

# Multi-unit Abutments and Healing Caps



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## Description

### Multi-unit Abutments

Multi-unit abutments are premanufactured dental implant abutments which can be directly connected to an endosseous dental implant to support the placement of a dental prosthesis.

An assortment of Multi-unit abutments are available for use with various Nobel Biocare implant systems.

- Multi-unit Abutment Conical Connection (CC) feature an internal conical connection and are available in platform sizes NP, RP, and WP. They come in a selection of different collar heights and can be straight or with an angulation of 17° or 30°. They can be used with Nobel Biocare's NobelActive™, NobelParallel™ CC, and/or NobelReplace™ CC implant systems. Abutment screw and handle for abutment seating included.
- Multi-unit Abutment Zeal™ Conical Connection (CC) feature an internal conical connection and are available in platform sizes NP, RP, and WP. They come in a selection of different collar heights and can be straight or with an angulation of 17° or 30°. They can be used with Nobel Biocare's NobelActive™, NobelParallel™ CC, and/or NobelReplace™ CC implant systems. Abutment screw and handle for abutment seating included.
- Multi-unit Abutments Plus Conical Connection (CC) feature an internal conical connection and are available in platform sizes NP, RP, and WP. They come in a selection of different collar heights and can be straight or with an angulation of 17° or 30°. They can be used with Nobel Biocare's NobelActive™, NobelParallel™ CC and/or NobelReplace™ CC implant systems. Abutment screw and holder Multi-unit Abutment Plus included.
- Multi-unit Abutments Zeal™ Nobel Biocare N1™ TCC feature a tri-oval conical connection and are available in platform sizes NP and RP. They come in a selection of different collar heights and can be straight or with an angulation of 17° or 30°. They can be used with Nobel Biocare's Nobel Biocare N1™ implant system. Abutment screw and handle for abutment seating included.
- Multi-unit Abutments NobelReplace™ feature an internal tri-channel connection and platform sizes NP, RP, and WP. They come in a selection of different collar heights and can be used with Nobel Biocare's NobelReplace™, Replace Select™, and NobelSpeedy® Replace implant systems. The Multi-unit Abutments NobelReplace™ NP and RP also have a selection of different angulations of 17° and 30°. Abutment screw and handle for abutment seating included.

| Multi-unit Abutment/Platforms                             | Implant system           | Healing Cap                     | Screwdriver                |
|---|--------------------------|---------------------------------|----------------------------|
| <b>Internal Conical Connection (CC)</b>                   |                          |                                 |                            |
| Multi-unit Abutment Plus CC NP/RP/WP                      | NobelActive™             | Healing Cap Multi-unit          | Healing Cap: Unigrip       |
| Multi-unit Abutment Xeal™ CC NP/RP/WP                     | NobelParallel™ CC        | Titanium                        | Straight MUAs: MUA Driver  |
| 17° Multi-unit Abutment Plus CC NP/RP/WP                  | NobelReplace™ CC         |                                 | Angled MUAs: Unigrip       |
| 17° Multi-unit Abutment Xeal™ CC NP/RP/WP                 |                          |                                 |                            |
| 30° Multi-unit Abutment Plus CC NP/RP                     |                          |                                 |                            |
| 30° Multi-unit Abutment Xeal™ CC NP/RP                    |                          |                                 |                            |
| <b>Tri-oval Conical Connection (TCC)</b>                  |                          |                                 |                            |
| Multi-unit Abutment Xeal™ Nobel Biocare N1™ TCC NP/RP     | Nobel Biocare N1™        | Healing Cap Multi-unit          | Healing Cap: Unigrip       |
| 17° Multi-unit Abutment Xeal™ Nobel Biocare N1™ TCC NP/RP |                          | Titanium                        | Straight MUAs: MUA Driver  |
| 30° Multi-unit Abutment Xeal™ Nobel Biocare N1™ TCC RP    |                          |                                 | Angled MUAs: Omnigrip Mini |
| <b>Internal Tri-channel Connection</b>                    |                          |                                 |                            |
| Multi-Unit Abutment NobRpl NP/RP/WP                       | Replace Select™          | Healing Cap Multi-unit          | Healing Cap: Unigrip       |
| 17° Multi-Unit Abutment NobelReplace NP/RP                | NobelSpeedy Replace™     | Titanium                        | Angled MUAs: Unigrip       |
| 30° Multi-Unit Abutment NobelReplace RP                   | NobelSpeedy® Replace     |                                 |                            |
| <b>External Hex</b>                                       |                          |                                 |                            |
| Multi-unit Abutments Brånemark System NP/RP               | Brånemark System®        | Healing Cap Multi-unit          | Healing Cap: Unigrip       |
| 17° Multi-Unit Abutments Brånemark System NP/RP           | NobelSpeedy® Groovy      | Titanium                        | Straight MUAs: MUA Driver  |
| 30° Multi-Unit Abutments Brånemark System RP              |                          |                                 | Angled MUAs: Unigrip       |
| Multi-unit Abutments Brånemark System WP                  | Brånemark System®        | Healing Cap                     | Healing Cap: Unigrip       |
|   | NobelSpeedy® Groovy      | Multi-unit Brånemark System® WP | Straight MUAs: MUA Driver  |
| Multi-unit Abutments Brånemark System® Zygoma             | Brånemark System® Zygoma | Healing Cap Multi-unit          | Healing Cap: Unigrip       |
| 17° Multi-unit Abutments Brånemark System® Zygoma         |                          | Titanium                        | Straight MUAs: MUA Driver  |
|   |                          |                                 | Angled MUAs: Unigrip       |
| 45° Multi-unit Abutments External Hex RP                  | NobelZygoma™ 0°          |                                 | Healing Cap: Unigrip       |
| 60° Multi-unit Abutments External Hex RP                  |                          |                                 | Angled MUAs: Unigrip       |

