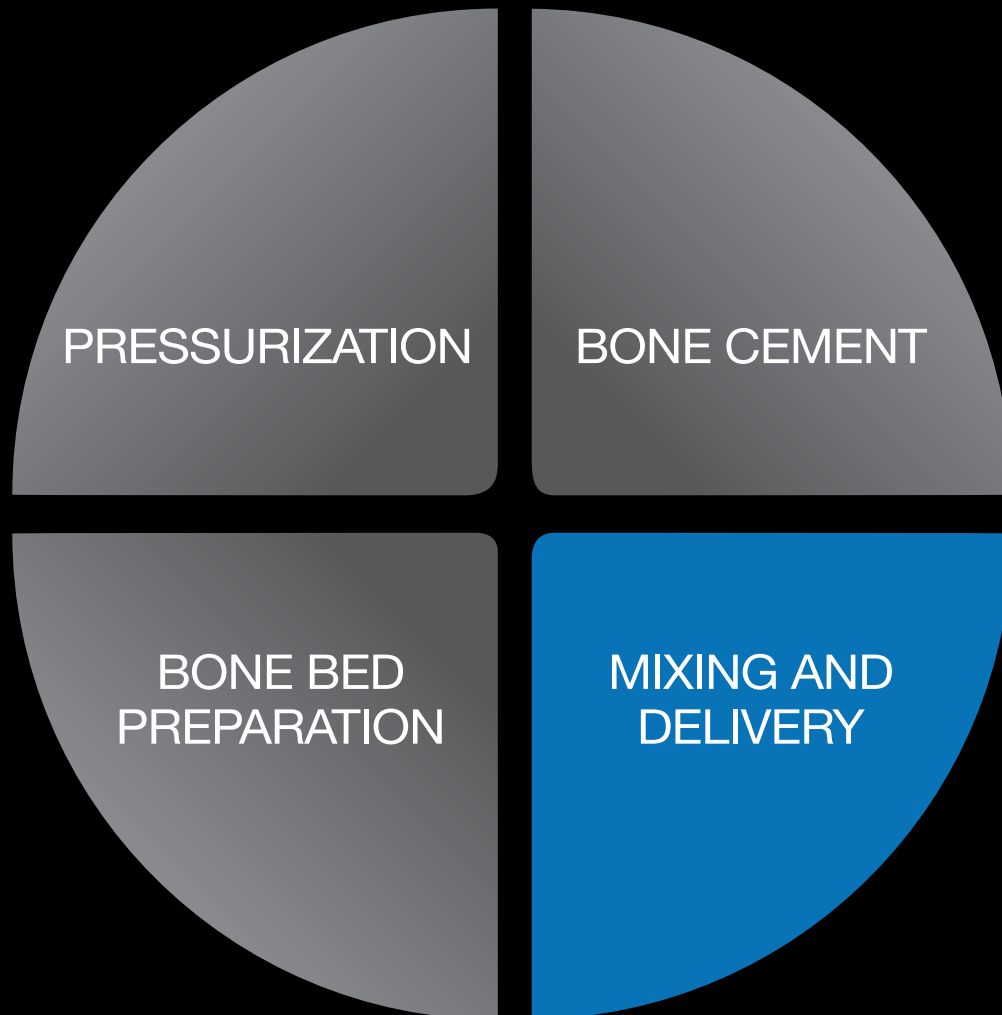




Optivac  
TECHNOLOGY  
Since 1993

BIOMET®

# Modern Cementing Technique



## Mixing and Delivery

Mixing and collecting the cement under vacuum reduces both micro and macro pores to a minimum. Deliver the cement with a cement gun and a nozzle suitable for the application.

- Improved cement strength and fatigue life<sup>1</sup>
- Lower risk of aseptic loosening caused by cracks in the cement<sup>1,2,3,4</sup>
- Delivery of reproducible results
- Safer working environment<sup>5,6</sup>

Modern Cementing Technique is a documented procedure. The objective with the procedure is to obtain the optimal cement-bone interface to achieve long term implant survival.

