocompatible, sterilization-compatible, non-leaching, low friction and wear resistant surface for key pivot points and wear surfaces. Our braze alloys provide high strength joining of ceramics to metals and can be used in electrical structures. Piezo electric ceramic materials and transducers provide solutions in many surgical applications such as scalpels, descalers and high intensity focused ultrasound (HIFU).



Instrumentation

MTC's capabilities in complex assemblies allow our application engineers to develop robust solutions to meet challenging life science environments. Our piezo electric materials can be tailored for flow and pressure sensors. Ceramic capacitors can be designed for precise tuning of MRI scanners.



Blood Handling

Each year MTC produces millions of high-quality sealing ceramics. The high hardness and polished surfaces of our materials ensure exceptional liquid-tight sealing. Diamonex DLC coatings increase durability of valves, plates and many other bearing surfaces and our innovative anti-wetting (AW) surface treatment helps reduce contaminant adherence during rinsing. Custom developed ultrasonic sensors can also detect bubbles in the blood flow as it circulates through equipment.



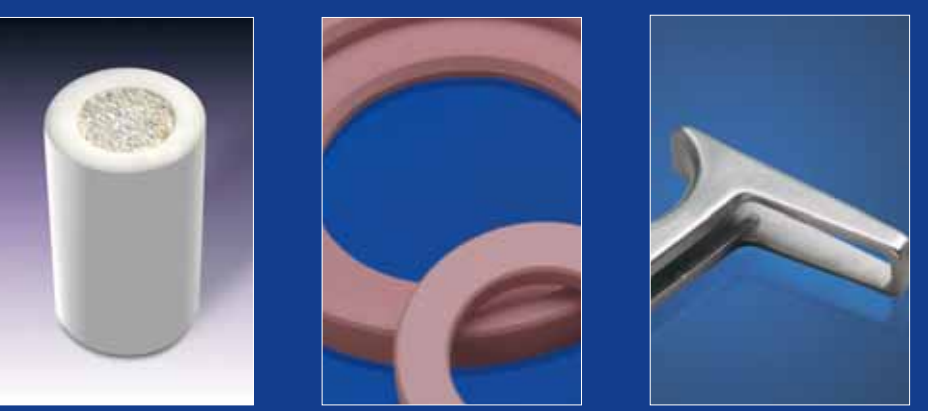
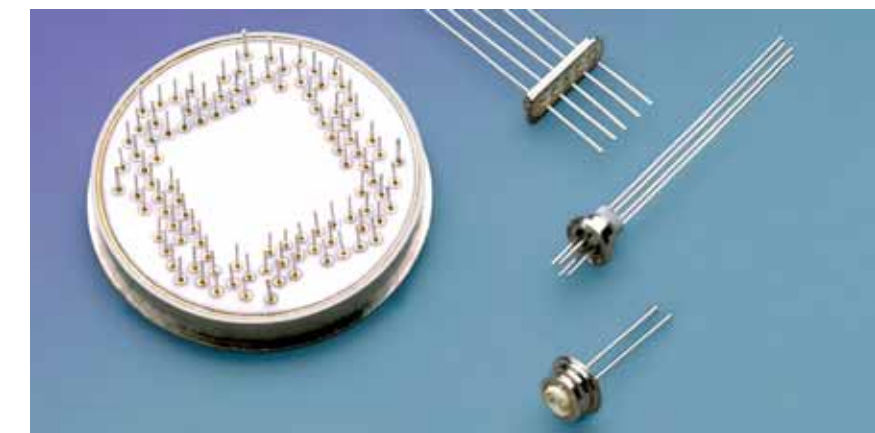
Orthopaedics

MTC offers HIP Vitox® alumina and Zyranox® zirconia for implantable medical device manufacture, made at its ISO13485 Medical Devices Quality Management System certified facility. These materials have proven low wear rates and can greatly reduce metal ion release and polymeric wear debris – a proven source for osteolysis and implant revision. MTC's unique manufacturing approach allows for custom development, and with nearly 20 years clinical experience, MTC is well placed to offer expert technical engineering advice.



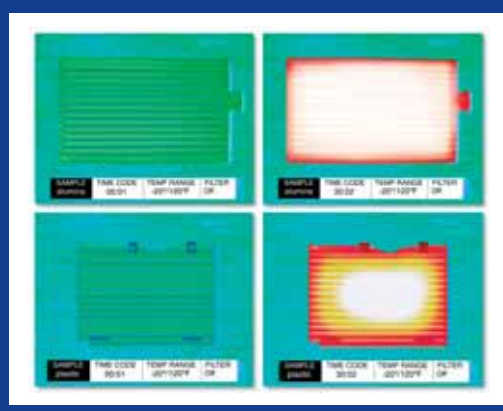
Surgical Implants

Survival in the harsh environment of the human body requires stringent quality control and consistent repeatability. MTC's ceramic-to-metal seal assembly technology is used for implantable pacemakers, defibrillators and cochlear implants. Piezo ceramic devices often serve as sensors for these implants. Internal sourcing of precious metal alloys and ceramics allow us to offer unique design capabilities.



Thermal Imaging

An experiment was conducted between two devices from leading manufacturers of life science instrumentation. The application requires these products to stay uniformly cool throughout their use. Thermal imaging shows that the significantly lower thermal conductivity of plastic leads to high thermal gradients. Differences across the device of more than one degree °C can result in erroneous results. The high purity alumina device manufactured by MAC outperforms under test conditions and in the field.



Typical physical properties of medical grade materials

