EcoFit®
cup

implantcast

SURGICAL TECHNIQUE

TABLE OF CONTENT

Nota Bene: The author of this technique has outlined the procedure for the uncomplicated surgical scenario. Ultimately however it is the operating surgeon who is best placed to assess and address the individual needs of each patient.

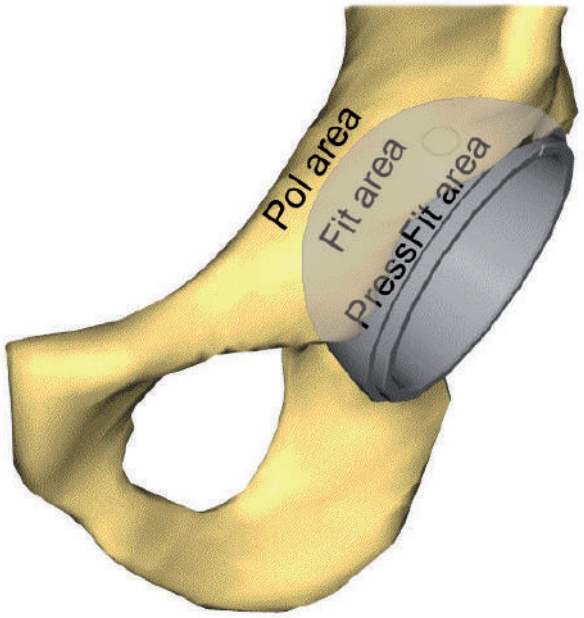
DESIGNCHARACTERISTICS

Pole-area:
- gap between cup and acetabulum
- protection of the bone

Fit-area:
- reduction of tension towards the pole area

PressFit-area:
- safety against tilting and migration

The ‚Low Profile' design of the cementless EcoFit® acetabular system is defined to enhance the stability and to support long-lasting bony integration.



Pole-area

The PressFit of hemispherical acetabular implants results from under-reaming of the implant bed. The resulting PressFit acts upon the total bony area of contact. In the area of the acetabular base and in the pole area respectively this action is undesirable, because the resulting forces hold the risk of migration and loosening of the implant. For this reason the EcoFit® cup is flattened in order to guarantee the protection of the bone and to reduce the risk of loosening.

