Press Information

Kyocera supplies cooling elements for Europe's most modern particle accelerator

Composite components made of alumina and copper enable the production of superconductors at minus 200 degrees Celsius.

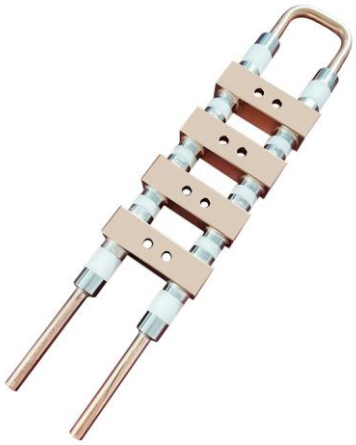
Kyoto/London, 26th September 2024. The 1,100 metre long "Facility for Antiproton and Ion Research" (FAIR), one of the most modern ring accelerators in Europe, is being built at the GSI Helmholtz Centre for Heavy Ion Research in Darmstadt, Germany. With its help, the extreme conditions - temperatures, pressures and densities - under which matter is created in the universe can be researched. The high mobility of electrically charged particles, which occurs in certain materials - known as superconductors - at temperatures below minus 200 degrees Celsius, is exploited for this purpose. The particles can then be accelerated to almost the speed of light. To achieve the extreme cold, liquid helium or liquid nitrogen is passed through coolers developed by Kyocera that surround the superconductor. These coolers combine the high cold resistance and insulating properties of ceramic tubes made of F99.7 alumina with the high thermal conductivity of contact heat sinks made of high-purity copper. The two components were joined using a nickel-iron alloy in a brazing process.

Many years of expertise from research partnerships

For decades, KYOCERA Fineceramics Europe GmbH has been a regular development partner of research institutions such as the European Organization for Nuclear Research (CERN) and the GSI Helmholtz Centre for Heavy Ion Research. Together with the scientists, special ceramics are being developed and tested to meet particularly high requirements. In addition to cold resistance, the electrical insulation of the individual copper heat sinks from each other (up to 1 kV) and the prevention of leaks (with helium up to 10^{-9} mbar l/s) also played a decisive role in the coolers manufactured for the GSI. In addition, the coolers have been designed for a service lifetime of around 30 years.

Development benefits medical, safety and laboratory technology

Today, particle accelerators are not only used in large-scale research facilities, but also in numerous other applications, such as for imaging processes and radiation treatments in medicine, for drug and explosive detection during security checks at airports or generally for material analyses in laboratories. At the moment, around 30,000 particle accelerators are in use around the world, and the trend is rising.



Heat sink made of ceramic-metal composite

For more information on Kyocera: uk.kyocera.com

About Kyocera

Kyocera has been successful in Europe for over 50 years. From its European headquarters in Esslingen am Neckar, KYOCERA Europe GmbH operates 26 sites including manufacturing facilities, with products ranging from fine ceramics, electronics, automotive, semiconductor and optical components to industrial tools, LCDs, touch solutions, industrial printing components, solar systems and consumer goods such as kitchen and office products.

KYOCERA Europe GmbH is a company of the KYOCERA Corporation headquartered in Kyoto/Japan, a world leader in semiconductor, industrial and automotive components as well as electronic components, printing and multifunction systems, and communications technology. The technology group is one of the world's most experienced manufacturers of smart energy systems, with more than 45 years of industry expertise. The Kyocera Group comprises 292 subsidiaries (31 March 2024). In England, Kyocera has a subsidiary in Frimley, KYOCERA Fineceramics Ltd. With around 79,200 employees, Kyocera generated net annual sales of around EUR 12.29 billion in the 2023/2024 fiscal year.

Kyocera is ranked 672 on Forbes magazine's 'Global 2000' list for 2023, and ranked as 'The 100 Most Sustainably Managed Companies in the World' according to the Wall Street Journal. For the second year in a row, Kyocera qualified for the Dow Jones Sustainability Index (Asia-Pacific). As well, Kyocera receives a Gold rating on EcoVadis Sustainability Survey for the second consecutive year and was acknowledged as a 'Top 100 Global Innovator 2023', being one of the world's leading innovators, for the eighth time by Clarivate.

The company also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation — established by Kyocera founder Dr Kazuo Inamori — to individuals worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind (equivalent to approximately €596,500 per prize category).

Contact
KYOCERA Fineceramics Ltd.
Allan Martin
General Manager
Prospect House, Archipelago,
Lyon Way, Frimley, Surrey.
GU16 7ER United Kingdom
Tel: +44 1276 693450
E-mail: PR@kyocera.de

uk.kyocera.com