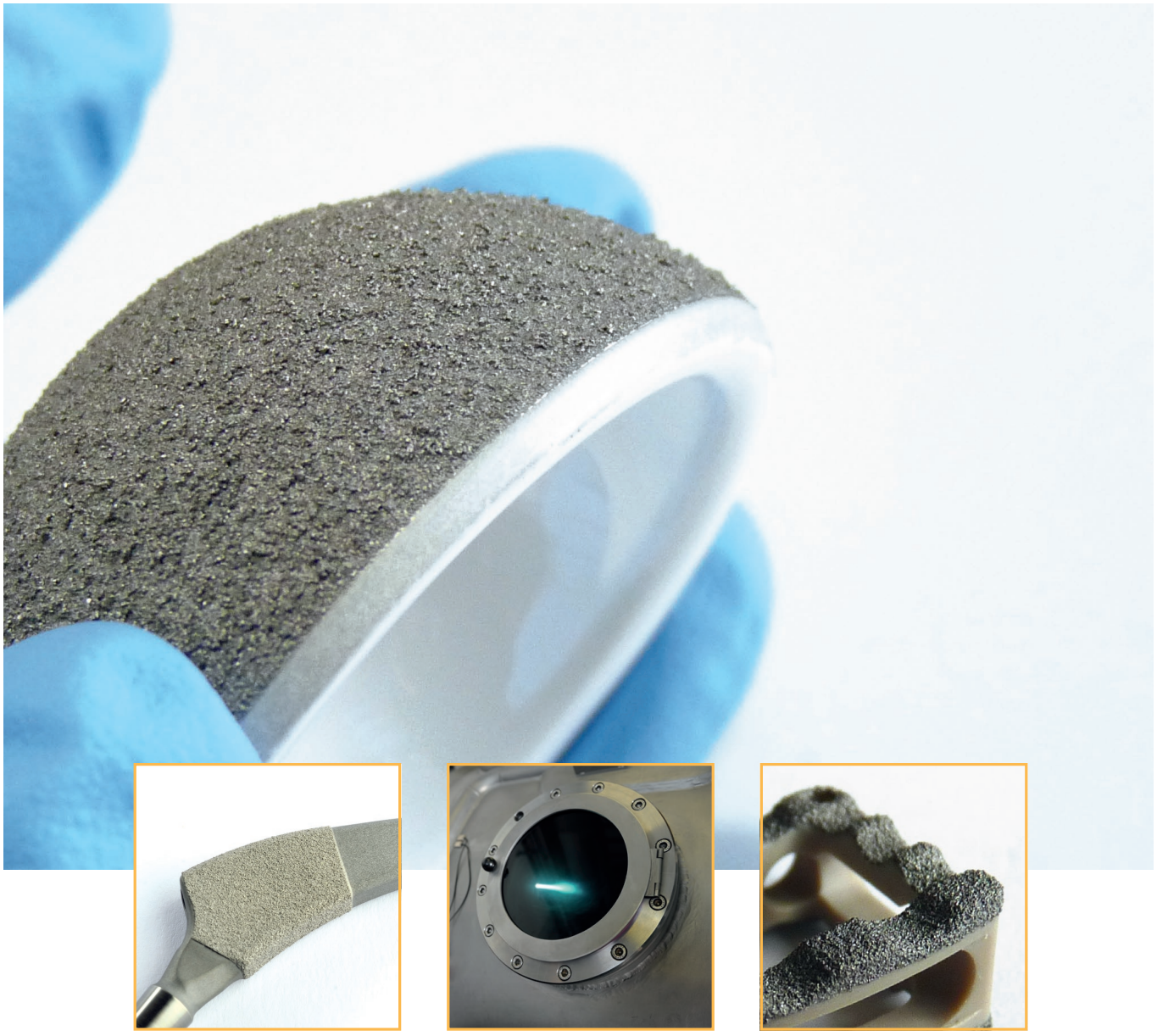
DOT Coatings

Enhancing Implant Fixation by using Porous Plasma-Sprayed Titanium Coatings on Metal, Ceramics & PEEK



DOT
medical implant solutions

TPS METAL

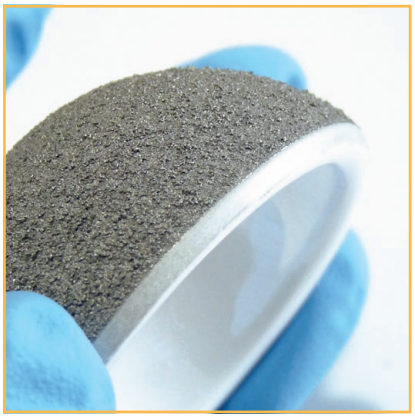
Plasma-sprayed titanium coatings have been applied to medical implant surfaces for several years. The coating process has proven to be a very successful means of producing highly adherent, micro-porous and biocompatible implant surfaces [1, 2, 3].

Porous titanium coatings have been plasma-sprayed onto orthopedic implant surfaces – for clinical applications – since the early 1980 [4]. As a result of their structure, the surfaces ensure that the implant is firmly anchored in the bone.

