

Summit Medical **Cementation Product Guide**

HiVac™ Bowl

HiVac™ 7

HiVac™ MultiMix

MiniMix™

Summit Medical Pulsed Lavage



About Summit Medical

Founded in 1984, Summit Medical Group Ltd is a global leader in the provision of quality medical products, trusted by clinicians, physicians, hospitals and patients; manufactured in the UK, with a commitment to innovation, service and quality.

Through decades of research and development, our products are a preferred choice for orthopaedic surgeons globally.





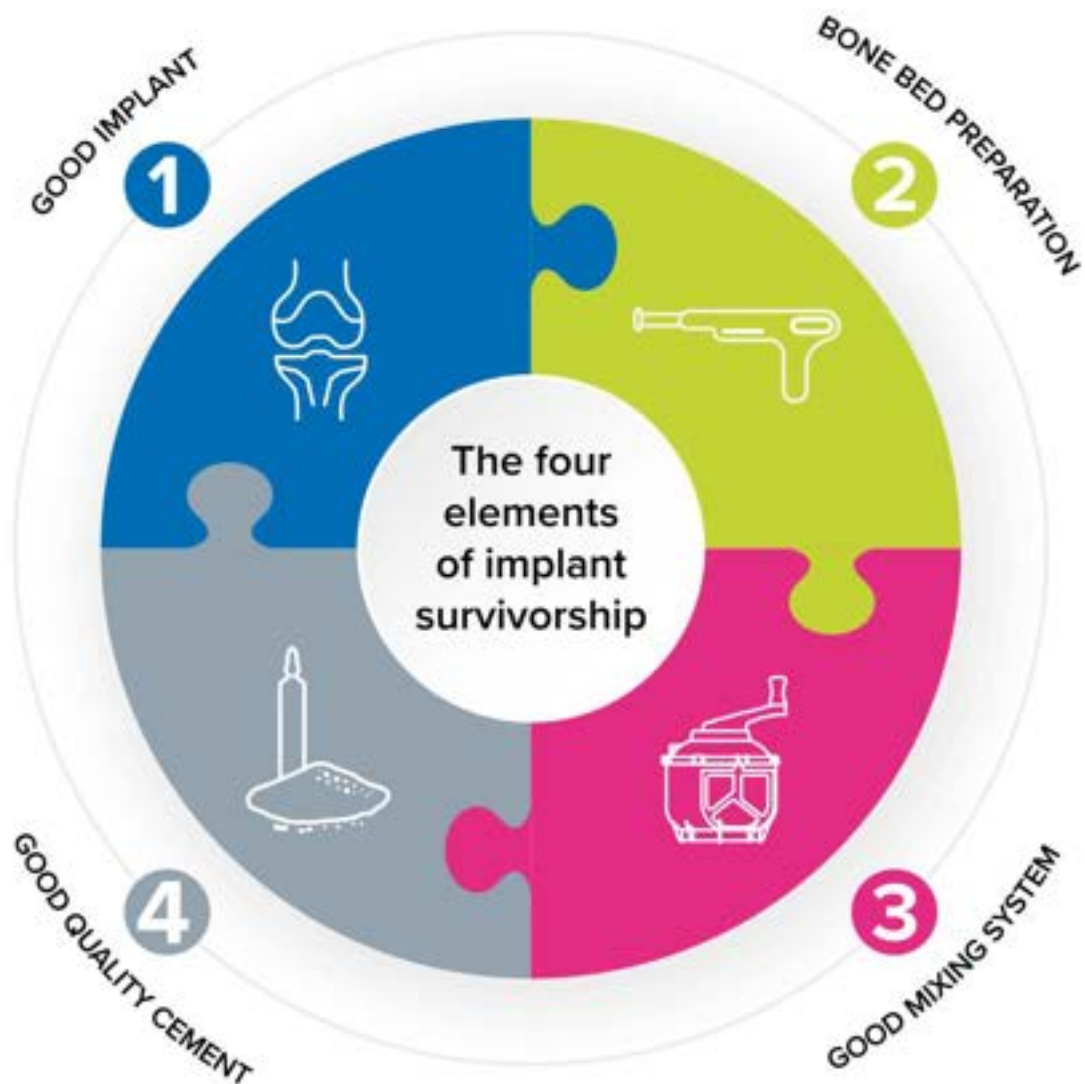
Summit Medical were first to design
and market a crystal-clear mixing system
so you can see you have a good mix.



