

M E D I C A L

Advanced Ceramics and  
Ultrasonic Technology for  
Medical Applications

**CeramTec**  
**Your Partner of Choice**



## Customised Solutions for Demanding Medical Applications

CeramTec advanced ceramics with their unique material properties open up enormous performance potential for applications in medical technology. With over 100 years of experience in technical ceramics and more than 40 years of expert know-how in medical technology, we offer our customers globally networked engineering and solution competence.

Today and in the future constant progress in medical therapy, as well as new knowledge in research, require high-quality materials which both allow the treading of new paths and withstand the high challenges of everyday clinical practice. Constantly increasing demands on quality and functional safety of medical products in

the various global health care systems require reliable materials, components and solutions that meet even the toughest approval standards in the long term.

CeramTec advanced ceramics form the basis for this in many applications used worldwide. We develop and realize components and assemblies based on our advanced ceramics for medical devices and equipment.

### Typical applications:

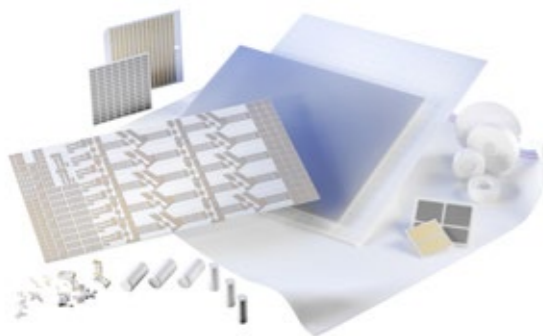
- Dialysis/infusion pumps
- Molecular diagnostics
- Medical instruments
- Blood analysis
- Nebulisers/inhalers
- CT Scanners / X-Ray
- Medical lasers
- Contrast injectors
- Mixing chambers
- Filtration
- Pressure sensing
- Surgical instruments
- Ultrasonic patient therapy
- Respirators
- Resectoscopes

# Critical Ceramic Components for Medical Systems

## Various ceramics and geometries

### Structural ceramics

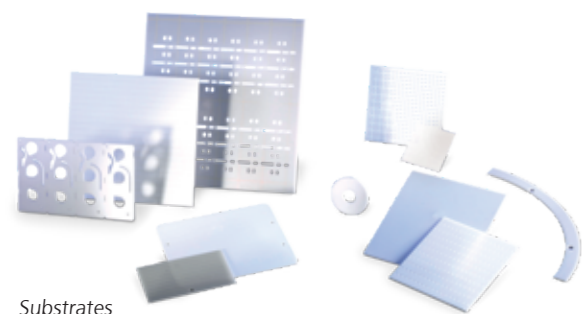
CeramTec offers a wide variety of ceramic materials. It all begins with Silicate ceramics, which are the most traditional of all advanced ceramics. Oxide ceramics like Aluminum Oxide in various purity levels and Zirconium Oxide are manufactured in both low and high volumes. Non-oxide ceramics like Silicon Carbide, Silicon Nitride and Aluminum Nitride are available in large scales as well. As this is only a choice of all available ceramic materials at CeramTec, in the end we can help determine a suitable material and design for most shapes and sizes together – all based on the customer's requirements.



Alumina metallised / non-metallised



Extrusion



Substrates



Aluminum Nitride

## Piezoceramic shapes



### Piezo and transducer ceramics

With three production sites – two in the UK and one in Germany – for piezoceramic parts and transducers, CeramTec is well equipped to provide excellent products for medical applications.

