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The Allofit/Allofit-S Cup System Uncemented

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The Allofit/Allofit-S Cup System

Hemispherical cups for uncemented implantation have gained wide acceptance in recent years. One of the main reasons for this is that they reconstruct the original shape of the acetabulum, thereby ensuring minimum bone resection. This makes it possible to maintain and use the subchondral bone area as a load-bearing element. Unlike most other uncemented spherical cups, Allofit cups have a flattened pole area. This ensures that the implant cannot shift at the peak of its hemisphere, instead it transfers load to the periphery of the cup. The cup is slightly larger than the reamed acetabulum, which provides primary stability. The cup locks in the area of the subchondral bone, which both anchors the implant and restores the original physiological function of load transfer.

Primary anchorage of the titanium shell is supported by an excellent macrostructure. Long-term anchoring through osseointegration is ensured by the use of a proven material for the cup, the titanium-wrought alloy Protasul®-Ti with a rough-blasted surface.

In cases of uncemented modular acetabular cups in the past, it was shown that an incomplete metal insert backing, particularly where the polyethylene walls are thin, can cause problems and may lead to implant failure. In the Allofit cup system, it was therefore ensured that the polyethylene walls would be thick enough, and also that all screw holes in the titanium shell were designed for capping. The insert is seated and secured in the shell by a snap mechanism that holds the insert firmly in place.

The Allofit cup system provides the surgeon with a reliable prosthesis that is easy to handle and offers considerable freedom of choice because of its modular design. Titanium shells with or without the possibility of additional screw fixation are available as anchoring components. Neutral and 10-degree hooded polyethylene inserts, as well as Metasul and Cerasul inserts, can be combined with the titanium shells. This makes it possible to individually select the most suitable acetabular cup for the patient in an economic and practical way.
Indications

The Allofit cup can be used for all forms of coxarthrosis if the bone quality and quantity is adequate and there is sufficient bone coverage.

The bispherical basic design with polar flattening is preferable to the purely spherical cup, even in the case of poor bone quality, as is common in osteoporotic or rheumatoid patients, for achieving stable anchorage.

Furthermore, in cases of primary dysplasia of the hip, the Allofit cup can be used in combination with hooded polyethylene inserts, which can be implanted with stable rotation in any position.

If no stability by means of press-fit is achieved in cases of poor bone quality or in a revision operation, the Allofit-S cup with screw holes offers additional options.
Preoperative Planning

X-ray templates are available for pre-operative planning of an Allofit cup. Together with a current X-ray overview of the pelvis, these are a practical aid for planning the surgical procedure.

The aim of preoperative planning is to determine the most favorable position of the implant and its approximate size, and anticipate potential surgical complications. A load-bearing, stable acetabular floor and solid lateral bony tissue are desirable. An extensively preserved osseous circumference of the acetabulum is a prerequisite for primary stability of the cup.

In cases of acetabular dysplasia, pre-operative planning helps in deciding whether the implant bed must be supported by using bone grafts. The center of rotation should approximate physiological conditions as closely as possible.

The inclination of the cup should form an angle of 40°–45° to the pelvic horizontal line. A cup template of appropriate size is placed between the acetabular root and teardrop figure, which serve as a reference to determine the shell diameter. The cup should be placed in an anteversion of 10°–15° interoparatively. However, it should be kept in mind that the correct cup orientation also depends on the femoral implant position.
Surgical Approach

The Allofit cup can be implanted using a variety of surgical approaches. The specific approach depends on the surgeon’s preference and therefore may differ from the procedure shown below.

Exposing the Acetabulum
A clean and clear exposure of the acetabulum is a prerequisite for successful implantation. The capsule is excised in its entire circumference so that reamers can be easily introduced. All fibrous, cartilaginous and bony structures preventing the preparation of the acetabulum must be removed.