Long-term implant survivorship

The skill of the surgeon and the quality of the implant are not the only key factors in ensuring a successful joint replacement. The perioperative practitioner is a vital link in the chain.

Good quality, well-prepared bone cement is essential for long-term implant survival. Cement mantle failure is one of the primary causes of aseptic loosening which is the most common indication for hip revision¹. With an ageing and active population, joint replacement longevity is increasingly important.



What is bone cement?

Bone cement is made from polymethyl methacrylate (PMMA) which is supplied as a sachet of polymer powder and a glass ampoule of monomer liquid.

BONE CEMENT MIXING

When using bone cement in the operating room, it is important to understand the phases which occur during the polymerisation process.

The polymerisation process has four distinct phases. The length of each phase will vary depending on brand of cement. The four phases are:



1. MIXING PHASE

The time to fully integrate the powder and liquid together.



2. WAITING PHASE

The time to achieve a suitable viscosity so that it can be handled without sticking to gloves. This time can be used to load the cement into the delivery device.



3. WORKING PHASE

The time during which the cement can be applied and the prosthesis implanted. The implant must be in place before the end of the working phase.



4. SETTING PHASE

The time for the cement to harden and set completely.

WHY DO CEMENTS VARY DURING THE MIXING PROCESS?

There are several factors that can contribute to the variation in behaviour of bone cement seen during the polymerisation process. A few of the factors include:

COMPOSITION – Can be influenced by the use of different copolymers, different powder to liquid ratios and the manufacturing or sterilisation process of the cement.

VISCOSITY – High viscosity cement is relatively thick (dough like), and loses its stickiness quickly making the working phase longer whereas medium/low viscosity cement is more runny (liquid) and keeps its stickiness longer but has a shorter working phase.

TEMPERATURE – Higher temperatures speed up the process, reducing the waiting phase and working time.

HUMIDITY – Higher humidity accelerates all the phases of the polymerisation process, whereas a dry atmosphere could lengthen the process².

The Importance of Vacuum Mixing

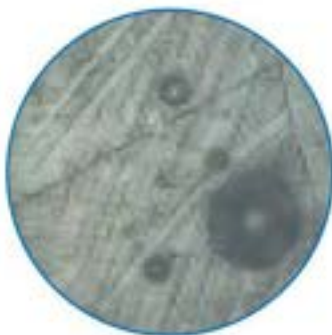
The original reason for vacuum mixing bone cement was to reduce the exposure to MMA fumes. Although excessive exposure to concentrated vapours may cause toxic side effects, the use of modern-day fume extraction units used in operating rooms reduces the level of exposure from cement mixing to well within the Health & Safety Executive guidelines. In addition, using a vacuum mixing device can further decrease exposure to MMA fumes³.

The main reason for vacuum cement mixing is to produce a bone cement that can withstand load transfer and physical forces that it is going to be subjected to over the lifetime of the implant. Aseptic loosening has been the dominant reason behind the need for revision surgeries¹.

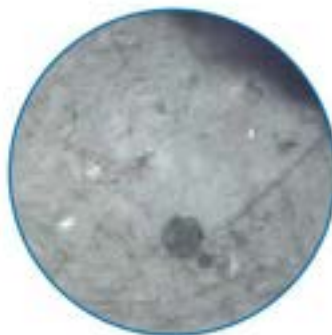
OPTIMUM RANGE FOR VACUUM MIXING?