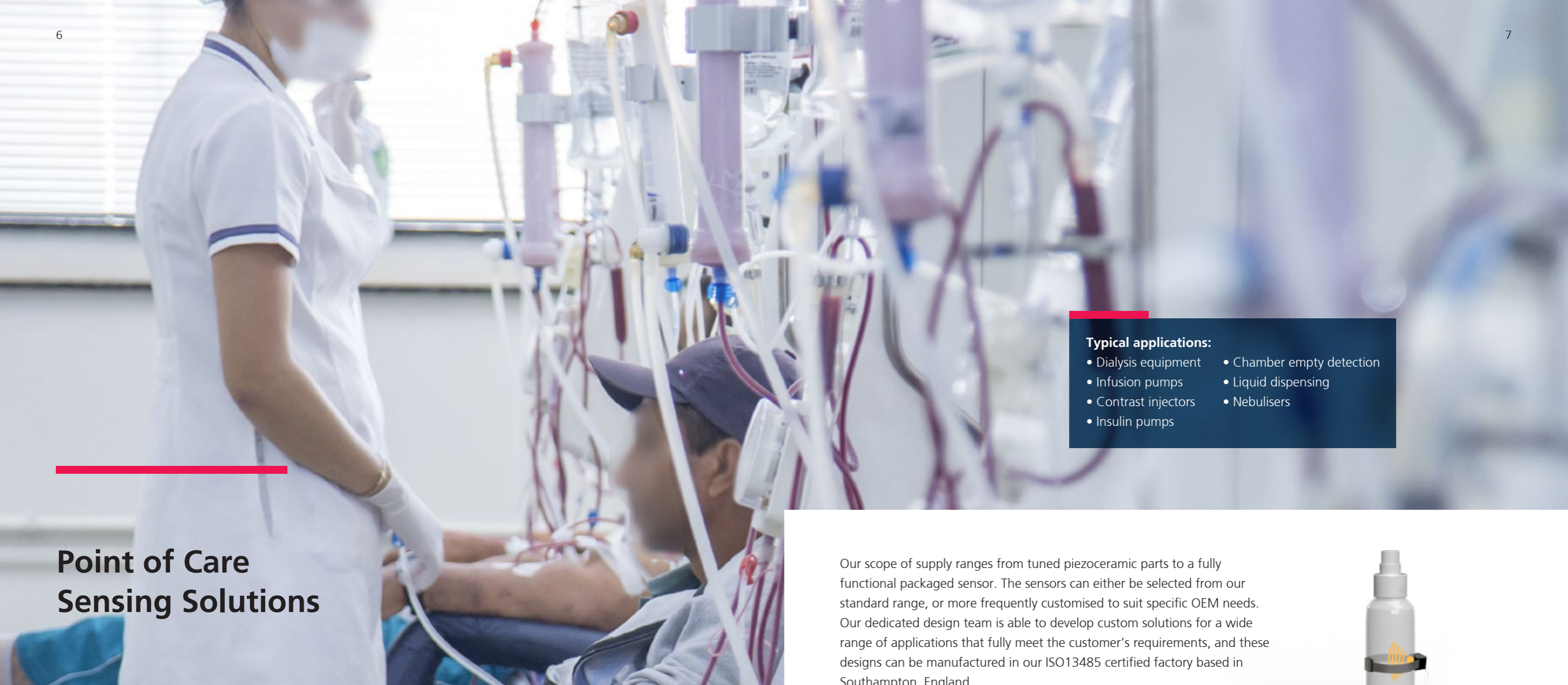
With a selection of more than 20 different piezo material formulations, we are able to offer customer specific solutions for every application. We offer high volume, highly automated production with integrated 100 % In-Line inspection as well as craftsmanship production of special components with complex shapes in low volumes.

Dimensional capabilities reach from sub 1 mm to in excess of 250 mm diameter. Our metallisation solutions include thick film silver processes, evaporation and plating using Ni, Ni/Au, Ni/Cr/Sn.

To ensure the reliability of our processes, all sites are at least certified according to ISO 9001 sections and medical sensors and transducers manufacturing according to DIN EN ISO 13485.

### In piezoceramics various geometries are possible:

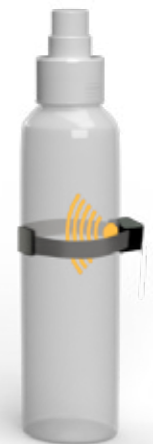
- Discs
- Rings
- Tubes
- Plates
- Blocks
- Hemispheres
- Bimorphs
- Complete transducers



## Point of Care Sensing Solutions

- Typical applications:**
- Dialysis equipment
  - Infusion pumps
  - Contrast injectors
  - Insulin pumps
  - Chamber empty detection
  - Liquid dispensing
  - Nebulisers

Our scope of supply ranges from tuned piezoceramic parts to a fully functional packaged sensor. The sensors can either be selected from our standard range, or more frequently customised to suit specific OEM needs. Our dedicated design team is able to develop custom solutions for a wide range of applications that fully meet the customer's requirements, and these designs can be manufactured in our ISO13485 certified factory based in Southampton, England.