Reaming the Acetabulum
The acetabular bone bed is reamed based on its size and prepared in 2 mm steps. The aim is to create an anatomically shaped acetabular implant bed so that the cup is gripped by bone on all sides and anchored in well-vascularized bone. This establishes the prerequisites for primary and secondary stability.
Important: Reaming must be minimal to preserve bone stock and the morphology of the acetabulum.

In flat acetabuli, first ream the central acetabular floor with a relatively small reamer and then deepen according to the preoperative planning (Fig. 2a). In normal acetabuli, deepening is not required. Once the necessary depth has been reached, incline the reamer at around 40° to the longitudinal axis of the body and form a hemispherical implant bed using the next largest reamer (Fig. 2b). This cranial reamer direction is maintained until:

1. The necessary depth has been attained, and
2. 50–60% of the acetabular roof has been reamed to vascularized bone.

The anterior and posterior acetabular roof must remain stable and solid.

The reaming process is completed when these conditions are met.

To obtain an implant bed being as symmetrical as possible and to avoid thermal necrosis, the final reaming should be performed manually. The reamer is inserted to a depth where its equator is entirely covered by bone; this does not apply to dysplastic acetabuli, for which an additional implant bed must be created.

Cleaning the Reamer Handle

To clean the reamer handle, the white tissue protector is removed from the reamer handle. Then push the locking sleeve up and turn it to the right (Fig. 3a).

Next, pull the coupling apart (Fig. 3b). After cleaning, reassemble the locking sleeve in reverse order.
Selecting the Implant
After reaming, the trial shell is tapped in at 40°–45° inclination and 10°–15° anteversion and its stability is checked. Stability is carefully tested under pulling, tilting and rotating loads. The contact between the acetabular floor and trial shell can be verified with the control hook after unscrewing the setting instrument.

If the trial shell does not have a sufficient fixation base, the acetabulum must be adequately deepened with the last reamer used, after which the stability of the trial shell is checked again. If the trial shell is not seated firmly enough even with sufficient osseous enclosure, choose the next largest trial implant.

Caution: To protect the acetabulum, the trial shell is slightly larger (1 mm) than the reamer of the nominal size due to its lack of surface structure. The definitive implant is 2 mm larger, and will therefore fit even more tightly.

If there is an “onlay effect” despite this, perform an additional primary anchoring with at least two cancellous bone screws.

The trial shell can be removed by tipping out.
Implanting the Titanium Shell Without Screw Holes (Allofit)

Important: The nominal size of the definitive shell must match the last reamer used; the excess of 2 mm has been taken into account. Oversizing and selection of a larger implant than prereamed is only advisable for soft bone, as the risk of pelvic fracture would be increased.

The titanium shell is completely screwed to the setting instrument and tapped in with 40°–45° inclination and 10°–15° anteversion (Fig. 5).

Any soft tissue which remains between the bone and the implant must be resected.

It is absolutely essential to align the shell before tapping in and maintain the selected setting direction.

The control hook is used to check whether the implant was driven to the acetabular floor. The shell must also maintain its stable seating under pulling, rotating and tipping loads.

If a trial reduction is planned with the trial insert, it is possible to fix the trial insert to the titanium shell using an attachment screw (Fig. 6).

The hole at the pole of the titanium shell is locked with the polar screw. This is set steadily on the placement instrument and screwed in accurately (Fig. 7). In addition to sealing the polar hole, the screw is also used for correct centering when fitting the cup insert.
Implanting the Titanium Shell With Screw Holes (Allofit-S)

**Important:** The nominal size of the definitive shell must match the last reamer used; the excess of 2 mm has been taken into account. Oversizing and selection of a larger implant than prereamed is only advisable for soft bone, as the risk of a pelvic fracture would be increased.

The titanium shell is completely screwed to the setting instrument and tapped in with 40°–45° inclination and 10°–15° anteversion (Fig. 8). Any soft tissue which remains between the bone and the implant must be resected. It is absolutely essential to align the cup correctly before tapping in, as its position cannot be changed after tapping in.

The Allofit-S cup has an orientation groove at the equator of the shell indicating the position of the screw holes in the shell. The holes must be placed correctly in the direction of the load transfer. A deviating orientation may not be biomechanically suitable and could lead to vascular and nerve lesions caused by the screws.

