

# $\gamma$ Gamma-bsm<sup>®</sup> Moldable Putty



ZIMMER BIOMET  
Your progress. Our promise.™

Sets Hard

Cell-mediated Remodeling

$\gamma$ Gamma-bsm Moldable Putty meets the need for high compressive strength materials that are implantable in a wet environment.

### Moldable

$\gamma$ Gamma-bsm moldability allows the putty to be easily placed into open defects. The putty sets hard and maintains shape to provide an osteoconductive scaffold for bone growth.

### Operative Flexibility

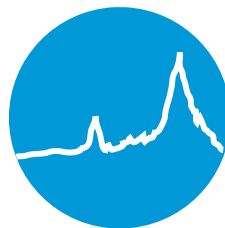
$\gamma$ Gamma-bsm provides 15 minutes of working time to allow for intraoperative flexibility. Not only does the putty set hard in a wet environment, it can also be irrigated during setting and drilled after setting.  $\gamma$ Gamma-bsm sets hard to a compressive strength of ~35 MPa,<sup>3</sup> 4 times the strength of cancellous bone.<sup>6</sup>

### Cell Mediated Remodeling

X-ray diffraction shows ETEX nanocrystalline\* calcium phosphate is comparable to the mineral composition of human bone, providing a scaffold for new bone growth while undergoing cell mediated remodeling as the bone heals.<sup>1,2</sup>



Natural Bone  
(X-ray diffraction)



ETEX<sup>®</sup> BSM  
(X-ray diffraction)

\*The grain size of the hydroxyapatite (HA) crystals that form as part of the amorphous and crystalline mixture of calcium phosphate sets are on the nanometer scale. The size of the crystalline structures were measured by x-ray diffraction to be less than 100 nanometers.

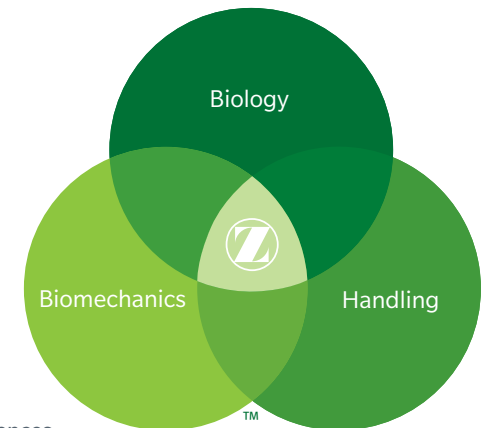


2.5 cc Kit	76-6023
5 cc Kit	76-6005
10 cc Kit	76-6010



Be sure to mix thoroughly. For complete mixing instructions, refer to the instructions for use.

PERFORMANCE CRITERIA		
CRITERIA	FEATURE	BENEFIT
Mixing	Open mixing system	Mix with blood or saline
Formulation	Proprietary nanocrystalline* calcium phosphate	Comparable to chemical formulation of human bone mineral <sup>1,2</sup>
Handling	Moldable putty	Easily packed into open defects
Cohesive	Sets in a wet environment, may be irrigated after setting	Complete defect fill / resists wash out
Structure	Sets hard and maintains shape	Osteoconductive scaffold
Working Time	15 minutes	Intraoperative flexibility
Setting time	Sets in 3-5 minutes at 37°C <sup>3</sup>	No thermal necrosis
Crystallization process	Isothermic <sup>3</sup>	Sets hard at body temperature
Compressive Strength	Average of 35 MPa <sup>3</sup>	Strength four times cancellous bone <sup>6</sup>
Drillability	Drillable during and after setting <sup>5</sup>	Procedural flexibility
Remodeling	Cell mediated remodeling <sup>2</sup>	Remodels as the bone heals
Sizes	2.5 cc, 5 cc and 10 cc	Accommodates a variety of applications



References

1. Etex TRE #91001
2. A. Tofghi, et al. New Generation of Synthetic, Bioresorbable and Injectable Calcium Phosphate Bone Substitute Materials: Alpha-bsm®, Beta-bsm™ and <sup>γ</sup>Gamma-bsm™ Journal of Biomimetics, Biomaterials and Tissue Engineering Vol.2 (2009) pp 39-55.
3. Etex TRE #030731
4. Etex TRE #030902
5. Etex TRE 202\_144
6. Van Hvid, Peter Christensen, Jørgen Søndergaard, Peter Brøgger Christensen & Christian Grønhøj Larsen (1983) Compressive Strength of Tibial Cancellous Bone: Instron® and Osteopenetrometer Measurements in an Autopsy Material, Acta Orthopaedica Scandinavica, 54:6, 819-825, DOI: 10.3109/17453678308992915.

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