There is an optimum vacuum range that bone cement should be mixed at which enhances the mechanical properties. If the vacuum level is too low, the cement will contain a high level of porosity, but if the vacuum level is too high, the cement may be subject to excessive thermal shrinkage which could cause cracking of the cement mantle. The Summit Medical vacuum pump operates between 505mmHg - 565mmHg.^{8,9}

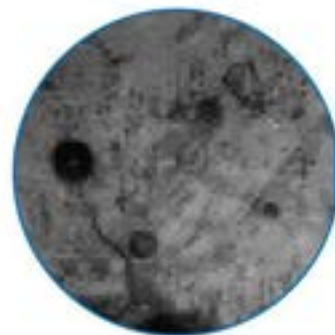
Radiographs of cement mixed in the same device at different vacuum levels⁴.



Vacuum=0mmHg
no cracks



Vacuum=550mmHg
no cracks



Vacuum=650mmHg
cracks seen

Getting the most from Modern Cementation Technique

Correct mixing and delivery of bone cement is critical for joint replacement survival⁵. Repeated cycles of loading the implants could weaken the bone cement mantle over time.

The key points to consider are:

- 1 A vacuum mixing system which operates at around 550mmHg will help achieve a bone cement mix with optimal porosity, giving enhanced mechanical performance.

- 2 Use a stop-clock to accurately monitor the polymerisation process.

- 3 Select a mixing device which allows for a repeatable mechanical action to ensure mix consistency.

- 4 Use a mixing device with an integrated charcoal filter to reduce MMA fume levels.

- 5 Ensure all staff are fully trained and competent to use the mixing systems.

- 6 Monitor the temperature of the storage area and operating room – communicate any temperature anomalies to the surgical team.

HiVac™ Bowl

HiVac™ Bowl

General-purpose vacuum mixing system for orthopaedic bone cement, designed for a triple mix (up to 120g) of bone cement.

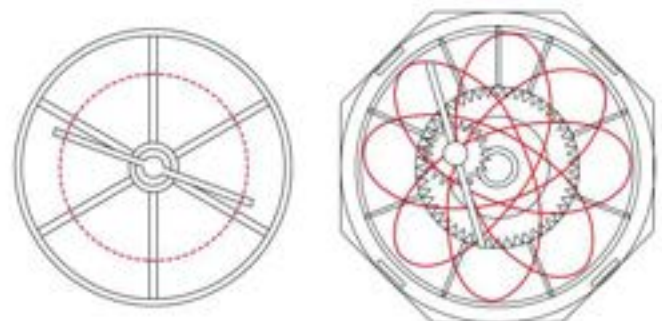
The Summit Medical compact HiVac™ Bowl features a geared rotational axis mixing mechanism. This has been proven to be significantly better than that mixed by a fixed axis device⁶.

GEARED ROTATIONAL AXIS MIX

The HiVac™ Bowl has been designed with a high clarity material, offering the clinician a clear view of the cement during mixing.

SHAPED SPATULA AND CURETTE

The HiVac™ Bowl is provided with a profile-matching spatula to minimise waste and a curette to help remove excess cement.



Fixed Axis

Rotational Axis



HiVac™ 7

HiVac™ 7 / HiVac™ 7 Syringe

Mixing and delivery system supporting a broad range of orthopaedic cement handling techniques.

HiVac™ 7 with Femoral Pressuriser

Mixing, delivery and femoral pressurisation system for orthopaedic bone cement.

HiVac™ 7 is available in two sizes – product codes ending '01 are suitable for a double mix (up to 80g) of bone cement and product codes ending '03 are designed for a triple mix (up to 120g) of bone cement.

CLEAR MIXING TUBE

HiVac™ 7 gives a clear view of the cement during mixing.

COLOURED MIXING ROD SNAP POINT

The coloured indicator shows the user the end stroke position to avoid any potential compacted cement powder at the lid section. It also ensures that after mixing the rod snap point is easily identifiable.

FEMORAL PRESSURISER

- Good pressurisation is proven to improve longevity of implant⁷.
- Suitable for a wide range of femur sizes.
- Shaped to fit with minimal femoral intrusion.
- The extension collar can be selected when a deeper location is required.
- Latex-Free and Phthalate-Free.



HiVac™ MultiMix

HiVac™ MultiMix

Designed for efficient transfer of cement into the MultiMix delivery cartridge, suitable for a triple mix (up to 120g) of bone cement.