The control hook is used to check whether the implant was driven to the acetabular floor.

Where necessary, a trial reduction is performed with the trial insert during stem preparation or after implanting the stem (Fig. 9).

The hole at the pole of the titanium shell is locked with the polar screw. This is set steadily on the placement instrument and screwed in accurately (Fig. 10). In addition to sealing the polar hole, the screw is also used for correct centring when fitting the cup insert.
Inserting the Screws (Allofit-S)

Zimmer 6.5 mm countersunk screws must be used. To simplify the initial insertion of the self-tapping cancellous bone screws, 3.2 mm holes are drilled into the subchondral bone (Fig. 11).

Tapping of the drill holes is recommended only in cases of sclerotic bone. This is used purely to break through the hard osseous parts. Since the screws are only to be anchored in cancellous bone, lengths of up to 30 mm are normally sufficient. The screws should not penetrate the opposite cortex.

The geometry of the screw holes allows the screws in all cup sizes to be oriented within a range of around 10° in all directions (Fig. 12).

Caution: The specified Ti-6Al-4V screws have a lower shearing resistance than screws made of steel or CoCrMo alloys.

The screws must be screwed in fully. Projecting screw heads would make correct fitting of the cup insert impossible.

Unused screw holes in the titanium shell can be capped with a screw hole plug (Fig. 13). The plug is placed on the appropriate setting instrument and fixed in the screw hole of the titanium shell with a light tap. The screw hole plugs are intended for single use only and cannot be snapped into the shell more than once.
Fitting the Cup Insert

After implanting the femoral component and the trial reduction, decide whether a neutral or hooded cup insert is to be used. The trial insert is then removed. The polar screw is fitted (Fig. 14). This must always be screwed in as the polar screw accepts the polyethylene peg of the liner into its hole, centring the insert.

Bone or soft tissue remnants must not overlap the edge of the titanium shell as they may prevent the insert from snapping into position. The shell edge must be free from any tissue and particular attention must be paid to the posterior inferior bony edge of the acetabulum.

The size of the cup inserts is indicated by a letter code. This code matches the size on the corresponding titanium shell.

The supplied insert is attached to the setting instrument, introduced into the cleaned shell, and is carefully centered. The polyethylene peg must be centred in the hole of the polar screw (Fig. 15).

To do this, use the setting instrument to position the insert at the entrance plane of the shell. In this position, the insert is turned clockwise using the setting instrument (Fig. 16). If it can easily be turned concentrically, it is only tapped lightly with a hammer.
If it can no longer be rotated with low torque, it sits concentrically and can be tapped in definitively (Fig. 17). If the insert can still be turned with low torque after tapping it lightly, this indicates nonconcentric positioning or soft tissues between insert and cup. After removing the soft tissue remnants and correctly positioning the insert, repeat the process (Fig. 16) until the insert cannot be turned after tapping it lightly. Only then it can be tapped in completely.

Where necessary, a tap plastic impactor provides confirmation that the connection is reliable.

If the insert has snapped into place correctly, the edge is protruding around 1.5 mm over the equator of the titanium shell (Fig. 18).

If unsure, the seating can be checked using a raspatory. If the fitting of the insert is faulty, a new insert must be used. If the polar peg is deformed, it will not be possible to anchor the insert correctly.
**Metasul** and **Cerasul** inserts must be handled with special care; there must not be any damage to their metal or ceramic surface. **Metasul** inserts must only be combined with **Metasul** femoral heads, and **Cerasul** inserts with **Cerasul** or **BIOLOX® delta** femoral heads.

