

INNOVATION FOR ACTIVE IMPLANTS

Foundation of MPS success is its culture of innovation that has prevailed for decades. In the field of active implants, MPS has specialized in the design, manufacturing and testing of miniature, biocompatible, powerful, reliable and extremely efficient electromechanical systems. MPS technologies are especially suitable for applications, for which the ratio mechanical performance/dimensions is particularly challenging, such as implantable pumps, bone lengthening, spine straighteners or urethral sphincters.



Innovation in product design

Sealing of non-biocompatible components

MPS is an expert in the development of the encapsulation of customized non-biocompatible miniaturized drive systems; not only from a product design point of view but also from a welding process (helium proved sealing) point of view.

Contactless transfer of torque from the sealed drive units to the biocompatible active mechanism

Managing mechanical power transfer through an implant is core business of MPS, whose competences are not only in the design of magnetic couplings for forces ranging from 1 to 1000N but also in the optimization of the dimensions and in the most suitable locations of the gearboxes.

Contactless transfer of torque from an external drive system to the implant

Managing mechanical power transfer from an external power unit to the implant is core business of MPS, whose competences are not only in the design of magnetic couplings for forces ranging from 1 to 1'000N but also in the optimization of the dimensions and in the most suitable location of the gearboxes.

Design for MRI compatibility

MPS has selected a range of permanent magnet materials able to keep their properties even after going through a complete 1.5T MRI procedure.

Non-corrosive and biocompatible high efficiency bearings and thrust bearings

Design of biocompatible non-corrosive bearings made of titanium or CoCr alloys and ceramic balls; for long-term implantation.

Non-corrosive and biocompatible screws and nuts

Design of biocompatible non-corrosive screws and nuts made of titanium, CoCr alloys, PEEK, Carbon filled PEEK for long-term implantation. These units can withstand loads up to 1'000N.

Very efficient implantable gearboxes made of CoCr material

The challenge of minimizing friction in active mechanical implants is taken seriously by MPS who developed a fully biocompatible gearbox made of CoCr material. The selection of the appropriate coating improves the system efficiency even more.

Applications

Implanted drug pumps



LVAD / Blood pumps



Spine & bone lengthening



Urethral sphincter



+ any other implanted active devices providing mechanical functions inside the body.

Innovation in product testing

Design, manufacturing and qualification of product specific test benches for

- friction testing
- measurement of energy consumption and efficiency
- mechanical accuracy and repeatability
- mechanical performance (torque, force, speed, acceleration etc.)
- lifetime testing



In-line friction testing equipment



Bench for torque measurement of a pumping unit

Innovation in Manufacturing and Assembly processes

Development of specific tooling to ensure uniformity of tolerances and surface roughness during grinding and polishing processes on complex surfaces.

Development of specific tooling to test residual friction in micro-assembly.

