



# BUMAX® – A FASTENER THAT MEETS THE DEMANDING REQUIREMENTS OF THE CERN PARTICLE ACCELERATOR

BUMAX supplies the CERN Particle Accelerators in Switzerland with high-strength screws and fasteners capable of withstanding both extreme heat and near absolute zero temperatures.

## High customer demands

Scientists at the CERN particle accelerator required high-strength fasteners, with a low magnetic permeability and low cobalt content for their various vacuum chambers and bellows modules. Additionally, the fasteners need to withstand near absolute zero temperatures, down to 1.9 degrees Kelvin (minus 271°C), as well as high temperatures during bake-out (300°C).

After various tests, CERN found that BUMAX® fully met all of its requirements

## The BUMAX solution

BUMAX has provided high quality fasteners to CERN since 1996. BUMAX® 109 is used for all BUMAX® fasteners at CERN, and 130,000 pieces per year on average have been supplied between 2016 and 2018.

BUMAX® 109 fasteners withstand cryogenic temperatures of 1.9 Kelvin (minus 271°C) and also retain their properties during bake-out temperatures of up to 300°C. Crucially, the non-magnetic nature of BUMAX® 109 ensures

that the BUMAX® fasteners do not interfere with the movement of particles and magnetic field in the accelerator.

## BUMAX customer collaboration

BUMAX has collaborated with CERN to successfully trial the use of silver coating on BUMAX® products to reduce galling. Since these trials with CERN, BUMAX has started to offer silver coating to other customers with the norm CERN 507.

## Customer benefits

### - Cost savings

As the fasteners can cope with both cryogenic and high temperatures, BUMAX® 109 avoids significant replacement and maintenance costs for CERN.

### - Environmental benefits

Stainless steel is 100% recyclable and retains its original physical properties in the process. This recyclability reduces the use of virgin material and lifecycle carbon emissions.