**Changing the Cup Insert**

If the removal of a firmly seated insert becomes necessary, the following approach is often successful: An AO type cancellous bone screw is inserted into the polyethylene insert after making a small pilot drill hole (Fig. 19). This is done centrally for polyethylene inserts if the PE insert is thick enough; otherwise decentrally between articulating surface and shell edge as with **Metasul** or **Cerasul** inserts. It is also possible to attempt to lever out the insert at the edge with an osteotome. The inside edge of the shell, where the locking mechanism for the insert is placed, must be protected if a new insert is to be fitted. If a new insert can no longer be reliably anchored in the old shell, the shell must be removed and replaced.

* **BIOLOX** delta is a trademark of CeramTec AG.*
Die Allofit Pfanne kann nur mit Alpha-Einsätzen kombiniert werden!
Die Kompatibilität zwischen Schalen und Einsätzen wird über die pfannenspezifischen Größenabstimmungen mittels Buchstabenzuordnung DD bis TT angegeben.

The Allofit cup shall only be used with Alpha inserts!
The compatibility between the shells and inserts is given by the specific letter codes DD to TT lasered on the respective implants.

Le cotyle Allofit ne doit etre utilisé qu’en combinaison avec des inserts Alpha!
La correspondance entre taille de cupule et d’insert est indiquée au moyen de lettres allant de DD à TT gravées sur la cupule et sur l’insert.

Metasul Einsätze dürfen nur mit Metasul Kugelköpfen kombiniert werden!
Cerasul Einsätze dürfen nur mit Cerasul oder BIOLOX delta Kugelköpfen kombiniert werden!

Metasul inlays are to be used only in combination with Metasul femoral heads!
Cerasul inlays are to be used only in combination with Cerasul or BIOLOX delta heads!

Les inserts en Metasul doivent être utilisés uniquement en combinaison avec des têtes sphériques Metasul!
Les inserts en Cerasul doivent être utilisés uniquement en combinaison avec des têtes sphériques Cerasul ou BIOLOX delta!
Allofit® Implants

1) Protasul®-Ti uncemented
2) Protasul®-10

** Buchstabencodes referenzieren die korrekte Größe des Alpha-Einsatzes.
** Letter code references indicate the correct Alpha insert size.
** Codes de lettre référencent la taille correcte de l’insert Alpha.

* Auf Anfrage
* On request
* Sur demande
Cancellous Bone Screws

Senkkopf-Spongiosaschraube
Countersunk Cancellous Bone Screw
Vis à spongieux à tête noyée

6.5 mm
Protasul®-64WF

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Senkkopf-Spongiosaschraube
Countersunk Cancellous Bone Screw
Vis à spongieux à tête noyée

6.5 mm
Tivanium®

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Alpha insert Sulene® PE

Sulene® PE Einsitz überhöht
Sulene® PE Alpha Insert hooded
Alpha insert Sulene® PE avec rebord

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Alpha insert Sulene® PE

Sulene® PE Alpha-Einsatz überhöht
Sulene® PE Alpha Insert hooded
Alpha insert Sulene® PE avec rebord

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**Durasul® Alpha Inserts**

Durasul® PE Alpha-Einsatz  
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### Table: Durasul® PE Alpha Inserts

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* Auf Anfrage  
* On request  
* Sur demande
Durasul® Alpha Inserts

Durasul® PE Alpha-Einsatz überhöht  
Durasul® PE Alpha Insert hooded  
Alpha insert Durasul® PE avec rebord

Durasul® PE uncemented  

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* Auf Anfrage  
* On request  
* Sur demande
Cerasul® Alpha Inserts

Cerasul® Alpha-Einsatz
Cerasul® Alpha Insert
Alpha insert Cerasul®

Sulene® PE/
Cerasul®
uncemented

ά mm REF

Größe/Size/Taille

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Metasul® Alpha Inserts

Metasul® Alpha-Einsatz
Metasul® Alpha Insert
Alpha insert Metasul®

Sulene® PE/
Protasul® 21WF
uncemented

ά mm REF

Größe/Size/Taille

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** Not available for distribution in the US.
Metasul® Alpha Inserts

Metasul® Alpha-Einsatz
Metasul® Alpha Insert
Alpha insert Metasul®

Sulene® PE/
Protasul® 21WF
uncemented

Metasul® Alpha-Einsatz, überhöht
Metasul® Alpha Insert, hooded
Alpha insert Metasul® avec rebord

