

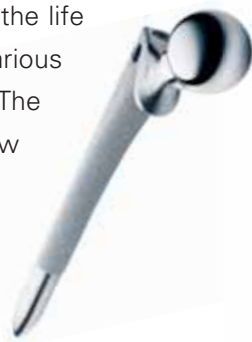
# In the SPOTLIGHT:

## S<sup>3</sup>P PROCESSES FOR MEDICAL GRADE MATERIAL

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. S<sup>3</sup>P processes offer a solution for surface hardening cobalt-chromium alloys to improve mechanical properties and maintain corrosion resistance.



S<sup>3</sup>P processes can help maximize the life of implant components on various grades of cobalt-chromium alloys. The S<sup>3</sup>P 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 HV<sub>0.05</sub> can be achieved to a case depth of 20 μm. Bodycote's S<sup>3</sup>P 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 HV<sub>0.05</sub>

### Material Selection

All cobalt-chromium alloys with an austenitic structure can be treated by S<sup>3</sup>P processes. Contact your S<sup>3</sup>P representative for details on optimal material selection.

### Examples of treatable alloys

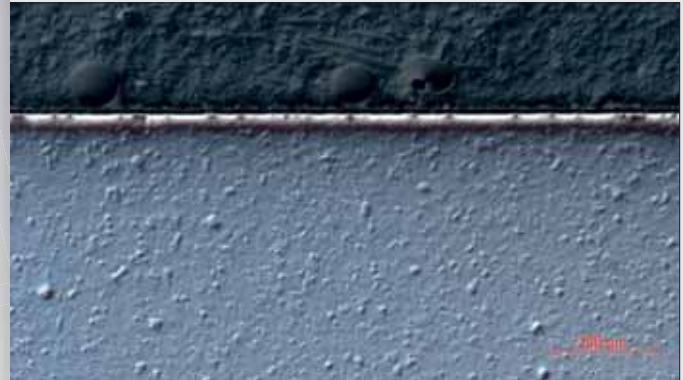
- BioDur® CCM Plus® alloy
- Stellite® 21 alloy

For applications in the medical sector, a FDA master file is available for the S<sup>3</sup>P processes.

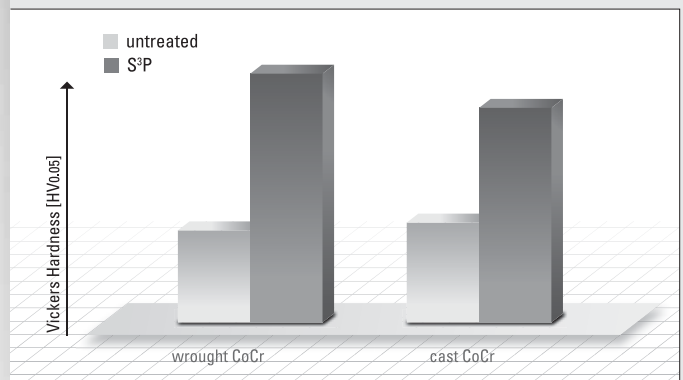
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BioDur® CCM Plus® is a registered trademark of Carpenter Technology Corporation

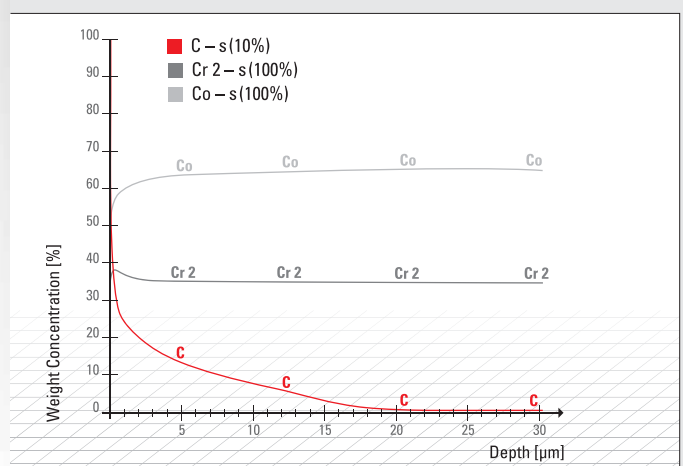
The contents presented here are based on experiences and laboratory testings and are not a warranty of the performance of any product of any company.



BioDur® CCM Plus® alloy microstructure after S<sup>3</sup>P treatment.



Influence of S<sup>3</sup>P on the surface hardness.



GDOES profile of S<sup>3</sup>P treated CoCr alloy.