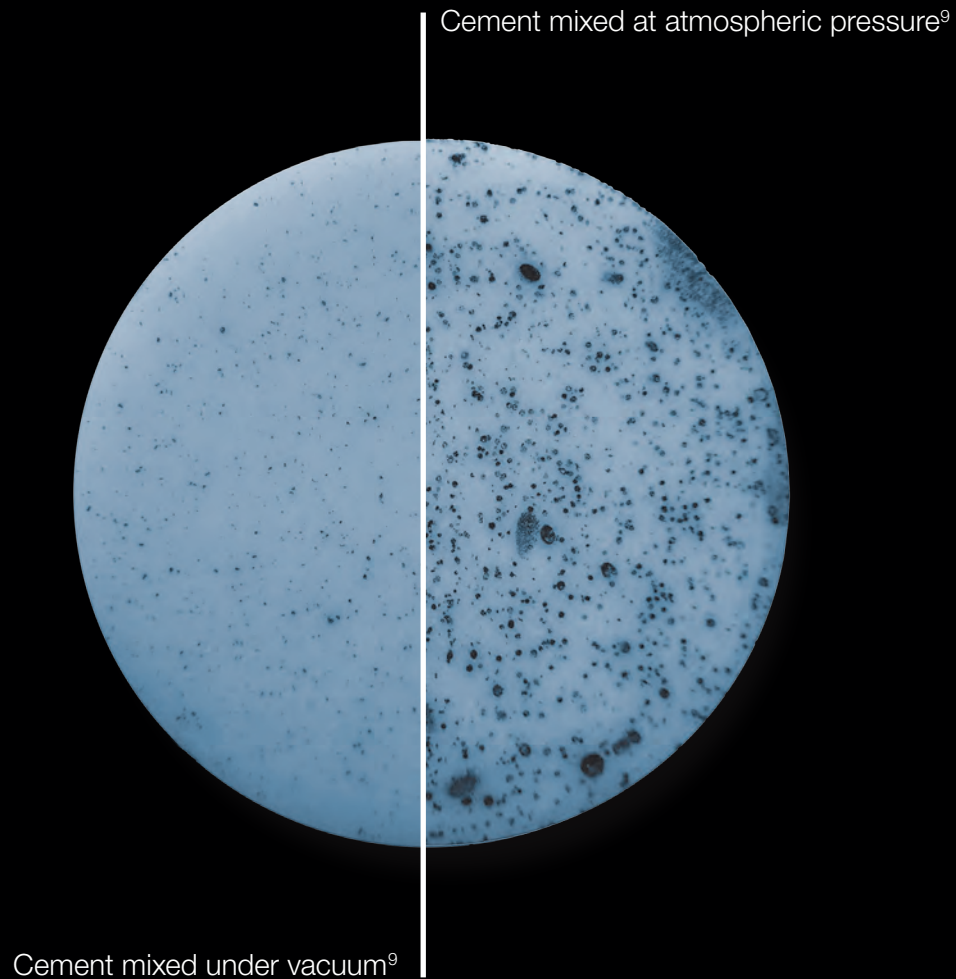
# Optivac Technology Since 1993



## Mixing and Collection Under Vacuum

Aseptic loosening due to porosity in bone cement has been a major problem since the start of cemented hip arthroplasty. The first experiments to reduce porosity in bone cement took place in the 1980s. This later led to the patented invention of bone cement collection under vacuum which has been proven to eliminate macropores. In 1993, Optivac was introduced on the market. With mixing and collection under vacuum, Optivac reduces both microporosity and macroporosity, thereby improving cement strength and fatigue life. Optivac has been the standard against which all other systems have been measured for the last 20 years. It is still unmatched in documentation among vacuum mixing systems.<sup>2,3,4,7,8</sup>

# Improvement of Bone Cement Quality



## Minimized Porosity and Improved Mechanical Strength

Cement porosity directly affects the fatigue behavior of the bone cement. Reducing the number of pores can lead to substantial improvements in cement strength and fatigue life. Several methods have been introduced to reduce cement porosity, the most efficient of which is applying vacuum throughout the process of mixing and collection of the cement.<sup>10</sup>

Optivac utilizes this feature, the effect of which has been validated by Mau *et al.*<sup>11</sup> Their study concluded that if cement is not collected under vacuum, porosity is increased.

Improving cement quality by using a vacuum mixing system is one of the key pillars of Modern Cementing Technique.



## Mixing and Collection Under Vacuum Minimizes Both Macropores and Micropores

Two types of pores are classified in fully polymerized bone cement:

- 1) macropores, with a pore diameter of more than 1.0 mm.
- 2) micropores, with a pore diameter of 0.1 – 1 mm.<sup>2,12</sup>

Mixing under vacuum reduces the cement's microporosity, but has less effect on macroporosity. Continuous vacuum – from mixing to collection – prevents macropore entrapment in high viscosity cement.

With its design for collection under vacuum, Optivac reduces both microporosity and macroporosity.<sup>1,2,3,4,8</sup>

By materially reducing macroporosity, Optivac helps to prolong cement fatigue life.<sup>3</sup>



*Bone cement mixed with a vacuum mixing system without collection under vacuum.  
High occurrence of macropores.*



*Bone cement mixed with Optivac,  
a vacuum mixing system with collection  
under vacuum.*



## Safer Working Environment

Optivac meets modern safety standards and the high demands on mixing bone cement. Bone cement in Optivac is mixed and delivered in the same cartridge, preventing direct contact of the user with the bone cement.