Größe/Size/Taille  mm  REF
GG 28 0.00016.407**  GG 28 0.00016.507**
HH 28 0.00016.408**  HH 28 0.00016.508**
II 28 0.00016.409**  II 28 0.00016.509**
JJ 28 0.00016.410**  JJ 28 0.00016.510**
KK 28 0.00016.411**  KK 28 0.00016.511**
LL 28 0.00016.412**  LL 28 0.00016.512**
MM 28 0.00016.413**  MM 28 0.00016.513**
NN 28 0.00016.414**  NN 28 0.00016.514**
OO 28 0.00016.415**  OO 28 0.00016.515**
PP 28 0.00016.416**  PP 28 0.00016.516**
QU 28 0.00016.417**  QU 28 0.00016.517**

II 32 0.00016.709**  II 32 0.00016.909**
JJ 32 0.00016.710**  JJ 32 0.00016.910**
KK 32 0.00016.711**  KK 32 0.00016.911**
LL 32 0.00016.712**  LL 32 0.00016.912**
MM 32 0.00016.713**  MM 32 0.00016.913**
NN 32 0.00016.714**  NN 32 0.00016.914**
OO 32 0.00016.715**  OO 32 0.00016.915**
PP 32 0.00016.716**  PP 32 0.00016.916**
QU 32 0.00016.717**  QU 32 0.00016.917**

** Available for distribution in the US only.
**Allofit® Instruments**

- **Alpha-Sieb (leer)**
- **Alpha tray (empty)**
- **Plateau Alpha (vide)**

  REF: 01.00019.101

- **Einsatz zu Alpha-Sieb (leer)**
- **Insert to Alpha tray (empty)**
- **Alpha plateau supérieur (vide)**

  REF: 01.00019.102

- **Siebdeckel**
- **Tray cover**
- **Couvercle pour plateau**

  REF: 01.00029.031

- **Sieb für Grössen 70–74 mm**
- **Tray for sizes 70–74 mm**
- **Plateau pour cotyles 70–74 mm**

  REF: 00-6000-005-00

- **Siebdeckel**
- **Tray cover**
- **Couvercle pour plateau**

  REF: 00-5900-099-00
Setzinstrument für Titanschale
Impactor for titanium shell
Impacteur pour cupule titane

Zielgerät
Positioning guide
Guide de positionnement

Lochverschluss-Setzinstrument
Setting instrument for screw plug
Positionneur pour obturateur des trous de vis

Pfannenmesskörper
Cup measuring instruments
Cotyle de mesure

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* Auf Anfrage
* On request
* Sur demande

All instruments
The Allofit®/Allofit®-S Alloclassic® Cup System Uncemented – Surgical Technique

**Screwdriver for MIS Instruments**
**Tournevis pour instruments MIS**

- **Durasul® 22 mm**
  - REF 01.00019.105*
- **Durasul® EE/28 mm**
  - REF 01.00019.115*
- **PE, Durasul® 22 mm**
  - REF 01.00019.106*
- **Durasul® EE/28 mm**
  - REF 01.00019.116*
- **PE, Durasul®, Metasul® 28 mm**
  - REF 01.00019.109
- **PE, Durasul®, Metasul® 32 mm**
  - REF 01.00019.110
- **Durasul® 32 mm**
  - REF 01.00019.112
- **Durasul® 36 mm**
  - REF 01.00019.114
- **PE, Durasul®, Metasul® 32 mm**
  - REF 01.00019.113

**Alpha top neutral**
**Porte-noyau neutre Alpha**

- **Durasul® 22 mm**
  - REF 01.00019.105*
- **Durasul® EE/28 mm**
  - REF 01.00019.115*
- **PE, Metasul®, Durasul® 28 mm**
  - REF 01.00019.107
- **Cerasul® 28 mm, Metasul® 32 mm**
  - REF 01.00019.108
- **Cerasul® 32 mm, Metasul® 32 mm**
  - REF 01.00019.110
- **Durasul® 36 mm**
  - REF 01.00019.114

