



**ALTEON<sup>®</sup>**  
XLE Liner

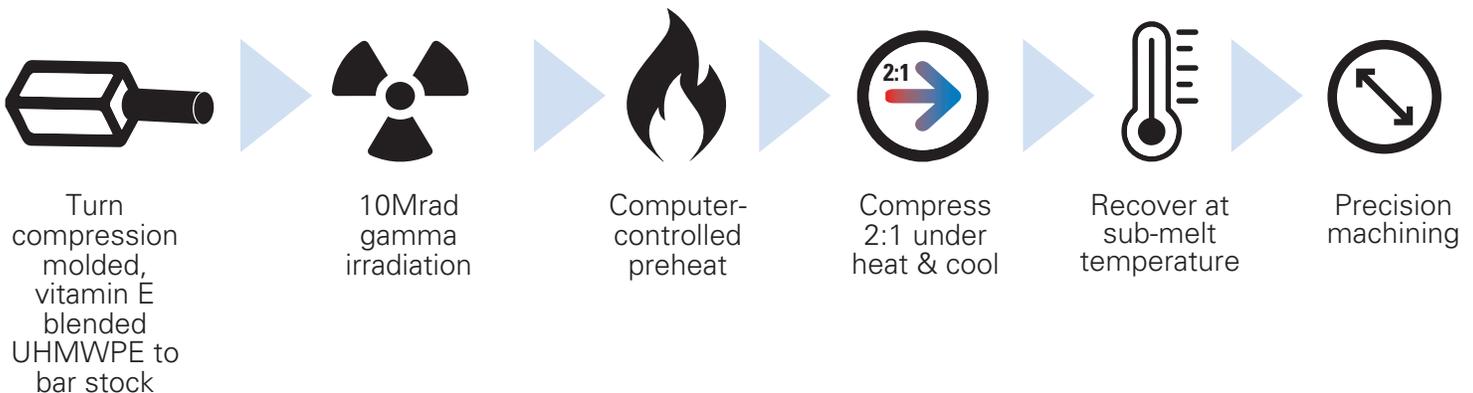
## Patented Massachusetts General Hospital Technology

Developed by Massachusetts General Hospital (MGH) in association with Cambridge Polymer Group, the foremost leaders in polyethylene technology, the Alteon<sup>®</sup> XLE is a highly crosslinked, vitamin E material engineered for improved wear properties<sup>5</sup>, superior oxidation resistance<sup>2</sup>, and optimized mechanical strength.<sup>1-3, 5, 8, 10</sup>

By virtue of its proprietary vitamin E binding process, coupled with a 10Mrad gamma irradiation dose and unique compressive mechanical annealing procedure, Alteon XLE represents one of the most advanced and compelling polymer technologies in orthopedics.

## Patented Manufacturing Process

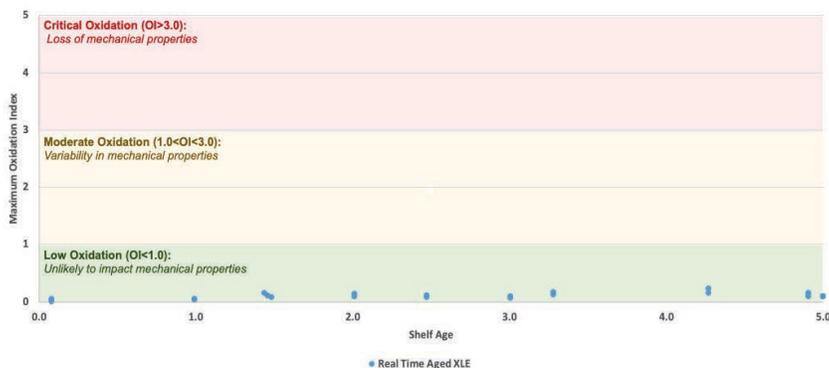
Developed by Massachusetts General Hospital in conjunction with Cambridge Polymer Group.<sup>3</sup>



