

Evolution of Ceramic Materials

BIOLOX®
MATERIAL
MATTERS®

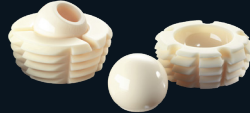
1st Generation

BIOLOX®
1974



2nd Generation

BIOLOX®
1985



3rd Generation

BIOLOX®forte
1995



4th Generation

BIOLOX®delta
2003

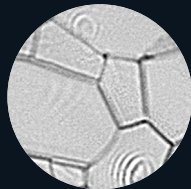


1st Generation
Alumina
Grain size >4.5 microns



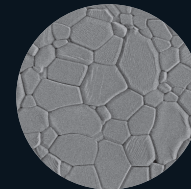
Ø 10 µm

2nd Generation
Alumina
Grain size <4.5 microns



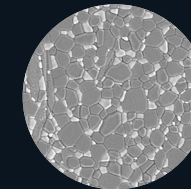
Ø 10 µm

3rd Generation
Alumina
Grain size <2 microns



Ø 10 µm

4th Generation
ZTA
Grain size <1 microns



Ø 10 µm

- The very first BIOLOX® alumina components manufactured by CeramTec were implanted by Dr. Mittelmeier in 1974. Throughout the years, each subsequent generation of BIOLOX® ceramics was improved to increase product reliability with major advances in component geometries, refinement of the raw material, fewer impurities, and smaller grain size.
- The manufacturing process of the third generation BIOLOX®forte was improved by introducing Hot Isostatic Pressing (HIP) for full densification.

Furthermore, laser marking for traceability and 100% component proof testing were implemented in order to detect any flaws that might impact the product performance or lifetime.

- In 2003, a new pink generation of medical grade ceramic was introduced: BIOLOX®delta, a zirconia toughened alumina (ZTA) composite that offers new possibilities in orthopaedics.

1st and 2nd BIOLOX® generations are not produced anymore. BIOLOX®delta and BIOLOX®forte femoral heads and inserts are registered by CeramTec's customers. 1st and 2nd Generation: laser microscope (LEXT OLS 4000, Olympus, Tokyo, Japan); magnification 2000X. 3rd and 4th Generation: scanning electron microscope (Zeiss GeminiSEM 500, Oberkochen, Germany); magnification 4000X.

CeramTec
THE CERAMIC EXPERTS