**Table 1 – Multi-unit Abutments with Compatible Implant Systems and Healing Caps**

- Multi-unit Abutments Brånemark System® feature an external hex connection and platform sizes NP, RP, and WP. They come in a selection of different collar heights and can be straight or with an angulation of 17° or 30°. They can be used with Nobel Biocare’s Brånemark System® and/or NobelSpeedy® Groovy implant systems. Abutment screw and handle for abutment seating included.
- Multi-unit Abutments Brånemark System® Zygoma feature an external hex connection and are available in platform size RP. They are available as straight or angled (17°) and come in different collar heights. They can be used with Nobel Biocare’s Brånemark System® Zygoma implant system. Abutment screw and handle for abutment seating included.
- 45° and 60° Multi-unit Abutments External Hex RP feature an external hex connection, have an angulation of 45° and 60° respectively and come in different collar heights. They can be used with Nobel Biocare’s NobelZygoma™ 0° implant system. Abutment screw included.

### Multi-unit Healing Caps

Multi-unit healing caps are premanufactured dental implant healing abutments which can be directly connected to a multi-unit abutment to support healing of the surrounding soft tissues.

An assortment of multi-unit healing caps is available:

- Healing Caps Multi-unit Titanium can be used with Multi-unit Abutments featuring an internal conical connection, tri-channel connection and/or external hex connection. They are available in two heights and two diameters.
- Healing Caps Multi-unit Brånemark System® WP can be used with Multi-unit Abutments Brånemark System® featuring a WP platform.

Table 1 summarizes the implant platforms which are compatible with the various multi-unit abutments and the corresponding healing caps.

Multi-unit Abutments are co-packed with a handle and a clinical screw. Exception: 45° and 60° Multi-unit Abutment external hex for NobelZygoma™ 0° are co-packed with an abutment screw only.

Refer to Nobel Biocare Instructions for Use (IFU) IFU1057 for information regarding clinical screws. This IFU is available for download at [ifu.nobelbiocare.com](http://ifu.nobelbiocare.com).

## Intended Use / Intended Purpose

### Multi-unit Abutments

Intended to be connected to an endosseous dental implant to support the placement of a dental prosthesis.

### Multi-unit Healing Caps

Intended to be temporarily connected to an endosseous dental implant or implant abutment, to support healing of the surrounding soft tissue.

## Indications

### Multi-unit Abutments

Multi-unit abutments are indicated to support the placement of multiple unit, screw-retained prosthetic restorations in the maxilla or mandible, including full arch dentures.

For compatibility with specific implant systems, refer to Table 1.

## Multi-unit Healing Caps

Same as Intended Use / Intended Purpose.

## Multi-Unit Abutment Zygoma

Multi-unit abutments are indicated to support the placement of multiple unit, screw-retained prosthetic restoration in the maxilla including full arch dentures.

## Contraindications

It is contraindicated to use Multi-unit abutments and/or healing caps in:

- Patients who are medically unfit for an oral surgical procedure.
- Patients in whom adequate sizes, numbers or desirable positions of implants are not reachable to achieve safe support of functional or eventually parafunctional loads.
- Patients who are allergic or hypersensitive to Polybutyleneterephthalate (PBT) Poca, Grade B1501, stainless steel 1.4305/AISI 303 austenitic steel according to EN 10088-3 and ASTM F899, unalloyed titanium grade 1 and 4 according to ASTM F67 and ISO 5832-2, titanium alloy Ti (90%), Al (6%), V (4%) according to ASTM F136 and ISO 5832-3, DLC (Diamond Like Carbon) coating, sodium dihydrogen phosphate ( $\text{NaH}_2\text{PO}_4$ ), or magnesium chloride ( $\text{MgCl}_2$ ), or PP (polypropylene).

The 45° Multi-unit Abutments External Hex and 60° Multi-unit Abutments External Hex are contraindicated for all implants other than NobelZygoma™ O°.

For contraindications specific to the Implants, refer to the Nobel Biocare Instructions for Use for the component available on [ifu.nobelbiocare.com](http://ifu.nobelbiocare.com).

## Cautions

### General

Close cooperation between surgeon, restorative dentist and dental laboratory technician is essential for a successful implant treatment.

Multi-unit Abutments and Healing Caps Multi-unit must only be used with compatible Nobel Biocare instruments and/or components and/or prosthetic components. Use of instruments and/or components and/or prosthetic components that are not intended to be used in combination with Multi-unit Abutments and Healing Caps Multi-unit can lead to product failure, damage to tissue, or unsatisfactory esthetic results.

When using a new device/treatment method for the first time, working with a colleague who is experienced with the new device/treatment method may help avoid possible complications. Nobel Biocare has a global network of mentors available for this purpose.

It is especially important to achieve proper stress distribution through adaptation and fitting of the crown or bridge, by adjusting the occlusion to the opposing jaw. In addition, avoid excessive transverse loading forces, particularly in immediate loading cases.

The colored surface of the Multi-unit Abutment Xeal™, is a result of the Xeal™ surface and does not indicate the platform size.