TPS CERAMIC

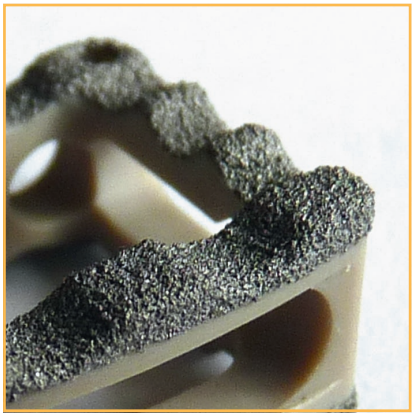
An increasing number of implants and implant components are being manufactured from ceramic substrates; which are known to offer excellent biomechanical properties and high mechanical strength. Ceramic implants are properly classified as bioinert [5] and therefore do not foster cementless fixation. The ceramic implant surface must therefore be modified to promote osseointegration.

Porous TPS coatings are applied to the implant by means of a vacuum plasma spray process with which the surface of the ceramic implant is modified. The topography of the implant surface is thus optimized for bone apposition, providing bone cells with the ideal topography for ingrowth without reducing the fatigue strength of the implant body.

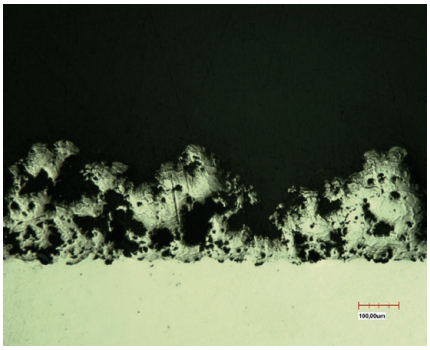


TPS PEEK

In addition to coating metals and ceramics, we offer our customers a highly porous TPS coating for implant components based on temperature resistant polyethylene (PEEK). The TPS coating is applied onto the implants by using vacuum plasma spraying technology, actively yielding a high degree of porosity and coating adhesion.
Biocompatible surfaces, which are attractive to the bone, can also be applied to substrates fabricated from bioinert plastics. This in turn, causes osseointegration to occour.

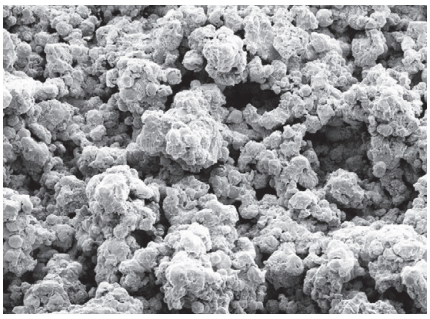


Test criteria TPS METAL	Result
Color	Gray
Coating thickness (ASTM F 1854)	30-800 µm
Tensile strength (ASTM F 1147)	≥ 22 MPa
Porosity (ASTM F 1854)	20-40 %
Roughness R_a (DIN EN ISO 3274) (DIN EN ISO 4287) (DIN EN ISO 4288)	3.5-80 µm
Biocompatibility (DIN EN ISO 10993-1)	Biocompatible
Titanium powder	In accordance with ASTM F 1580



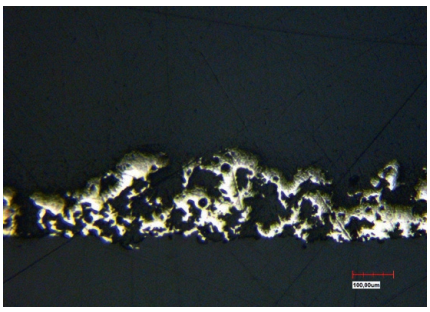
Vertical micrograph of the TPS METAL coating

Test criteria TPS CERAMIC	Result
Color	Gray
Coating thickness (ASTM F 1854)	50-300 µm
Tensile strength (ASTM F 1147)	≥ 22 MPa
Porosity (ASTM F 1854)	20-40 %
Roughness R_a (DIN EN ISO 3274) (DIN EN ISO 4287) (DIN EN ISO 4288)	30-60 µm
Biocompatibility (DIN EN ISO 10993-1)	Biocompatible
Titanium powder	In accordance with ASTM F 1580



SEM picture of the TPS CERAMIC coating

Test criteria TPS PEEK	Result
Color	Gray
Coating thickness (ASTM F 1854)	50-250 µm
Tensile strength (ASTM F 1147)	≥ 22 MPa
Porosity (ASTM F 1854)	20-60 %
Roughness R_a (DIN EN ISO 3274) (DIN EN ISO 4287) (DIN EN ISO 4288)	20-40 µm
Biocompatibility (DIN EN ISO 10993-1)	Biocompatible
Titanium powder	In accordance with ASTM F 1580



Micro-section of the TPS PEEK coating

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We look forward to talking with you!

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DOT – coating specialist for orthopedic and dental implants

DOT is one of Europe's leading providers of medical coating solutions for orthopedic and dental implants and instruments and also their cleanroom packaging.

Our comprehensive supply chain concept makes us an ideal medical technology partner. Our activities help restore the health of patients worldwide and thus make a major contribution to the improvement of their quality of life.

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