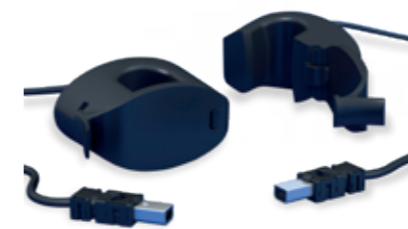


Chamber Level Sensor

### Medical In-Line Sensors for Critical Applications

CeramTec specialises in the design and manufacture of In-Line sensors for a variety of medical equipment such as infusion pumps, enteral feeding pumps, dialysis equipment and other fluid management applications.

Our range of medical In-Line sensors offers non-invasive detection of gas bubbles, pressure changes and fluid levels in soft flexible tubing as well as soft or hard body disposable sets and containers. In tubing leading into and out of the body it is vital that variables such as air content, pressure and levels are monitored, therefore our safety critical sensors are an important part of critical medical care.



Drip Chamber Level Sensor



Bubble and Occlusion sensors



Point Level Sensor for Complex Geometry



## Performance You Can Rely On

### Ultrasonic Transducers for Medical Applications

CeramTec specialises in the design and manufacture of transducers for a variety of medical and industrial applications.

#### Custom products

- Ultrasonic devices for bone cutting and drilling
- Langevin transducers for cell disruption and cell lysis
- Ultrasonic transducers that create cavitation for precision cleaning



#### Capabilities

- Full-service offer including design, development and manufacture of transducers
- Enhanced R&D capability for highly customised products, including matching and interface with customer's electronics
- Customisation services for full design, development and manufacture of sensors and transducers

### High-Power Transducers

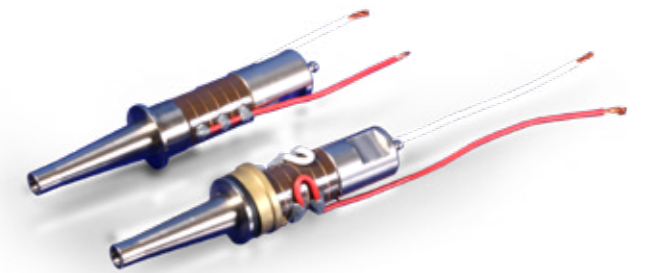
Utilising CeramTec's speciality piezoceramic rings combined with high quality materials and manufacturing processes, our design engineers have created a standard 40kHz transducer that is capable of delivering high quality performance and reliability in your application.

#### Typical applications:

- Molecular diagnostics
- Ultrasonic mixing and stirring
- Dissolving of solids and degassing
- Cell disruption and mechanical cell lysis
- Tissue aspiration / bone cutting and drilling

#### Customisable for surgical devices:

- Ultrasonic scalpels
- Dental descalers
- Phacoemulsification





## Manufacturing and Material Expertise

Advanced ceramic materials make applications possible today that were virtually inconceivable just yesterday. Due to their unique material properties, technical ceramics are considered to be one of the most efficient materials of our time. To meet the highest quality standards, we offer a wide range of production processes such as:

- Tape casting
- Dry-pressing
- Isostatic pressing
- Metallizing
- Polishing
- Lapping
- 3D printing
- Lasering
- Injection moulding
- Fully customized ultrasonic assemblies



### Our Production Sites in Germany and the UK

- **Plochingen (Germany)**  
Headquarters, Production and R&D
- **Ebersbach (Germany)**  
Production of SPK® cutting tools
- **Lohmar (Germany)**  
Production of ceramics for wear and corrosion protection and of ceramic armour for ballistic protection
- **Lauf (Germany)**  
Production of piezoceramics, silicate & alumina ceramics
- **Marktredwitz (Germany)**  
Production of substrates and other structural ceramics
- **Wilhermsdorf (Germany)**  
Production of salt cores
- **Wittlich (Germany)**  
Assembly of cartridges and test centre
- **Ruabon and Southampton (UK)**  
Production of piezoceramic products in custom sizes and geometries as well as standard shapes and transducer or sensor assemblies.

**CeramTec**  
THE CERAMIC EXPERTS

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