Medical Ceramic Materials, Components and Assemblies

Morgan Technical Ceramics recently showcased a wide range of ceramic materials, components and assemblies, at the Medical Design & Manufacturing East (MD&M East) Conference and Exposition 2012, which took place May 22-May 24, 2012, in Philadelphia, PA, Booth #577.

The extensive range of products for medical devices displayed at MD&M East demonstrates MTC's superior capabilities in the medical market. These include custom ceramic sensors and transducers where MTC offers more than 30 formulations of piezoelectric materials that can be manufactured into standard and custom sizes and shapes, HIP Vitox® ceramic femoral heads, which are mechanically and chemically stable and bio-inert and advanced ceramic components for therapeutic equipment.

Therapeutic equipment components showcased included metalized ceramic RF windows, medical linear accelerator (LINAC) metallized rings as well as feedthroughs and high power insulators for cyclotrons. Typically used within tubes or rings inside medical accelerators as acceleration units, or within proton therapy equipment as high voltage, high power insulators, the ceramic components provide low dielectric loss at high frequency and high mechanical strength. They also feature vacuum integrity, good thermal conductivity, and high electrical volume and surface resistance.

Also exhibited at MD&M was PZT (lead zirconate titanate) high dielectric materials, 1-3 and 2-2 composites, and in-line sensors used in medical ultrasound devices, including those used for air-in-line, occlusion and flow sensing. MTC's piezo ceramic

air-in-line sensors include a standard bubble detector for a 4-5 millimeter (mm) tube, designed to minimize their footprint, with a short flexi circuit for easy connection. Contact pressure sensors based on piezo resistivity are designed to detect blockages in infusion lines, detecting both negative and positive pressure changes. They are ideal for use in such equipment as infusion pumps, enteral feeding pumps, dialysis equipment and other fluid applications.

Ultrasonic sensors include those used for in-line flow measurement, which combine precision machined mechanical parts with advanced piezoelectric components to provide accurate flow measurement of de-aerated liquids, such as blood, saline and water in medical grade tubing.

Application discussed MTC's capabilities for customizing sensor designs to suit specific OEM needs, including housing geometry, color, and adaptation to specific tubing and environmental conditions, mounting arrangement, or interface with a disposable cassette.

HIP Vitox® ceramic-on-ceramic hip joints, manufactured from a high quality alumina material, can withstand high shock without fracture. The high material hardness and scratch resistance mean that the ceramic femoral heads reduce the amount of polyethylene cup wear compared to that of metal heads. The company's HIP Vitox® ceramic-on-ceramic hip joints have demonstrated an exceptionally low wear rate of just 0.032mm3/million cycles. They are available in sizes from 28mm to 60mm; the larger head sizes provide increased range of motion and have an even lower wear rate as load is spread over a larger surface area.

MTC's piezoelectric ceramic manufacturing facilities are ISO 9001 and 14001 registered and several sites are certified under the ISO13458 standard for designing and manufacturing medical devices.

Morgan Technical Ceramics
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