PressFit-area

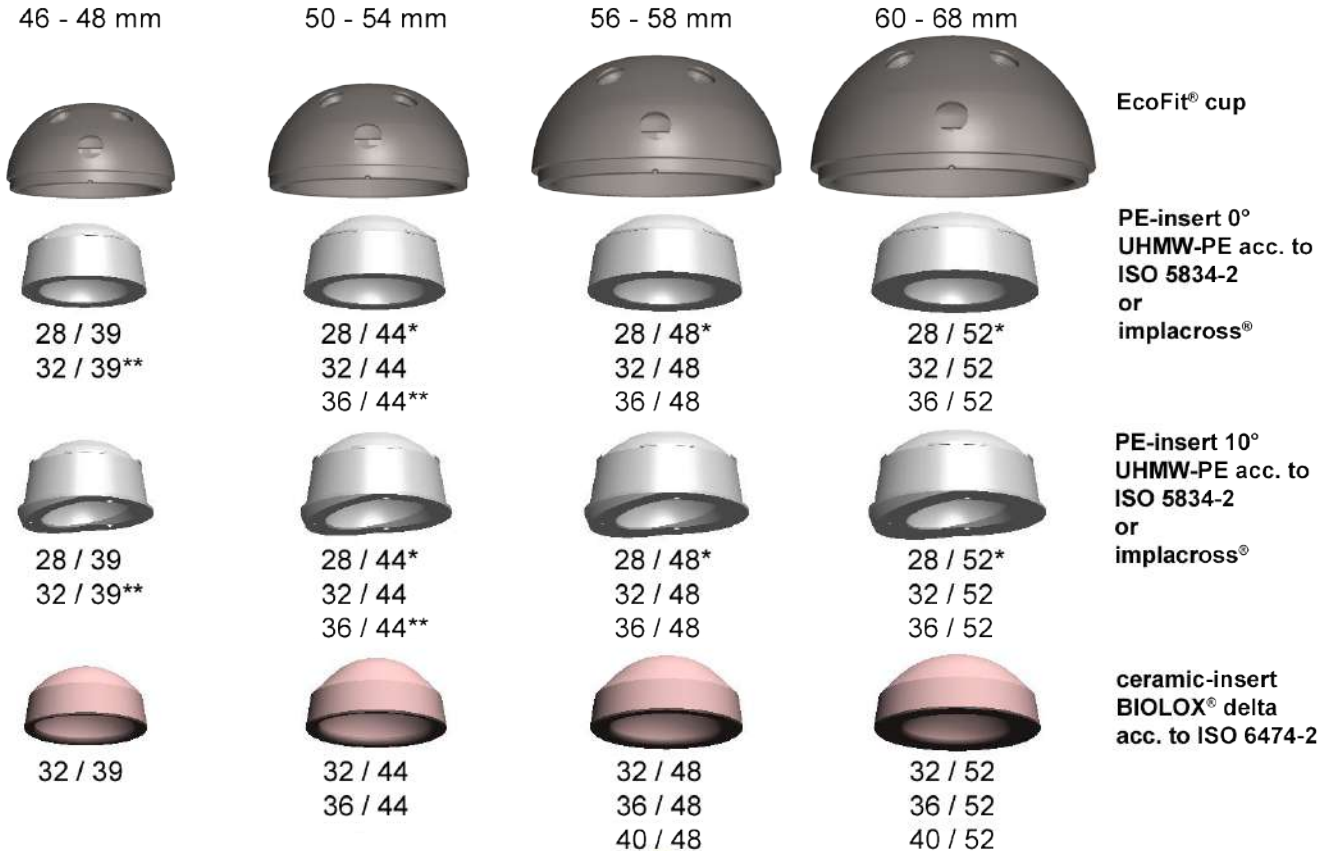
The EcoFit® cup locks stable through a peripheral enhanced PressFit. The primary stability is produced by the rough pure titanium coating. The PressFit grows progressively with the external diameter of the EcoFit® acetabular implants. In comparative tests[1] with commercial implants an excellent primary stability could be demonstrated. The primary stability decisively depends on the rate of tensions which appear during insertion of the implant. The degrees of these bone tensions are defined by the rate of the under-reaming. On equal under-reaming with all implant diameters you can see an increase of the resulting bone tensions rising with the growing diameter of the cups.

Fit area

The cup has also got a rough pure titanium coating in the adjacent Fit area in order to enhance the osseointegration. The geometry corresponding to the reaming of the cup leads to reduced tensions in direction to the pole.

1) Literature: Vergleichende Analyse der Primärstabilität des neues Oberflächendesigns EcoFit® - Sellenschloh; Morlock - TUHH

SYSTEMOVERVIEW



* not available in implacross®
** only available in implacross®

In order to minimize the micro motions and prevent PE abrasion in the contact area between metal cup and PE insert, a special locking mechanism has been developed. It allows the use of the identical acetabular cup implant for the use of BIOLOX® delta ceramic or PE inserts. The PE inserts are sterilized with ethylene oxide gas to prevent oxidative predegradation of the material. Alternatively PE inserts made of implacross® crosslinked polyethylene, are available. These PE-inserts have shown improved wear characteristics during preclinical tests.

The implants of the EcoFit® system show a central hole in the acetabular base. The hole allows the control of the seating and the attachment of the impactor. It is covered by the use of a central screw cover which captures the cover while inserting. The EcoFit® cup has three covered screw holes. To enhance the primary stability by using screws, the tapered covers may be removed (while the cup is already seated) and screws will be used. The cancellous screws can be angled up to 15°. The cup is also available without three additional holes (EcoFit® NH). Furthermore both options can be ordered with additional implaFix® HA-coating.