GEARED ROTATIONAL AXIS MIX

The primary paddle produces a high quality, reproducible cement mix.

CONTRA-ROTATING PADDLE

Primary, rotational axis paddle combined with a contra-rotating scraper.

CEMENT TRANSFER GATE

The Summit HiVac™ MultiMix features a flow gate allowing efficient transfer of cement under vacuum from the mixing bowl to the injection cartridge.

LARGE CAPACITY MIXING CHAMBER

The Summit HiVac™ MultiMix high volume capacity bowl allows mixing of up to 120g of low or medium viscosity bone cement.



MiniMix™

MiniMix™

Delivery system for patients requiring an orthopaedic surgical procedure, such as hip resurfacing, unicondylar knees, vertebroplasty, bone void filling or other small joint procedures, which require the use of a small amount of PMMA bone cement or bone substitute material. It has been designed for a single mix (up to 40g or less) of PMMA bone cement or bone substitute materials.

MiniMix™ LV

Delivery system intended for patients undergoing vertebroplasty.

ROTATIONAL AXIS MIXING

MiniMix™ has a geared rotational axis mixing mechanism to ensure a high quality mix⁶.

VACUUM LEVEL OF 550MMHG (±15MMHG)

MiniMix™ allows for vacuum mixing by using the Summit Medical vacuum pump.

TRANSFER VALVE

To allow the mixed material to be precisely and cleanly transferred into the delivery device or prosthesis. The larger port MiniMix™ delivery devices can be connected to the 10cc syringe.

PLUNGER

A screw plunger is available to ensure all material can be ejected from the mixer, saving time and preventing waste.

10ML PRECISION SYRINGE

The delivery syringe can be pushed for quick ejection, or screwed for more accurate delivery. The syringe has a 10cc capacity, ideally suited to assist with vertebroplasty or small joint surgery.

200mm CATHETER WITH 90 DEGREE BEND

Used with the delivery syringe, the catheter is ideal for vertebroplasty procedures, allowing the operator to inject the material whilst outside the X-ray field.



Summit Medical Pulsed Lavage

EFFECTIVE IRRIGATION AND DEBRIDEMENT

A fully disposable Pulsed Lavage system for cleaning wounds, removing dirt, necrotic tissue and debris during orthopaedic surgery. Preparing the bone bed during arthroplasty is an important element of modern cementing technique, improving fixation strength and reducing revision rates.

STERILE AND DISPOSABLE

Simplifies operation planning and eliminates the need for sterilisation.

SHORT & LONG NOZZLE

Both supplied in pack for hip or knee surgery.

SECURE LOCKING RING

Easy to attach and secure the nozzle of choice.

2 SPEED SETTINGS

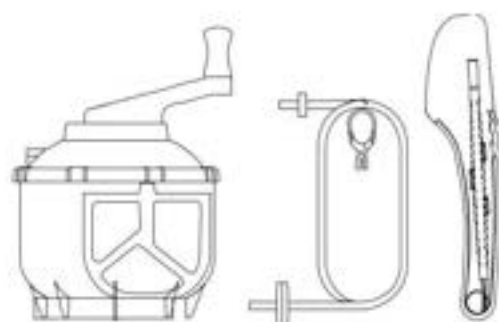
High or low speed for user choice.

LOCKING CLAMPS

To prevent leakage of fluids.

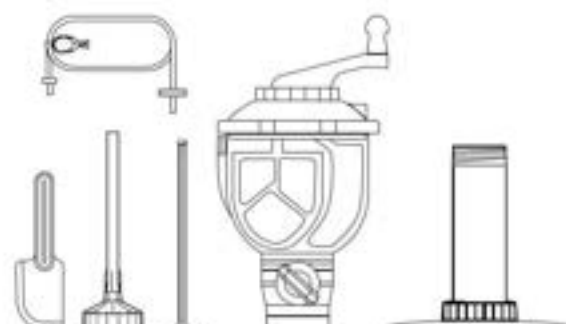


Product Ordering Information



HiVac Bowl

B713	HiVac Bowl	QTY/BOX 15
B713PP	Non-sterile	QTY/BOX 30



HiVac Multimix

For use with gun H749F

T100	Triple-mix pack	QTY/BOX 6
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HiVac 7