## Before Surgery

Careful psychological and physiological evaluation, followed by clinical and radiological examination must be performed on the patient prior to surgery to determine the suitability of the patient for treatment.

Special attention has to be given to patients who have local or systemic factors that could interfere with the healing process of either bone or soft tissue or the osseointegration process (e.g., cigarette smoking, poor oral hygiene, uncontrolled diabetes, oro-facial radiotherapy, steroid therapy, infections in the neighboring bone). Special caution is advised in patients who receive bisphosphonate therapy.

In general, implant placement and prosthetic design must accommodate individual patient conditions. In case of bruxism, other parafunctional habits or unfavorable jaw relationships, reappraisal of the treatment option may be considered.

The device has not been evaluated in pediatric/adolescent patients and is not recommended for use in children. Routine treatment is not recommended until the end of the juvenile jaw bone growth phase has been properly documented.

Pre-operative hard tissue or soft tissue deficits may yield a compromised esthetic result or unfavorable implant angulations.

All components, instruments and tooling used during the clinical and/or laboratory procedure must be maintained in good condition and care must be taken that instrumentation does not damage implants or other components.

## At Surgery

Care and maintenance of sterile instruments are crucial for a successful treatment. Sterilized instruments not only safeguard your patients and staff against infection but are also essential for the outcome of the total treatment.

Because of the small sizes of the devices, care must be taken that they are not swallowed or aspirated by the patient. It is appropriate to use specific supporting tools to prevent aspiration of loose parts (e.g. gauze, dental dam, or throat shield).

## After Surgery

To help ensure a successful long term-treatment outcome, it is advised to provide comprehensive regular patient follow up after implant treatment and to inform the patient about appropriate oral hygiene.

## Intended Users and Patient Groups

Multi-unit Abutments and Healing Caps are to be used by dental health care professionals.

Multi-unit Abutments and Healing Caps are to be used in patients subject to dental implant treatment.

## Clinical Benefits and Undesirable Side Effects

### Clinical Benefits Associated with Multi-unit Abutments and Healing Caps

Multi-unit Abutments and Healing Caps are a component of treatment with a dental implant system and/or dental crowns and bridges. As a clinical benefit of treatment, patients can expect to have their missing teeth replaced and/or crowns restored.

| Connection                        | Straight Multi-unit Abutment | 17°/30° Multi-unit Abutment          | 45°/60° Multi-unit Abutment (Zygoma Implant System) | Prosthetic screw    |
|-----------------------------------|------------------------------|--------------------------------------|---|---------------------|
| Conical connection (CC)           | 35 Ncm                       | 15 Ncm                               | -   | 15 Ncm              |
| Tri-oval conical connection (TCC) | 20 Ncm                       | 20 Ncm*                              | -   | 15 Ncm              |
| Tri-channel                       | 35 Ncm                       | 15 Ncm                               | -   | 15 Ncm              |
| External Hex                      | 35 Ncm                       | 15 Ncm                               | 35 Ncm  | 15 Ncm              |
| Driver                            | Multi-unit Screwdriver       | Unigrip / *Omnigrip mini Screwdriver | Unigrip Screwdriver                                 | Unigrip Screwdriver |

**Table 2 – Multi-unit Abutment Screw Tightening Torques and compatible screwdrivers**

## Undesirable Side Effects Associated with Multi-unit Abutments and Healing Caps

The placement of this device is part of an invasive treatment which may be associated with typical side effects such as inflammation, infection, bleeding, hematoma, pain, swelling. During abutment placement or removal, the pharyngeal reflect (gag reflex) may be triggered in patients with a sensitive gag reflex.

Implant abutments are part of a multi-component system that replaces teeth and as a result, the implant recipient may experience side effects similar to those associated with teeth, such as retained cement, calculus, mucositis, ulcers, soft tissue hyperplasia, soft and/or hard tissue recessions. Some patients may experience discoloration in the mucosal area such as graying.

### Notice regarding serious incidents

For a patient / user / third party in the European Union and in countries with an identical regulatory regime (Regulation 2017/745/EU on Medical Devices); if, during the use of this device or as a result of its use, a serious incident has occurred, please report it to the manufacturer and to your national authority. The contact information for the manufacturer of this device to report a serious incident is as follows:

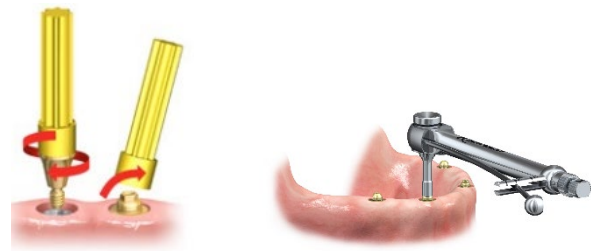
Nobel Biocare AB  
[www.nobelbiocare.com/complaint-form](http://www.nobelbiocare.com/complaint-form)

## Handling Procedure

Ensure sufficient implant stability before beginning the prosthetic procedure.

### A. Clinical Procedure for Placement of Straight Multi-unit Abutment

1. Select the appropriate abutment according to Table 1.
2. Place the abutment, using plastic holder to facilitate the insertion.
3. Remove the plastic holder.
4. Tighten the clinical screw to the required torque according to Table 2, using a Screwdriver Machine Multi-unit and Manual Torque Wrench Prosthetic. Refer to Nobel Biocare IFU1085 for information regarding the screwdriver. Refer to Nobel Biocare IFU1098 for information regarding the torque wrench.
5. It is recommended to verify the final abutment selection and seating using radiographic imaging.
6. If required, a bone mill can be used to remove excess bone from around the seating area. Refer to Nobel Biocare IFU1089 for information regarding bone mills.