PREOPERATIVE PLANNING

For each surgery a preoperative planning has to be performed to allow for a precise planning in terms of dimensioning of the prostheses as well as the positioning of the implant components in the bone. Therefore templates of each implant are available as:

- digital templates: The templates are entered in the data bases of the most planning tools. For the case that the templates are not available in the software, please contact the planning tool. They will order the requested templates from implantcast GmbH.
- printed x-ray templates: Alternatively, you can order printed templates. In this case please contact your local distributor. The x-ray templates are available as standards 1:1; 1,1:1 and 1,15:1. Regarding the choice of the cup size and position the EcoFit® cup should rest congruently against the subchondral bone.

Further prior to surgery the following should be ensured:

- all needed components are available during surgery. An adequate number of various implant components should be available for surgery.
- all instruments for the implantation are present and are matching the corresponding implants. The insertion instruments must be adapted to the implant. The implants may only be used with the instruments of the implantcast GmbH. An exeption are exclusively the standardized instruments used during surgery.

PREPARATION OF THE ACETABULUM

Please expose the hip joint completely. Resect the articular capsule and the labrum acetabulare. Dissect the bony rim of the acetabulum, if possible, completely. Remove the osteophytes and the connective tissue of the fossa acetabuli. In order to rebuild normal anatomical proportions, the acetabulum should be medialised to the extent to which you are able to reconstruct the preoperatively chosen centre of rotation.

SURGICAL TECHNIQUE

To prepare the acetabular bone (Fig. 1), reamers of external diameters in increments of 2mm are available.

Align the reamer anatomically, in abduction of about 45° and anteversion of 20 - 30°. By using the reamer the acetabulum is prepared until bleeding subchondral bone is reached (Fig. 2).

Please note that the posterior and anterior acetabular rim serve for sizing and therefore should be preserved accordingly.

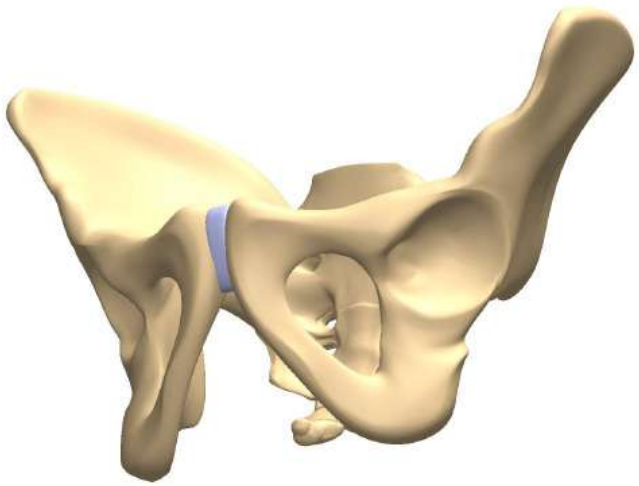
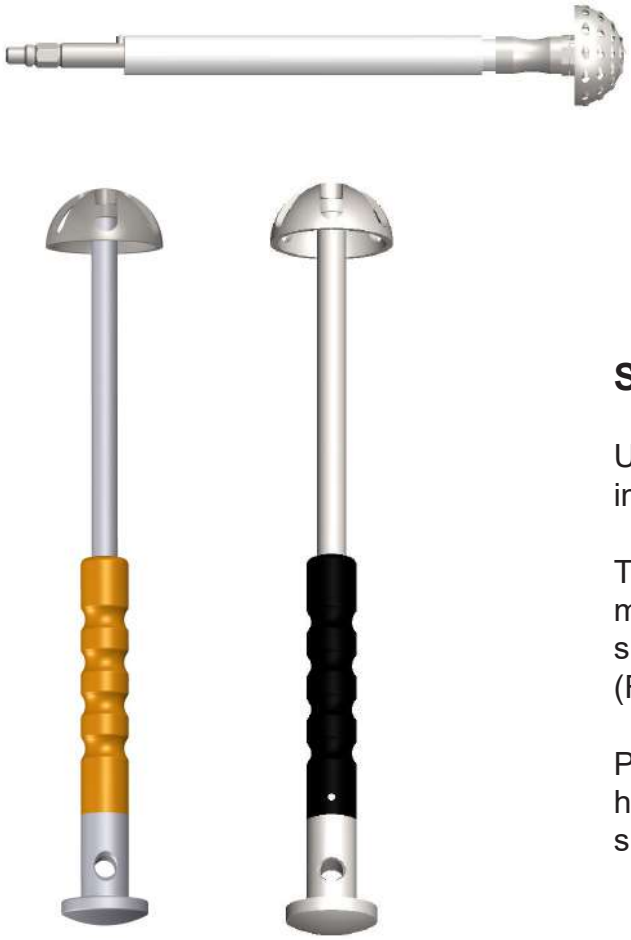


