X-LINKed®

Highly crosslinked polyethylene for acetabular cups and cup inserts

LINK's range of acetabular cups serves a wide variety of indications. LINK acetabular cups are frequently used both for young, active patients and for those who are older or undergoing revision surgery. Prosthesis heads with diameters of up to 36 mm can be used with X-LINKed® polyethylene acetabular cups to increase the range of movement and give optimal joint stability.

With X-LINKed® polyethylene, wear is greatly reduced. This extends the life of the other implant components.

The following components are available in X-LINKed® polyethylene:

Uncemented

- T.O.P.® polyethylene inserts, standard and anti-luxation
- BetaCup® polyethylene inserts

Cemented

- Lubinus® polyethylene acetabular cups, eccentric, without snap-fit
- IP polyethylene acetabular cups
- FAL polyethylene acetabular cups, anti-luxation

T.O.P.® polyethylene inserts,
standard, anti-luxation

BetaCup® polyethylene inserts

IP polyethylene acetabular cups

Lubinus® polyethylene acetabular cups
(without snap-fit)

FAL IP polyethylene acetabular cups

Literature

[1] Kurtz et. al, Second Edition, 2009, Elsevier Inc.: UHMWPE Biomaterials Handbook
[2] Results of R & D tests of X-LINKed Material 2009/ 2010, endolab Mechanical Engineering GmbH, Seb.-Tiefenthaler Str. 13, D-83101 Thansau / Rosenheim
[3] Beksaç et. al., Clin Orthop Relat Res (2009) 467:1765-1772: Wear is reduced in THA Performed with Highly Cross-linked Polyethylene
[4] Röhrl et. al., Acta Orthopaedica 2007; 78 (6): 739-745: Very low wear of non-remelted highly cross-linked polythylene cups
[5] Morrison et. Al, Wiley InterScience Nov.2008, DOI: 10.1002/jbm.b.331257: Evaluation of sequentially Crosslinked UHMWPE
[6] Greer, Richard, 47th Annual Meeting, Orthopaedic Research Society, Feb. 2001 San Fransisco USA: The properties of UHMWPE following annealing above the melting point

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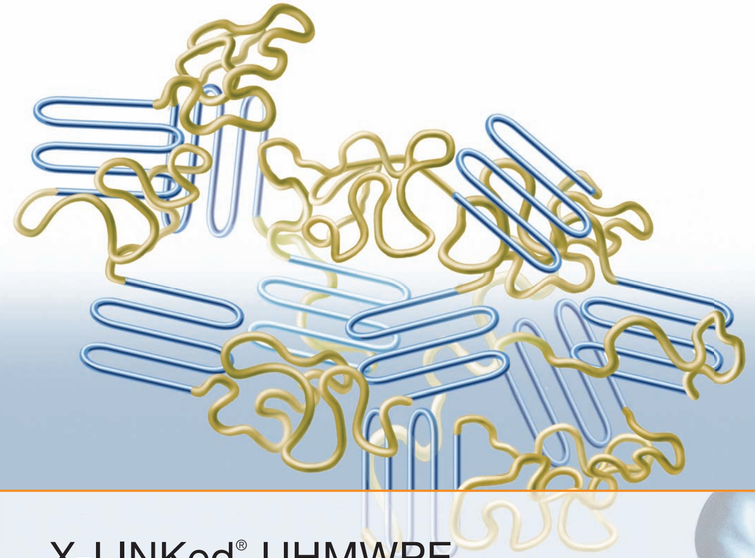

X-LINKed® UHMWPE

The new material from LINK®

Materials

The new material from LINK®

X-LINKed® is a highly crosslinked UHMWPE material combining maximum durability with optimised properties.

Looking back on decades of experience in using polyethylene LINK has developed an extensive range of acetabular cup systems. Now, constantly striving to improve its products, LINK has developed a new UHMWPE material.

