An engineering challenge in the medical industry is prolonging the lifetime of implants for an ever-aging population and younger patients. Cobalt-chromium alloys are a state-of-the-art material and optimal choice to maximise longevity of medical implants for aggressive in-body environments. S³P processes offer a solution for surface hardening cobalt-chromium alloys to improve mechanical properties and maintain corrosion resistance.
S³P processes can help maximize the life of implant components on various grades of cobalt-chromium alloys. The S³P surface treatment involves a low temperature diffusion of carbon into the material. This results in an extremely hard and wear resistant surface that maintains its corrosion resistance. Depending on the material and alloy composition, a surface hardness up to 1300 HV0.05 can be achieved to a case depth of 20 µm. Bodycote’s S³P treatment is suitable for both wrought and cast materials, and virtually eliminates the risk of delamination and metal debris.

Advantages
- Improve wear resistance
- Ductile diffusion zone
- No cracking or flaking of the hardened layer
- No influence on the corrosion resistance
- Surface hardness > 900 HV0.05

Material Selection
All cobalt-chromium alloys with an austenitic structure can be treated by S³P processes. Contact your S³P representative for details on optimal material selection.

Examples of treatable alloys
- BioDur® CCM Plus® alloy
- Stellite® 21 alloy

For applications in the medical sector, a FDA master file is available for the S³P processes.