Figure 1



cup impactor optionally orange or black

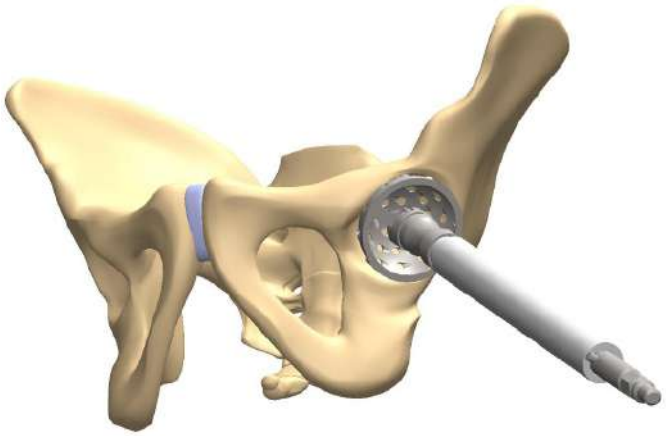


Figure 2

Sizing

Using the trial shells, the size of the prepared implant bed is checked (Fig. 3a).

The slots of the trial shells serve for the determination of the bone contact between the respective trial shell and the prepared acetabulum (Fig. 3b).

Please consider that the trial shells are of a hemispherical shape, while the EcoFit® cup shows a circumferential enhanced PressFit.

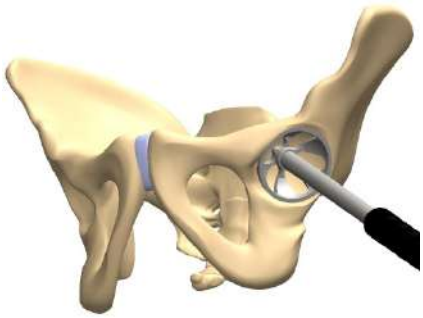


Figure 3a

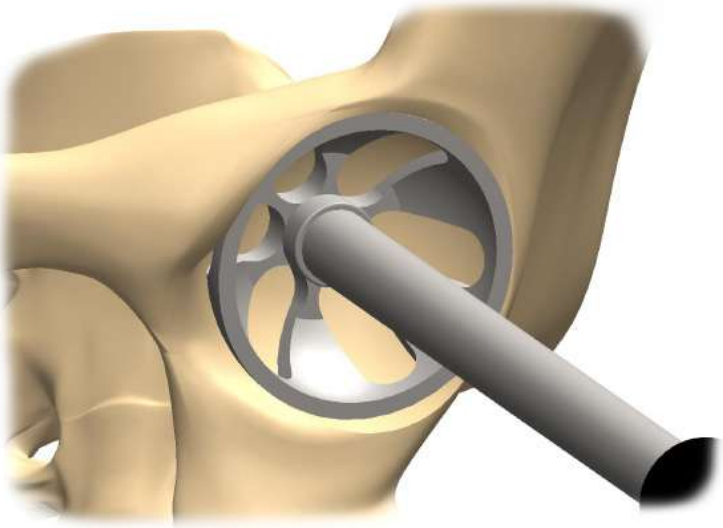


Figure 3b

Insertion of the cup

The chosen EcoFit® cup is combined with the universal impactor and inserted in the prepared acetabulum (Fig. 4). Exactly aligned the EcoFit® cup should rest at an angle of abduction of 45° and an anteversion of 10-20°.