**Figure A – Handling of Straight Multi-unit Abutment**

**Caution** Never exceed recommended maximum tightening torque for the clinical screw. Overtightening of the abutment may lead to a screw fracture.

**Caution** Each time a component is connected to the straight Multi-unit Abutment, make sure the clinical screw is not loosened and is re-tightened if necessary.

### B. Clinical Procedure for Placement of 17° and 30° Multi-unit Abutment

1. Select the appropriate angulated abutment according to Table 1.
2. Place the abutment. Use the holder to facilitate proper position, as there are several positions possible. Hand-tighten the clinical screw using appropriate screwdriver according to Table 2.
3. Unscrew the holder.
4. Tighten the abutment to the required torque according to Table 2, using the appropriate screwdriver and Manual Torque Wrench Prosthetic. Refer to Nobel Biocare IFU1085 for information regarding the screwdriver. Refer to Nobel Biocare IFU1098 for information regarding the torque wrench.
5. It is recommended to verify the final abutment selection and seating using radiographic imaging.
6. If required, a bone mill can be used to remove excess bone from around the seating area. Refer to Nobel Biocare IFU1089 for information regarding bone mills.



**Figure B – Handling of Angled Multi-unit Abutment**

**Caution** Never exceed recommended maximum tightening torque for the abutment screw. Overtightening of the abutment may lead to a screw fracture.

**Caution** To place the abutment, the implant should be able to withstand the recommended tightening torque for the abutment screw. For immediate function, the implant should be able to withstand a torque of at least 35 Ncm.

### C. Clinical Procedure for Placement of 45° Multi-unit Abutments and 60° Multi-unit Abutments

1. Select the appropriate angulated abutment according to Table 1.
2. Place the abutment. Hand-tighten the clinical screw using the appropriate screwdriver according to Table 2.

**Note** The 45° Multi-unit Abutments and 60° Multi-unit Abutments do not have a holder.

**Caution** The screw is not locked by a holder. Ensure that the screw is engaged to the Unigrip™ Screwdriver when placing the abutment.

3. Tighten the abutment to the required torque according to Table 2 using Unigrip™ Screwdriver and Manual Torque Wrench prosthetic. Refer to Nobel Biocare IFU1085 for information regarding the screwdriver. Refer to Nobel Biocare IFU1098 for information regarding the torque wrench

**Caution** Never exceed recommended maximum tightening torque for the abutment screw. Overtightening of abutment may lead to a screw fracture.

### D. Clinical Procedure for Healing Cap Multi-unit

1. Select the appropriate Healing Cap according to Table 1 and check occlusal clearance.
2. Hand-tighten using Unigrip™ Screwdriver. Refer to Nobel Biocare IFU1085 for information regarding the screwdriver.

**Caution** Never exceed recommended maximum tightening torque of 15 Ncm for the healing cap screw. Overtightening of the healing cap screw may lead to a screw fracture.

**Caution** Blood coagulation between Healing Cap and Multi-unit Abutment may lead to difficult disassembly.

### E. Installation of the Fixed Prosthesis on Multi-unit Abutments

1. Remove temporary prosthesis if applicable.
2. Verify that the desired tightening torque for the Multi-unit Abutment has been applied according to Table 2, using the appropriate screwdriver and Manual Torque Wrench Prosthetic. Refer to Nobel Biocare IFU1085 for information regarding the screwdriver. Refer to Nobel Biocare IFU1098 for information regarding the torque wrench.
3. Insert the fixed prosthesis and tighten the prosthetic screws by alternating left and right side. Finally, tighten the prosthetic screws to the desired torque according to Table 2 using a Unigrip Screwdriver and Manual Torque Wrench Prosthetic.
4. Close screw access channel using suitable material.



Figure C – Installation of the Fixed Prosthesis

5. If removal of the restoration is needed, open the screw access and untighten the screw using the appropriate screwdriver.
6. If the abutment cannot be removed, use the Abutment Retrieval Tool. Refer to Nobel Biocare Instructions for Use (IFU) IFU1096 for information regarding Abutment Retrieval Tool.

## Materials

### Healing Cap Multi-unit

- Polybutyleneterephthalate (PBT) Pocan, Grade B1501 and stainless steel 1.4305/AISI 303 austenitic steel according to EN 10088-3 and ASTM F899.
- Healing Caps Multi-unit Abutment Titanium: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3.

### Multi-Unit Abutment Brånemark System

- Straight Multi-unit Abutment for implants with external hex connection and internal tri-channel connection: unalloyed titanium grade 1 and 4 according to ASTM F67 and ISO 5832-2, titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3 according to ASTM F136 and ISO 5832-3, DLC (Diamond Like Carbon) coating, and PP (polypropylene).
- Angulated Multi-unit Abutments for implants with external hex connection and internal tri-channel connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3 according to ASTM F136 and ISO 5832-3 and DLC (Diamond Like Carbon) coating

### Multi-Unit Abutment NobelReplace

- Straight Multi-unit Abutment for implants with internal conical connection and tri-oval conical connection: unalloyed titanium grade 1 and 4 according to ASTM F67 and ISO 5832-2, titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, DLC (Diamond Like Carbon) coating, and PP (polypropylene).
- Angulated Multi-unit Abutments for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, and DLC (Diamond Like Carbon) coating.