The development process paid particular attention to achieving maximal abrasion resistance and material strength with minimal oxidation and meets the latest findings in endoprosthetics and polymer science [1].

Minimal wear

Reduced polyethylene wear cuts down the risk of particle-induced osteolysis and thus helps to extend the functional life of endoprostheses. The share of highly crosslinked UHMWPE components that show reduced wear rates has increased within the last years.

LINK's standard material already possesses very low wear rates, still, the new material brings a 10fold improvement. The abrasion values attained by X-LINKed® highly crosslinked UHMWPE are up to 90% lower than those of the established standard UHMWPE materials already on the market.

Wear rates of X-LINKed® highly crosslinked UHMWPE: 2.03 mg/ Mio cycles*

*Results for standard LINK UHMWPE and X-LINKed® highly crosslinked UHMWPE (artificially aged) from Endolab report (2009/ 2010): mean of results for wear over 5 million cycles [2]

Strength

Materials using highly crosslinked UHMWPE are often less strong than standard UHMWPE. In producing the X-LINKed® material, special efforts have been made to maintain the mechanical properties as far as possible and the tendency of the material to become brittle has been minimised.

No measurable oxidation

Oxidation of materials leads to aging processes which in turn cause the general properties of the material to deteriorate with UHMWPE components. This can result in increased brittleness and fracture.

The risk of premature aging is greatly reduced in the case of X-LINKed® highly crosslinked UHMWPE. An independent laboratory tested acetabular components for aging effects and found that almost no oxidation of the material took place.

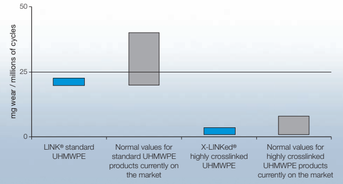

Fig. 1
Wear of X-LINKed® highly crosslinked UHMWPE and LINK standard UHMWPE in comparison to products available on the market (source: Kurtz et. al [1] and Endolab final report 2009/2010 [2])

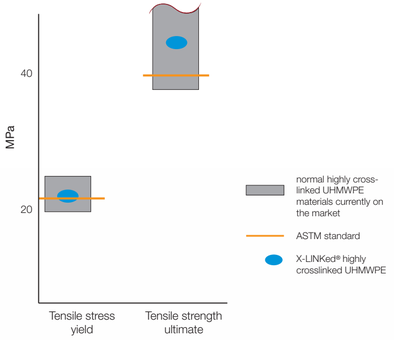

Fig. 2
Tensile stress yield and tensile strength ultimate of X-LINKed® and standard materials [1], [2], [5], [6] and ASTM F648.

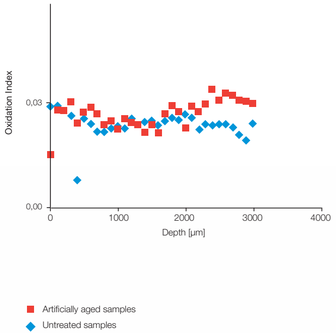

Fig. 3
Oxidation of X-LINKed® UHMWPE, measured by an independent laboratory [2]

Production of X-LINKed® highly crosslinked UHMWPE

The raw material is GUR 1020. It is sintered at high pressure to form sheets which are then turned into rods.

The GUR 1020 UHMWPE rods are irradiated at 75kGy. A 5 mm layer is then shaved off the entire surface to remove the oxidised outer skin.

The highly crosslinked UHMWPE rods are refined in a special process.

All rods are packed in black airtight foil to protect them from oxidation during onward transport and storage.

Every stage of the production process has been fine-tuned to meet the particular needs of X-LINKed®. For example, within the production facility the rods are transported in light-proof containers.

Products are sterilised with EtO. This method is gentle to the material and ensures that products made from X-LINKed® UHMWPE do not undergo physical changes during sterilisation.

Products are packed in light-proof airtight packaging. LINK has added an aluminium foil layer to the packaging to ensure complete protection.