PROTI 360°™
Titanium Integrated Technology

The Benefits of Both Worlds: Combining a PEEK Core + Titanium Integrated Surface

STIMULATE, CREATE, INTEGRATE

STIMULATE – Bone matrix formation directly on the implants’ titanium surfaces through contact osteogenesis

CREATE – Interbody cages that are designed to prevent surface delamination while combining the benefits of PEEK and Titanium osteoconductive properties

INTEGRATE – 360° external surface titanium integration designed to promote boney on-growth at the endplates and within the disc space

STIMULATE
Accelerated osteoconduction and bone matrix formation on the titanium integrated cage surfaces

- The detection of calcium is the ultimate measure of bone matrix formation
- Osteoblast functions, including bone matrix production, are enhanced on surfaces that are most similar to bone
- At day 1, the calcium deposition on PROTI 360°™ Technology is 470.4% higher than PEEK, and 305.1% higher than bare Titanium

STIMULATE Adhesion

CREATE
Designed to prevent delamination

Enhanced Titanium/PEEK Bonding Strength

- Bonding strength approximately twice that of regulatory coating requirement and 30% more compared to other Ti coated PEEK devices
- Uniform proprietary process allows approximately 10% of the titanium thickness to penetrate into the PEEK

Fortified Titanium Edges
- No external, leading edge exposed PEEK corners

INTEGRATE
Greater surface area for osteoblast integration

30% more surface area per sq. micron
- Additional osteoconductive surfaces with 360° design
- More favorable environment for bone growth

INTEGRATE

Available Surface Area

Calcium Deposition

Titanium/PEEK Bonding Strength

Available Surface Area

PROTI 360°™ = PROTI 360° Integrated Technology
PEEK = Poly-ether-ether-ketone
Ti = Titanium
PROTI 360° Titanium Integrated Technology is engineered to provide immediate mechanical stability and to promote rapid and long-lasting biological fixation with supporting bone as demonstrated by in vitro testing. This is accomplished through a number of design considerations:

• PEEK core with mechanical properties similar to bone provides mechanical stability and effectively disperses dynamic loads to minimize stress shielding effects\(^2, 3, 4, 5\).
• Titanium integrated surface treatment creates a bioactive surface that promotes the attachment and growth of bone forming cells\(^2, 3, 4, 5\).
• The additional surface area created by more surface roughness increases in vitro osteoblast population by ~50% within 7 days compared to standard PEEK surfaces\(^1\).
• Osteoblast population is increased by 21% after 14 days compared to Ti 6Al 4V\(^1\).
• Incorporation of 3-dimensionally complex surface features increases the in vitro formation of mineralized bone matrix from osteoblasts by more than 350% within 7 days compared to PEEK\(^1\).
• Calcium deposition increases by 470% compared to PEEK, and 305% compared to Titanium after just one (1) day\(^1\).

Combined, the PROTI 360° Titanium Integrated Technology provides an enhanced structure for spinal fusion procedures by sustained mechanical and biological stability throughout the bone remodeling process.

References
1. TR-201801-B (PROTI Test Report)
2. TR-201803-A (Integrated Titanium Bonding strength testing report)