### Multi-Unit Abutment Zygoma

- Straight Multi-unit Abutment for zygoma implants with external hex connection: unalloyed titanium grade 1 and 4 according to ASTM F67 and ISO 5832-2, titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, and PP (polypropylene).
- Angulated Multi-unit Abutments for zygoma implants with external hex connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3.

### Brånemark System® Zygoma

- Straight Multi-unit Abutment for zygoma implants with external hex connection: unalloyed titanium grade 1 and 4 according to ASTM F67 and ISO 5832-2, titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, and PP (polypropylene).

- Angulated Multi-unit Abutments for zygoma implants with external hex connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3.

### Multi-Unit Abutment Brånemark System

- Angulated Multi-unit Abutments for implants with external hex connection and internal tri-channel connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3 and DLC (Diamond Like Carbon) coating.

### Multi-Unit Abutment Plus Conical Connection

- Straight Multi-unit Abutment for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3 and PP (polypropylene).
- Angulated Multi-unit Abutments for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3 and DLC (Diamond Like Carbon) coating.

### Multi-Unit Abutment Xeal Conical Connection

- Straight Multi-unit Abutment for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, sodium dihydrogen phosphate ( $\text{NaH}_2\text{PO}_4$ ), magnesium chloride ( $\text{MgCl}_2$ ), and PP (polypropylene).
- Angulated Multi-unit Abutments for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, DLC (Diamond Like Carbon) coating, sodium dihydrogen phosphate ( $\text{NaH}_2\text{PO}_4$ ), and magnesium chloride ( $\text{MgCl}_2$ ).

### Multi-Unit Abutment Trioval Conical Connection

- Straight Multi-unit Abutment for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, DLC (Diamond Like Carbon) coating, sodium dihydrogen phosphate ( $\text{NaH}_2\text{PO}_4$ ), magnesium chloride ( $\text{MgCl}_2$ ), and PP (polypropylene).
- Angulated Multi-unit Abutments for implants with internal conical connection and tri-oval conical connection: titanium alloy Ti-6Al-4V (90% titanium, 6% aluminum, 4% vanadium) according to ASTM F136 and ISO 5832-3, DLC (Diamond Like Carbon) coating, sodium dihydrogen phosphate ( $\text{NaH}_2\text{PO}_4$ ), and magnesium chloride ( $\text{MgCl}_2$ ).

## Sterility and Reusability Information

Multi-unit Abutments and Healing Caps Multi-unit Titanium have been sterilized using irradiation and are intended for single use only. Do not use after the labeled expiration date.

**Warning** Do not use device if the packaging has been damaged or previously opened.

**Caution** Multi-unit Abutments and Healing Caps Multi-unit Titanium are single use products and must not be reprocessed. Reprocessing could cause loss of mechanical, chemical and/or biological characteristics. Reuse could cause local or systemic infection.

Healing Cap Multi-unit Brånemark System® is delivered non-sterile and is intended for single use only. Prior to use clean and sterilize the product following the manual or automated procedure in the Cleaning and Sterilization Instructions.

**Warning** Use of non-sterile device may lead to infection of tissues or infectious diseases.

**Caution** Healing Cap Multi-unit Brånemark System® is a single use product and must not be reprocessed. Reprocessing could cause loss of mechanical, chemical and/or biological characteristics. Reuse could cause local or systemic infection.

**Warning** Do not use device if the packaging has been damaged or previously opened.

## Cleaning and Sterilization Instructions

Healing Cap Multi-unit Brånemark System® is delivered non-sterile by Nobel Biocare and is intended for single use. Prior to use, the devices must be cleaned and sterilized by the user.

The devices can be cleaned manually, or in an automatic washer. Each device must then be individually sealed in a sterilization pouch and sterilized.

The following cleaning and sterilization processes have been validated according to international standards and guidelines as applicable:

- Manual and Automated Cleaning: AAMI TIR 12.
- Sterilization: AAMI ST79 and ISO 17665-1.

According to EN ISO 17664, it is the responsibility of the user/processor to ensure that the processing/reprocessing is performed using equipment, materials and personnel which are suitable to ensure the effectiveness of the processes. Any deviation from the following instructions should be validated by the user/processor to ensure the effectiveness of the process.

**Note** The manufacturer's instructions for use for any detergent / cleaning solution and/or equipment and accessories used to clean and/or dry the device(s) must be strictly followed where applicable.

**Note** The Healing Cap Multi-unit Brånemark System® has been validated to withstand these cleaning and sterilization procedures.

**Caution** Do not deviate from the following processing instructions.

### Automated Cleaning and Drying (Including Pre-cleaning)

#### Pre-cleaning

1. Immerse the device in 0.5% lukewarm enzymatic cleaning agent (e.g. Neodisher Medizym) for a minimum of 5 minutes.
2. Fill lumina (where applicable) with 0.5% lukewarm enzymatic cleaning agent (e.g. Neodisher Medizym) using a 20 ml syringe. Repeat this step until the lumens are free of any visually datable soil.
3. Brush the outer surfaces with a soft bristled nylon brush (e.g. Medsafe MED – 100.33) for a minimum of 20 seconds until all visible soil is removed.
4. Brush the inner surfaces, lumina and cavities (where applicable) with an appropriately sized bottle brush (e.g., 1.2 mm / 2.0 mm / 5.0 mm diameter) for a minimum of 20 seconds.