**Alpha top with rim**
**Porte-noyau avec rebord Alpha**

- **PE, Durasul® 22 mm**
  - REF 01.00019.106*
- **Durasul® EE/28 mm**
  - REF 01.00019.116*
- **PE, Durasul®, Metasul® 28 mm**
  - REF 01.00019.109
- **PE, Durasul®, Metasul® 32 mm**
  - REF 01.00019.110
- **Durasul® 32 mm**
  - REF 01.00019.112
- **Durasul® 36 mm**
  - REF 01.00019.114

**Impactor**
**Impacteur**

- **flach/flat/plat**
  - Ø mm REF
  - 22 840.6022*
  - 28 840.6023
  - 32 840.6024
  - 36 01.00209.114
- **überhöht/hooded/surélevé**
  - Ø mm REF
  - 22 01.00209.106*
  - 28 840.6032
  - 32 840.6033

* Auf Anfrage
* On request
* Sur demande

All instruments *protected*
Instruments for Spherical Reamers

Sieb für sphärische Fräser (leer)
Tray for spherical reamers (empty)
Plateau pour fraises sphériques (vide)

Antriebswelle für 4-Steg-Fräser,
EZ clean, lang
Drive shaft for 4-strut reamers,
EZ clean, long
Axe d’entraînement pour la fraise
à 4 branches, EZ clean, long

Größe/Size/Taille REF
360 mm 01.00209.402

4-Steg-Raffelfräser sphärisch
4-strut spherical reamer
Fraise sphérique à 4 branches
Ø mm REF
36 01.00209.436*
38 01.00209.438*
40 01.00209.440
42 01.00209.442
44 01.00209.444
46 01.00209.446
48 01.00209.448
50 01.00209.450
52 01.00209.452
54 01.00209.454
56 01.00209.456
58 01.00209.458
60 01.00209.460
62 01.00209.462
64 01.00209.464
66 01.00209.466
68 01.00209.468
70 01.00209.470*
72 01.00209.472*
74 01.00209.474*
Instruments for Trial Inserts

Befestigungsschraube
Fixation screw
Vis de fixation

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Manipuliereinsatz
Trial insert
Insert de manipulation

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* Auf Anfrage
* On request
* Sur demande
Instruments for Cancellous Bone Screws

Sieb für Knochenschrauben (leer)
Tray for cancellous bone screws (empty)
Plateau pour vis à spongieux (vide)

REF 5901

Schaumbenträger
Screw compartment
Porte-vis

REF 5911

Siebdeckel
Tray cover
Couvercle pour plateau

REF 7139

Kardanschraubenzieher 3,5 mm
Cardan hex screwdriver 3.5 mm
Tournevis à cardan 3,5 mm

REF 7798

Bohrlehre 3,2 mm, gerade
Drill guide 3.2 mm, straight
Guide-mèches 3,2 mm, droite

REF 5913

Schaubenzieher gerade 3,5 mm
Screwdriver straight 3.5 mm
Tournevis droit 3,5 mm

REF 5912*

Flex-Welle
Flexible shaft
Tige flexible

REF 75.80.04
Winkelgetriebe  
Angular gear  
Renvoi d’angle  

Gewindeschneider  
Tap  
Taraud  
Größe/Size/Taille*  
6.5 \times 50  

Zentrierhaken  
Guiding hook  
Crochet de centrage  

Spiralbohrer  
Drill bit  
Mèche  
Größe/Size/Taille  
3.2 \times 35  
3.2 \times 56  
3.2 \times 70  
3.2 \times 145  

Tiefenmessinstrument  
Depth gauge  
Jauge de profondeur  

T-Griff  
T handle  
Poignée en T  

Schraubenmessgerät  
Gauge for screws  
Jauge de longueur pour vis  

* Auf Anfrage  
* On request  
* Sur demande  

All instruments