The chosen size of the EcoFit® cup should have the same diameter as the previously used reamer. The PressFit of the EcoFit® cup increases proportionally to the cup diameter.

The stability of the implant fit (PressFit) and the implant-to-bone contact can be adjusted by moving the impactor at the end of the handle. In doing so the whole pelvic should move without changing the position of the cup in the acetabulum. If the stability is not desirable, please consider to use a larger reamer and cup size or consider to use additional cancelous bone screws to enhance the stabilty (see page 14).

If so, you can act on the assumption of a firm primary fit and the impactor can be removed.
Peripheral osteophytes that possibly hinder the femoral implant from its full range of motion have to be removed (Fig. 5).

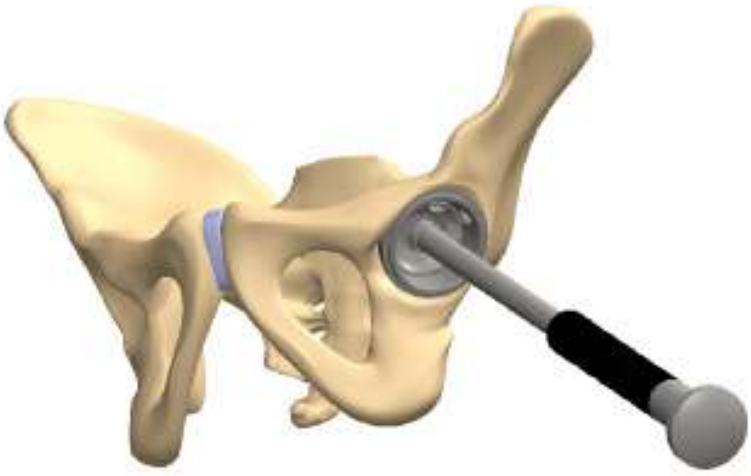


Figure 4

Figure 5

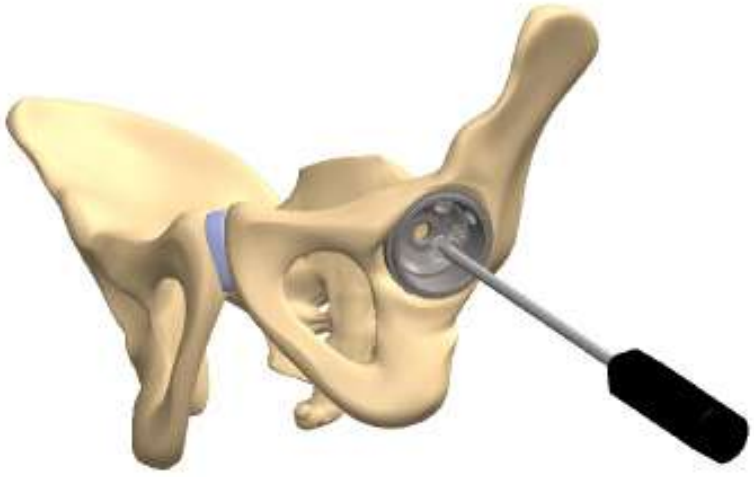


Figure 6

Insertion of the central cover

The central hole of the EcoFit® cup has got a thread and is closed with a screw driver. The captured screw driver holds the cover while inserting (Fig. 6 and Fig. 7)

Before inserting the central screw holder, the central hole has to be cleaned thoroughly by rinsing and sucking off.

Make sure that the central cover is seated completely (Fig. 8).

Figure 7

Figure 8

Trial reduction

When the EcoFit® cup is fixed firmly in the desired position, a trial insert of the appropriated size may be inserted for the trial reduction.

By the use of the trial insert you avoid damages of the PE and the ceramic insert respectively.

The table below shows the colour coding of the trial inserts. The same colour coding could be found on the outside labelling of the implant packages.

Combine the universal impactor with the trial impactor of the correct size and colour (see table 1) and insert the trial insert (Fig. 9).