5. Thoroughly rinse all outer and inner surfaces, lumina and cavities (where applicable) with cold running tap water for a minimum of 10 seconds to remove all cleaning solution.
6. Rinse lumina (where applicable) with 20 ml tap water using a 20 ml syringe.

#### Automated Cleaning and Drying

The following washer was used in the Nobel Biocare validation: Miele G7836 CD with the Vario TD program.

**Note** It is recommended to perform the automated cleaning and drying with a maximum load of 11 individual devices.

1. Place the devices in a suitable rack or load carrier (e.g. metal sieve basket).
2. Load the devices into the washer. Ensure the rack or load carrier is oriented in a horizontal position.
3. Perform automatic cleaning. The following parameters are based on the Vario TD program on the Miele G7836 CD washer:
  - Minimum of 2 minutes pre-cleaning with cold tap water.
  - Draining.
  - Minimum of 5 minutes cleaning with a minimum of 55°C (131°F) tap water and an 0.5% mildly alkaline detergent (e.g. Neodisher Mediclean).
  - Draining.
  - Minimum of 3 minutes neutralization with cold desalinated water.
  - Draining.
  - Minimum of 2 minutes rinsing with cold desalinated water.
  - Draining.
4. Run drying cycle at a minimum of 50°C (122°F) for a minimum of 10 minutes.
5. Dry with compressed air or clean and lint-free single use wipes, if any residual moisture remains after the drying cycle.

#### Visual Inspection

After cleaning and drying, inspect the device for unacceptable deterioration such as corrosion, discoloration, pitting, or cracked seals and properly discard any devices that fail the inspection.

#### Manual Cleaning and Drying

1. Immerse the device for a minimum of 5 minutes in a sterile 0.9% NaCl solution.
2. Scrub the outer surfaces of the device with soft-bristled nylon brush for a minimum of 20 seconds until all visible soil is removed.
3. Flush the inner surfaces, lumina and cavities (where applicable) with 20 ml of lukewarm enzymatic cleaning solution (e.g. Cydezyme ASP; maximum of 45°C (113°F)) using an irrigation needle connected to a 20 ml syringe.
4. Brush the inner surfaces, lumina and cavities (where applicable) with an appropriately sized bottle brush (e.g. 1.2 mm / 2.0 mm / 5.0 mm diameter) for a minimum of 10 seconds until all visible soil is removed.
5. Thoroughly rinse the outer surfaces and lumina of the device with cold running tap water for a minimum of 10 seconds to remove all cleaning solution.

6. Immerse the device in an ultrasonic bath (e.g. Bandelin; frequency 35 kHz, effective ultrasonic power 300 W<sub>eff</sub>) containing an 0.5% enzymatic cleaning agent (e.g. Cydezyme ASP) and treat for a minimum of 5 minutes at a minimum of 40°C (104°F) / maximum 45°C (113°F).
7. Flush the inner surfaces, lumina and cavities (where applicable) with 20 ml of lukewarm tap water 20 ml using an irrigation needle connected to a 20 ml syringe.
8. Thoroughly rinse the outer surfaces of the device with purified or sterile water for a minimum of 10 seconds to remove all cleaning agent.
9. Dry with compressed air or clean and lint-free single use wipes.

#### Visual Inspection

After cleaning and drying, inspect the device for unacceptable deterioration such as corrosion, discoloration, pitting, cracked seals and properly discard any devices that fail the inspection.

#### Sterilization

The following steam sterilizers were used in the Nobel Biocare validation: Systec HX-320 (pre-vacuum cycle); Amsco Century Sterilizer (gravity cycle).

**Note** It is recommended to perform sterilization with a maximum load of 11 devices individually sealed in sterilization pouches.

1. Seal each device in a suitable sterilization pouch. The sterilization pouch should fulfill the following requirements:
  - EN ISO 11607 and/or DIN 58953-7.
  - Suitable for steam sterilization (temperature resistance up to at least 137°C (279°F), sufficient steam permeability).
  - Sufficient protection of the instruments as well as of the sterilization packaging to mechanical damage.

Table 3 presents examples of suitable sterilization pouches.

| Method           | Recommended Sterilization Pouch          |
|------------------|--|
| Gravity Cycle    | SPSmedical Self-Seal sterilization pouch |
| Pre-vacuum Cycle | SteriCLIN® pouch                         |

**Table 3 – Recommended Sterilization Pouches**

2. Label the sterilization pouch with the information necessary to identify the device (e.g., the product name with article number and lot/batch number (if applicable)).
3. Place the sealed sterilization pouch into the autoclave/sterilizer. Ensure that the sterilization pouch is oriented in a horizontal position.
4. Sterilize the device. Both the gravity displacement cycle and pre-vacuum (top dynamic air removal) cycle can be applied, using the following recommended parameters Table 4:

| Cycle                         | Minimum Temperature | Minimum Sterilization Time | Minimum Drying Time (In Chamber) | Minimum Pressure          |
|-------------------------------|---------------------|----------------------------|----------------------------------|---------------------------|
| Gravity cycle <sup>1</sup>    | 132°C (270°F)       | 15 minutes                 | 20 minutes                       | ≥2868.2 mbar <sup>4</sup> |
| Pre-vacuum cycle <sup>1</sup> | 132°C (270°F)       | 4 minutes                  | 20 minutes                       | ≥2868.2 mbar <sup>4</sup> |
| Pre-vacuum cycle <sup>2</sup> | 134°C (273°F)       | 3 minutes                  | 20 minutes                       | ≥3042 mbar <sup>5</sup>   |
| Pre-vacuum cycle <sup>3</sup> | 134°C (273°F)       | 18 minutes                 | 20 minutes                       | ≥3042 mbar <sup>5</sup>   |

**Table 4 – Recommended Sterilization Cycles**

- 1 Validated sterilization processes to achieve a Sterility Assurance Level (SAL) of 10<sup>-6</sup> in accordance to EN ISO 17665-1.
- 2 Recommendation of the Welsh Health Technical Memorandum (WHTM) 01-01 Part C.