## Superior Oxidative Stability

Blending the vitamin E prior to consolidation allows the antioxidant to distribute uniformly throughout the material. Subsequent gamma crosslinking bonds the vitamin E molecules onto the polyethylene chains, and in combination with the compressive mechanical annealing procedure, greatly reduces measured free radical content.<sup>3,9</sup> The cumulative result is a material with high oxidative stability<sup>2</sup> and low potential for surface oxidation.<sup>3</sup>

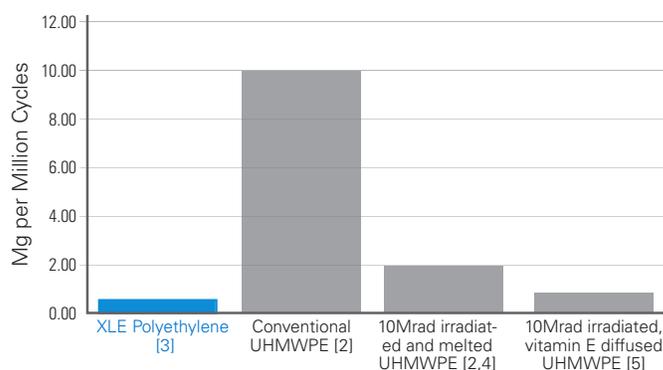
## Surface Oxidation Testing: Alteon XLE Hip Polyethylene<sup>3</sup>



## Improved Wear Resistance

A patented gamma irradiation and mechanical annealing process, tailored to the vitamin E content, is used to achieve the desired crosslink density. An irradiation dose of 10 Mrad (Mrad) or 100 KiloGray (kGy) is imparted to the material prior to final gamma sterilization. This highly crosslinked polyethylene yields a reduced wear rate compared to conventional polyethylene.<sup>5</sup>

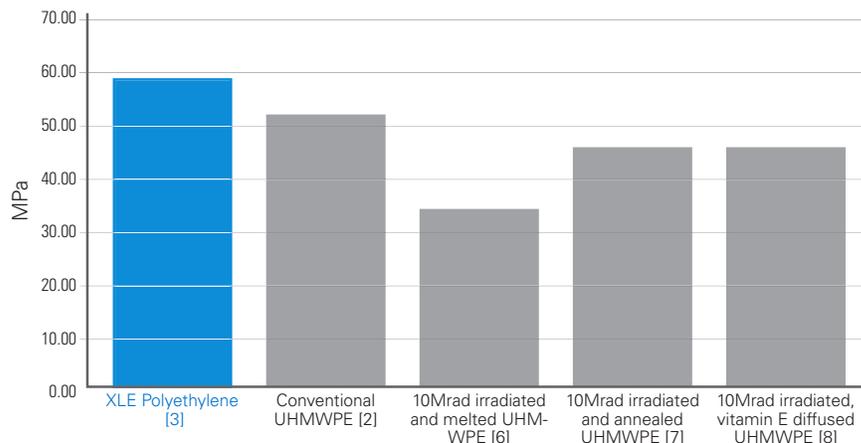
## Hip Simulator Wear Rate\*



## Optimized Mechanical Strength

Unlike remelted polymers, the proprietary XLE polyethylene mechanical annealing process quenches free radicals below the melt temperature, which maintains the crosslink density and provides enhanced mechanical strength over conventional polyethylene.<sup>9</sup>

## Ultimate Tensile Strength\*



\*TEST PARAMETERS: Exactech XLE [3]: Test parameters: 40mm diameter CoCr head; 4.4mm thick liner; 5 million cycles; 90% bovine serum; 1.1Hz; 2kN peak load; Wear rate: Slope of the linear regression for corrected mass change in the steady-state cycles. Conventional UHMWPE [2]: Test parameters: Not specified. 10Mrd irradiated and melted UHMWPE [2,4]: Test parameters: 46mm head; 3mm thick liner; 11 million cycles; 100% bovine serum; 3.3kN peak load; Wear rate: Slope of the linear regression for corrected mass change over the full number of cycles. 10Mrd irradiated, vitamin E diffused UHMWPE [5]: Test parameters: 36mm CoCr head; 4.9mm thick liner; 5 million cycles; 100% bovine serum; 2Hz; 3kN peak load; Wear rate: Slope of the linear regression for corrected mass change over the full number of cycles.

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