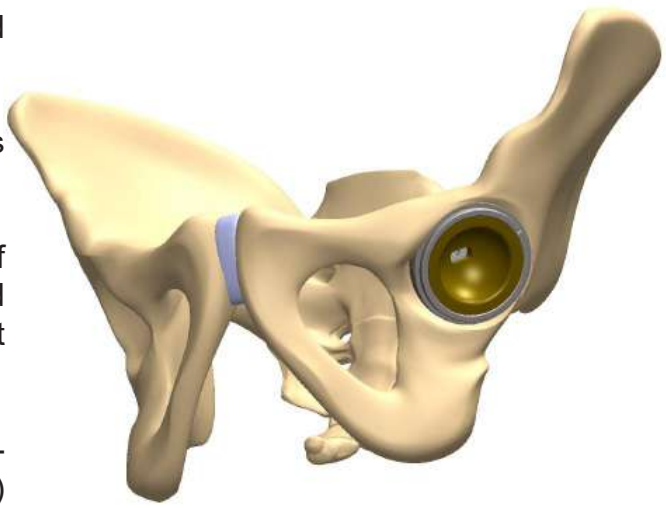


Figure 9

cup impactor optionally orange or black

cup Ø 46-48mm		
cup Ø 50-54mm		
cup Ø 56-58mm		
cup Ø 60-68mm		

Table 1

Removal of the trial insert

Mount the trial insert extractor to the universal impactor.

Insert the tip of the extractor into the bottom hole of the trial insert (Fig.10) and turn the extractor. It will hook in and the trial insert can be pulled out (Fig. 11).

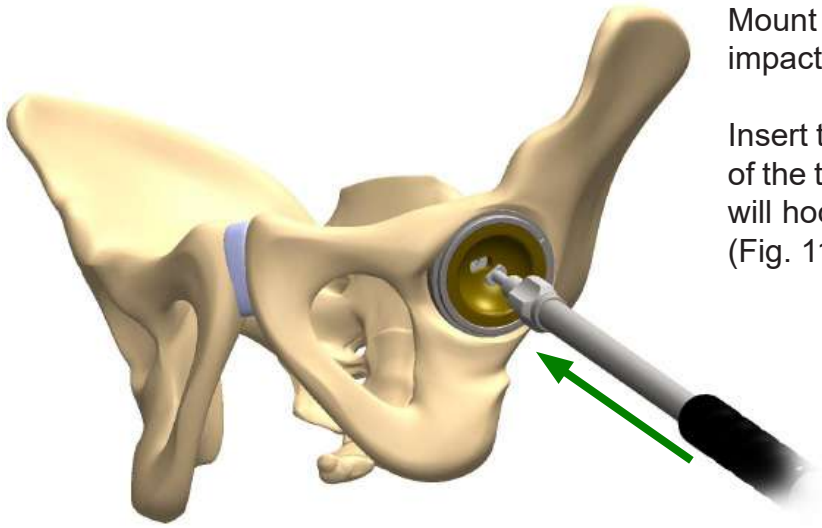
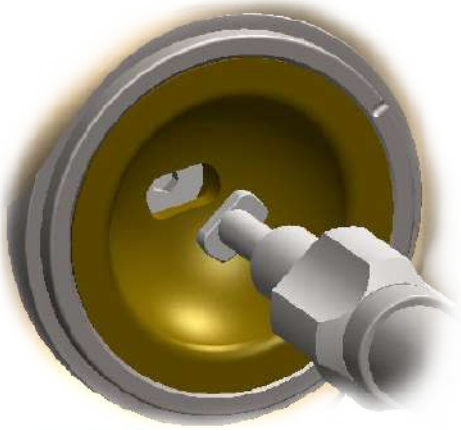