- 3 Recommendation of the World Health Organization (WHO) for steam sterilization of instruments with potential TSE/CJD contamination. Ensure that the packaging and monitoring systems (chemical/biological indicators) used for this cycle are validated for these conditions.
- 4 Saturated steam pressure at 132°C as per required by EN ISO 17665-2.
- 5 Saturated steam pressure at 134°C as per required by EN ISO 17665-2.

**Note** Autoclave/sterilizer design and performance can affect the efficacy of the sterilization process. Healthcare facilities should therefore validate the processes that they use, employing the actual equipment and operators that routinely process the devices. All autoclaves/sterilizers should comply with the requirements of, and be validated, maintained and checked in accordance to EN 13060, EN 285, EN ISO 17665-1, and/or AAMI ST79, or to the applicable national standard. The autoclave/sterilizer manufacturer's instructions for use must be strictly followed.

### Storage and Maintenance

After sterilization, place the labeled and sealed sterilization pouch in a dry and dark place. Follow the instructions provided by the manufacturer of the sterilization pouch regarding the storage conditions and expiration date of the sterilized device.

### Containment and Transportation/ Shipping to Point of Use

The container and/or outer packaging used to transport or ship the processed device back to the point of use must be suitable to protect and safeguard the sterility of the devices during transportation, taking the device packaging and the required transportation or shipping process (intrafacility transportation or shipping to an external site) into account.

## Magnetic Resonance (MR) Safety Information

### MR Safety Information for Multiple Teeth Configurations

MR Safety Information



Non-clinical testing has demonstrated the Multi-unit Abutments is MR conditional. A patient with this device can be safely scanned in an MR system meeting the following conditions mentioned here below. Failure to follow these conditions may result in injury to the patient.

| Nominal value(s) of Static Magnetic Field [T]     | 1.5-Tesla (1.5 T)  | 3-Tesla (3 T)  |
|---|--|--|
| Maximum Spatial Field Gradient [T/m and gauss/cm] | Maximum spatial field gradient of 44.4 T/m (4,440 G/cm).   |  |
| RF Excitation                                     | Circularly Polarized (CP).   |  |
| RF Transmit Coil Type                             | Whole body transmit coil.  |  |
| Maximum Whole-Body SAR [W/kg]                     | Inferior to the shoulders: 2.0 W/kg<br>Superior to the shoulders: 0.2 W/kg   | Inferior to the navel: 2.0 W/kg<br>Superior to the navel: 0.1 W/kg |
| Limits on Scan Duration                           | Under the scan conditions defined above, the dental implant systems are expected to produce a maximum temperature rise less than 6.0°C after 15 minutes of continuous scanning.              |  |
| MR Image Artifact                                 | In non-clinical testing, the image artifact caused by the dental implant systems extend radially approximately 2.7 cm from the devices or device assemblies when imaged in a 3 T MRI system. |  |

## MR Safety Information for Single Tooth Restoration

MR Safety Information



Non-clinical testing has demonstrated that Multi-Unit Abutments and Healing Caps are MR conditional. A patient with this device can be safely scanned in an MR system meeting the following conditions mentioned here below. Failure to follow these conditions may result in injury to the patient.

| Nominal value(s) of Static Magnetic Field [T]     | 1.5-Tesla (1.5 T)  | 3-Tesla (3 T)   |
|---|--|---|
| Maximum Spatial Field Gradient [T/m and gauss/cm] | Maximum spatial field gradient of 58.9 T/m (5,890 G/cm).   |   |
| RF Excitation                                     | Circularly Polarized (CP).   |   |
| RF Transmit Coil Type                             | Whole body transmit coil.  |   |
| Maximum Whole-Body SAR [W/kg]                     | Inferior to the neck: 2.0 W/kg<br>Superior to the neck: 0.5 W/kg   | Inferior to the xyphoid: 2.0 W/kg<br>Between the xyphoid and neck: 1.0 W/kg<br>Superior to the neck: 0.5 W/kg |
| Limits on Scan Duration                           | Under the scan conditions defined above, the dental implant systems are expected to produce a maximum temperature rise less than 6.0°C after 15 minutes of continuous scanning.              |   |
| MR Image Artifact                                 | In non-clinical testing, the image artifact caused by the dental implant systems extend radially approximately 3.0 cm from the devices or device assemblies when imaged in a 3 T MRI system. |   |

## Performance Requirements and Limitations

To achieve the desired performance, Multi-unit Abutments and Healing Caps must only be used with the products described in this Instructions for Use and/or in the Instructions for Use for other compatible Nobel Biocare products, and in accordance with the Intended Use for each product. To confirm the compatibility of products which are intended to be used in conjunction with Multi-unit Abutments and Healing Caps, check the color coding, dimensions, lengths, connection type and/or any direct marking as applicable on the products or product labeling.