For use with gun H759

CP701	HiVac-7 Syringe (with cut-off nozzle) (with pressuriser)	QTY/BOX 10
C701	HiVac-7 Syringe (with cut-off nozzle) (without pressuriser)	QTY/BOX 10
C701PP	Non-sterile	QTY/BOX 20
CP901	HiVac-7 Syringe (with snap-off nozzle) (with pressuriser)	QTY/BOX 10
C901	HiVac-7 Syringe (with snap-off nozzle) (without pressuriser)	QTY/BOX 10



HiVac 7

For use with gun H759L

C703	Triple-mix pack (with cut-off nozzle)	QTY/BOX 5
C703PP	Non-sterile	QTY/BOX 15
C903	Triple-mix pack (with snap-off nozzle)	QTY/BOX 5

Product Ordering Information



9mm Nozzle with Extruder

N700

QTY/BOX 20



6.35mm Flexible Nozzle

N635

QTY/BOX 20



Vacuum Foot Pump

H550

QTY/BOX 1



Knee Nozzle

N720

QTY/BOX 10



Femoral Cement Pressuriser

P721

QTY/BOX 10



Summit Open Bowl

B710

QTY/BOX 30



HiVac 7 Bone Cement Delivery Gun

For use with C701, CP701, C901 & CP901

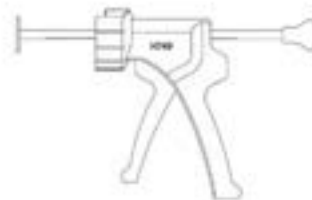
H759

QTY/BOX 1

For use with C703 & C903

H759L (Long)

QTY/BOX 1



MultiMix Bone Cement Delivery Gun

For use with T100

H749F

QTY/BOX 1



MiniMix Small Port with Luer Lock

Sterile:

SMLV

QTY/BOX 10

Non-sterile:

MMS1-NS

QTY/BOX 50



MiniMix Medium Port

Sterile:

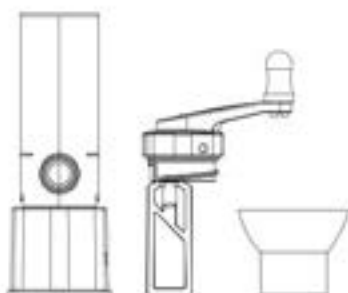
SMMM1

QTY/BOX 10

Non-sterile:

132892

QTY/BOX 50

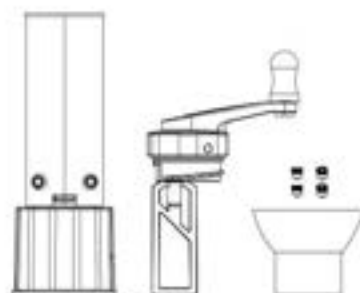


MiniMix Large Port with Luer Lock

Non-sterile:

MML1-NS

QTY/BOX 50

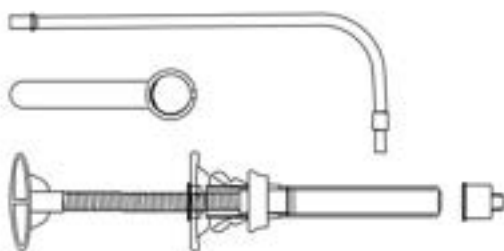


MiniMix 4 Port (small)

Non-sterile:

CMM4-NS

QTY/BOX 30



MiniMix Delivery Syringe with Catheter

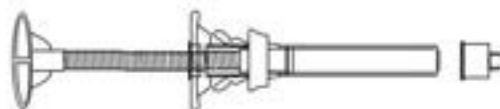
SMDS1C

QTY/BOX 10

Non-sterile:

MDS1C-NS

QTY/BOX 50



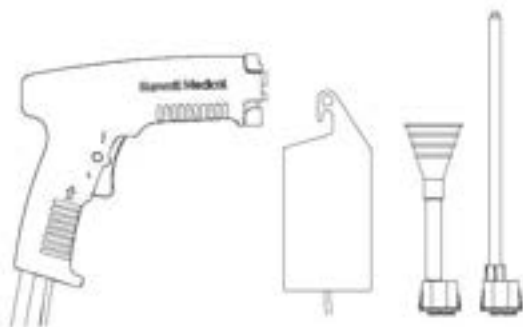
MiniMix Delivery Syringe

Non-sterile:

MDS1-NS

QTY/BOX 50

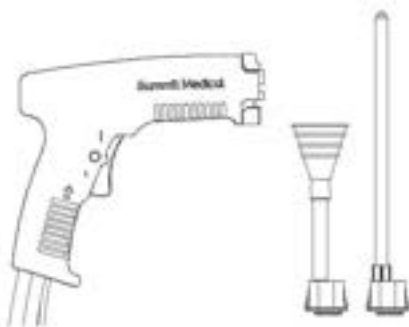
Product Ordering Information



Pulsed Lavage with External Battery Pack

Fan Spray Nozzle and Long Nozzle
WZ-WDS-01

QTY/BOX 5



Pulsed Lavage with Built-In Battery Pack

Fan Spray Nozzle and Long Nozzle
WZ-WPL-01

QTY/BOX 5



Single Packed Sterile Femoral Brush Tip

WZ-PT-03

QTY/BOX 5



Here at Summit Medical, we believe in being responsive to the needs of our customers and business partners, in the ever changing, dynamic market place.

That is why we are always listening to feedback, to allow us to be flexible and adaptable, so we can stay one step ahead of the competition and offer best in class solutions for the most important customers... the patients.

Founded in 1984, Summit Medical Group Ltd is a global leader in the provision of quality medical products, trusted by clinicians, physicians, hospitals and patients; manufactured in the UK, with a commitment to innovation, service and quality.

Summit Medical uses highly skilled and advanced manufacturing techniques that meet the changing demands in global healthcare.

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1. National Joint Registry (2025) 22nd Annual Report. Available at: reports.njrcentre.org.uk
 2. Yoon, J.-R., Ko, Y.-R. and Shin, Y.-S. (2018) 'Effect of shape on bone cement polymerization time in knee joint replacement surgery', *Medicine*, 97(17), e0558.
 3. Schlegel, U.J., Sturm, M., Ewerbeck, V. and Breusch, S.J. (2004) 'Efficacy of vacuum bone cement mixing systems in reducing methylmethacrylate fume exposure: comparison of 7 different mixing devices and handmixing', *Acta Orthopaedica Scandinavica*, 75(5), pp. 559-566.
 4. Eveleigh, R. (2001) 'Mixing Systems: and the Effects of Vacuum Mixing on Bone Cement', *British Journal of Perioperative Nursing*, 11(3), pp. 132-140. doi: 10.1177/175045890101100307.
 5. Eveleigh, R., Dunne, N., Orr, J., Mushipe, M. and Beverland, D. (2002) 'The Fatigue Life of Bone Cement: how it is affected by mixer design, vacuum level and user technique', *Journal of Advanced Perioperative Care*, 11(1), pp. 12-16.
 6. Lewis, G. (1996) 'Acrylic bone-cement: Influence of mixer design and unmixed powder', *The Journal of Arthroplasty*, 11(7), pp. 813-819. doi: 10.1016/S0883-5403(96)80181-1.
 7. Churchill, D.L., Incavo, S.J., Uroskie, J.A. and Beynon, B.D., 2001. Femoral stem insertion generates high bone cement pressurization. *Clinical Orthopaedics and Related Research* (1976-2007), 393, pp.335-344.
 8. Dunne, N.J., Orr, J.F., Mushipe, M.T. and Eveleigh, R.J., 2003. The relationship between porosity and fatigue characteristics of bone cements. *Biomaterials*, 24(2), pp.239-245.
 9. Orr, J.F., Dunne, N.J. and Quinn, J.C. (2003) 'Shrinkage stresses in bone cement', *Biomaterials*, 24(17), pp. 2933-2940.

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