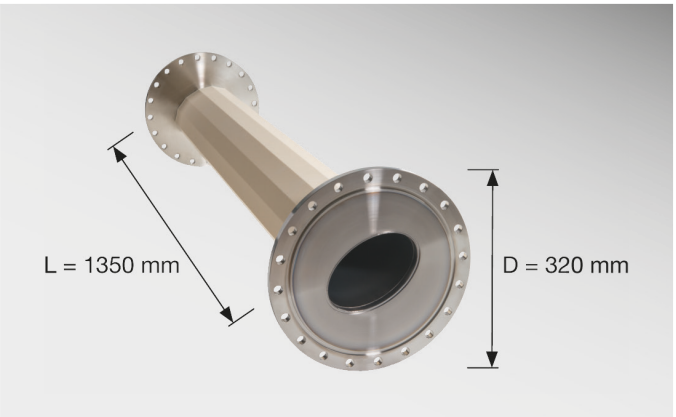
HIGH-PERFORMANCE CERAMICS

VACUUM CHAMBER



Application:
Beam deflection in particle accelerators

Material:
Aluminium Oxide **F99.7**

Particle accelerators are used throughout the world in research and development as well as in the medical field. They make it possible to view the minutest particles in existence, facilitate new scientific discoveries and open the door to new therapeutic approaches in the treatment of cancer.

Renowned institutions include the European Organisation for Nuclear Research (CERN) in Switzerland with the Large Hadron Collider (LHC), the German Electron Synchrotron (DESY), the Heidelberg Ion-Beam Therapy Center (HIT) and many more. Such institutions strongly prefer the use of ceramic-to-metal components made of High-Performance Ceramics.

Due to their excellent properties, these components are used for high-voltage insulation or for beam deflection through fastpulsed magnets. KYOCERA manufactures such ceramic-to-metal components in customised dimensions. The components, made of **F99.7** and metal, display only minimal leakage and outgassing rates, and are thus ideal for use in ultra-high vacuum (UHV) conditions. Corresponding metal parts provide for easy connection to further components.

In the radiation source insulated by our ceramics, atoms are ionised and pre-accelerated by means of high voltage. After this, the particles enter the synchrotron orbits, are channelled by means of magnetic fields to circular paths and, step-by-step, further accelerated in these orbits. The particles are further focused and deflected by means of vacuum chambers made of Oxide Ceramics.

The vacuum chamber made of **F99.7** here illustrated is used for beam deflection as a so-called kicker chamber. It is also responsible for keeping the particles on their path. Passed through two magnets, the particle beam can be horizontally or vertically deflected, and thus controlled with precision.

Due to the non-magnetic properties of Oxide Ceramics, rapid switching times can be achieved by means of very rapidly changing magnetic fields. In the case of metallic components, induced eddy currents prevent these rapid switch times. In order to remove the image charges on the inside walls, however, a thin titanium coating is applied.

- Minimum desorption and leakage rates
- Heatable up to bis 300°C
- Non-magnetisable
- Inner coating

Competence in Advanced Ceramics
Engineering for customized solutions

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