## Facilities and Training

It is strongly recommended that new and experienced users of Nobel Biocare products always go through special training before using a new product for the first time. Nobel Biocare offers a wide range of courses for various levels of knowledge and experience. For more information please visit [www.nobelbiocare.com](http://www.nobelbiocare.com).

## Storage, Handling and Transportation

The device must be stored and transported in dry conditions in the original packaging at room temperature and not exposed to direct sunlight. Incorrect storage and transportation may influence device characteristics leading to failure.

## Disposal

Safely discard potentially contaminated or no longer usable medical devices as healthcare (clinical) waste in accordance with local healthcare guidelines, country and government legislation or policy.

Separation, re-cycling or disposal of packaging material shall follow local country and government legislation on packaging and packaging waste, where applicable.



# Manufacturer and Distributor Information

|   |  |
|---|--|
|  <b>Manufacturer</b> | Nobel Biocare AB<br>PO Box 5190, 402 26<br>Västra Hamngatan 1<br>411 17 Göteborg<br>Sweden<br><a href="http://www.nobelbiocare.com">www.nobelbiocare.com</a> |
| <b>Distributed in Australia by</b>  | Nobel Biocare Australia Pty Ltd<br>Level 4, 7 Eden Park Drive<br>Macquarie Park, NSW 2113<br>Australia<br>Phone: +61 1800 804 597                            |
| <b>Distributed in New Zealand by</b>  | Nobel Biocare New Zealand Ltd<br>33 Spartan Road<br>Takanini, Auckland, 2105<br>New Zealand<br>Phone: +64 0800 441 657                                       |

CE Mark for Class IIb Devices  2797

**Note** Regarding Canadian device licensure, not all products described in the IFU may have a device licence according to Canadian law.

## Basic UDI-DI Information

The following table lists the Basic UDI-DI information for the devices described in this IFU.

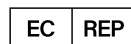
| Product   | Basic UDI-DI Number |
|---|---------------------|
| Multi-unit Abutment Plus CC NP/RP/WP                      | 73327470000001687H  |
| Multi-unit Abutment Xeal™ CC NP/RP/WP                     |                     |
| 17° Multi-unit Abutment Plus CC NP/RP/WP                  |                     |
| 17° Multi-unit Abutment Xeal™ CC NP/RP/WP                 |                     |
| 30° Multi-unit Abutment Plus CC NP/RP                     |                     |
| 30° Multi-unit Abutment Xeal™ CC NP/RP                    |                     |
| Multi-unit Abutment Xeal™ Nobel Biocare N1™ TCC NP/RP     |                     |
| 17° Multi-unit Abutment Xeal™ Nobel Biocare N1™ TCC NP/RP |                     |
| 30° Multi-unit Abutment Xeal™ Nobel Biocare N1™ TCC RP    |                     |
| Multi-Unit Abutment NobelReplace NP/RP/WP                 |                     |
| 17° Multi-Unit Abutment NobelReplace NP/RP                |                     |
| 30° Multi-Unit Abutment NobelReplace RP                   |                     |
| Multi-unit Abutments Brånemark System NP/RP/WP            |                     |
| 17° Multi-Unit Abutments Brånemark System NP/RP           |                     |
| 30° Multi-Unit Abutments Brånemark System RP              |                     |
| Multi-unit Abutments Brånemark System® Zygoma             |                     |
| 17° Multi-unit Abutments Brånemark System® Zygoma         |                     |
| 45° Multi-unit Abutments External Hex RP                  |                     |
| 60° Multi-unit Abutments External Hex RP                  |                     |
| Healing Cap Multi-unit Titanium                           | 73327470000001236T  |
| Healing Cap Multi-unit Brånemark System® WP               |                     |

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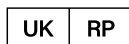
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# Symbols Glossary

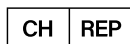
The following symbols may be present on the device labeling or in information accompanying the device. Refer to the device labeling or accompanying information for the applicable symbols.



Authorized Representative in the European Community/ European Union



UK Responsible Person



Authorised Representative in Switzerland



Sterilized using Ethylene Oxide



Sterilized using irradiation



Sterilized using steam or dry heat



Batch code



Catalogue number



Unique Device Identifier



Serial number



Medical device



Magnetic resonance safe



Caution



Magnetic resonance conditional



Non-sterile



Contains hazardous substances



Contains or presence of DEHP phthalate



Contains or presence of natural rubber latex



Contains or presence of phthalate



Contains biological material of animal origin



CE mark



CE mark with Notified Body number



UKCA mark



UKCA mark with Approved Body number



Consult instructions for use



For prescription use only



[symbol.glossary.nobelbiocare.com](https://symbol.glossary.nobelbiocare.com)  
[ifu.nobelbiocare.com](https://ifu.nobelbiocare.com)

Link to Online Symbols Glossary and IFU Portal



Date of manufacture



Manufacturer



Use-by date



Upper limit of temperature



Temperature limit



Do not resterilize



Do not re-use



Non-pyrogenic



Date



Tooth number



Patient number



Patient identification



Health care centre or doctor



Patient information website



EU Importer



Swiss Importer



Double sterile barrier system



Single sterile barrier system



Single sterile barrier system with protective packaging inside



Single sterile barrier system with protective packaging outside



Do not use if package is damaged and consult instructions for use



Keep away from sunlight



Keep dry