By drawing monomer fumes through special filters, Optivac minimizes MMA exposures in the OR to barely detectable levels. The packaging is PVC free and the blister pack also serves as a working tray. This reduces waste.<sup>5,6</sup>

- Reduced skin contact and sensitizing risk
- Reduced air exposure to methylmethacrylate<sup>5,6</sup>
- Reduced sensitization due to absence of latex

## Standardized Procedure

The Optivac standardized mixing procedure produces homogeneous cement with the lowest possible porosity.

All types of bone cements can be mixed with the Optivac system. Optivac is adaptable to various application areas, such as hip, knee or shoulder arthroplasty. We have suitable nozzles in our assortment to be used for different types of application areas.






Depending on the amount of the bone cement required, choose the suitable Optivac cartridge. Three sizes of Optivac cartridges are available, small, medium and large.

Mixing is easy, requiring only a few simple steps. Illustrated step-by-step instructions are included in every product package.





# Ordering Information





## Optivac sets

Product	Part Number	Product
	4150	Optivac Hip Set
	4161	Optivac S
	4160	Optivac M
	4152	Optivac L
	4250	Optivac + Hip Set for high volume cements

## Instrumentation

Product	Part Number	Product
	4195	Optigun Rachet
	4232	Vacuum pump

## Accessories

Product	Part Number	Product
	4149	Nozzle angled
	4154	Nozzle slim
	4155	Nozzle revision
	4312	Knee cementation nozzle

## References

1. Breusch S, Cementing Techniques in Total Hip Replacement: Factors Influencing Survival of Femoral Components, In Bone Cements and Cementing Technique ed. by Walenkamp G, Murray D, Springer Verlag 2001.
2. Wang J-S, Franzén H, Jonsson E, Lidgren L. Porosity of bone cement reduced by mixing and collecting under vacuum. Acta Orthop Scand 1993; 64 (2): 143-146.
3. Wang J-S, Kjellson F. Bone Cement Porosity in Vacuum Mixing Systems, Bone Cements and Cementing Technique 2001, Walenkamp, Murray (Eds). Springer Verlag.
4. Dunne N-J, Orr J.F. Influence of the mixing techniques on the physical properties of acrylic bone cement. Biomaterials 2001; 22: 1819-1826.
5. Report from SP Technical Research Institute of Sweden (2007 08 13). Airborne methyl methacrylate monomer during the use of different bone cement mixing systems.
6. Schlegel UJ, Sturm M, Eysel P, Breusch SJ. Pre-Packed Vacuum Bone Cement Mixing Systems. A Further Step in Reducing Methymethacrylate Exposure in Surgery. Ann. Occup. Hyg. 2010 June 30, pp. 1-7.
7. Malchau H, Herberts P, Garellick G, Söderman P, Eisler T. Prognosis of Total Hip Replacement. Scientific Exhibition presented at the 69<sup>th</sup> Annual Meeting of the American Academy of Orthopaedic Surgeons. February 13-17, 2002, Dallas.
8. Wilkinson J.M., Stockely I, *et al.* Effect of Mixing Techniques on the Properties of Acrylic Bone-Cement, The Journal of Arthroplasty, 2000; 15:663-667.
9. Lidgren L, Bodelind B, Möller J. Bone cement improved by vacuum mixing and chilling, Acta Orthop Scand 1987; 57: 27-32.
10. Wang J-S, Toksvig-Larsen S, Muller-Wille P, Franzen H. Is there any difference between vacuum mixing systems in reducing bone cement porosity? Journal of Biomedical Materials Research. 1996; 33: (2):115-8.
11. Mau H *et al.* Comparison of various vacuum mixing systems and bone cements as regard reliability, porosity and bending strength. Act Orthop Scand 2004; 75(2): 160-172.
12. Lewis G. Properties of Acrylic Bone Cement: State of Art Review, J Biomed Mater Res. 1997; 38 (2): 155-82.

All trademarks herein are the property of Biomet, Inc. or its subsidiaries unless indicated otherwise.

This material is intended for the Biomet Sales force and physicians only and is NOT intended for patient distribution. It is not to be redistributed, duplicated or disclosed without the express written consent of Biomet.

For product information, including indications, contraindications, warnings, precautions and potential adverse effects, see the package insert and Biomet's website.

[www.biomet.com](http://www.biomet.com) | [www.bonecement.com](http://www.bonecement.com)



**Responsible Manufacturer:**  
Optivac and Accessories  
Biomet France s.a.r.l.  
F-26903 Valence Cedex 9, France

**BIOMET®**  
**ORTHOPEDICS**

**One Surgeon. One Patient.®**