Figure 10



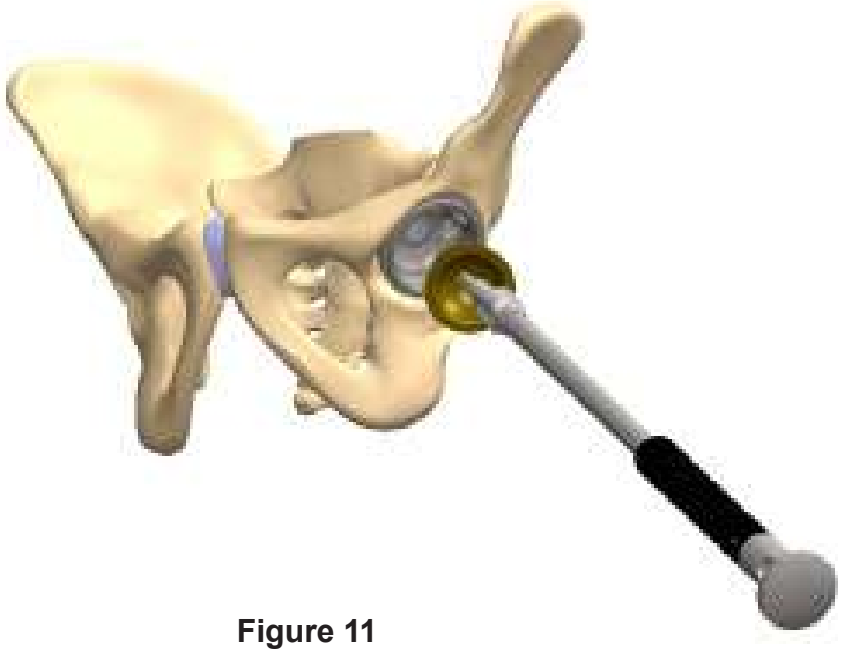
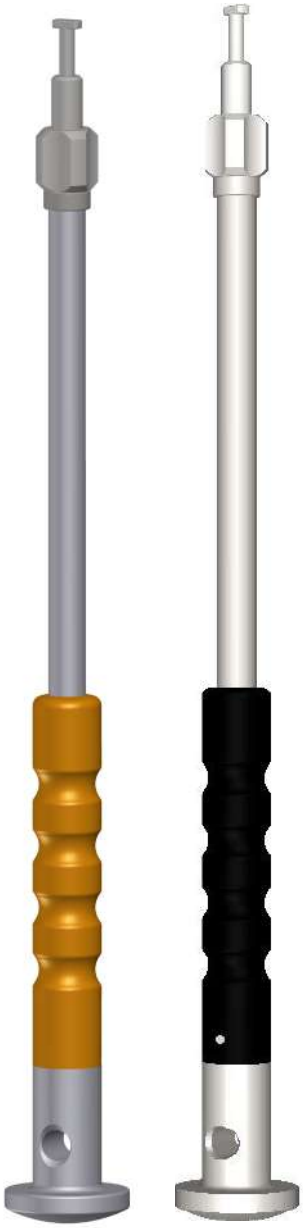


Figure 11



cup impactor optionally orange or black

Insertion of the PE-insert

Before final insertion of the PE articulation inserts into the EcoFit® cup, the rim and the inner surface have to be cleaned thoroughly. Tissue and bone particles have to be removed.

Combine the impactor for PE insert 10° with the PE insert of the correct size. The two spikes of the impactor will seat firmly into the holes of the PE insert. Before pressing in the PE insert 10° make sure the overhang is placed in the apropriated position. Please respect that the X-mark of the impactor should line up with the mark of the acetabular cup (Fig. 12).
The overhang optimizes the stability of the joint and reduces the tendency to subluxate. Usually the overhang is inserted in the cranio/posterior direction.

The PE insert 0° is inserted by using the non captured impactor as it is used for inserting the ceramic inserts (see next page).

Please make sure that the PE insert fits with stability thus assuring that the snap mechanism of the PE insert is caught completely by the cup (Fig. 13).

If a removal of the PE insert from the EcoFit® cup is necessary for correction, the polyethylene component has to be lifted up and discarded.
In no case the PE insert may be inserted into the cup a second time. The use of a new PE insert is mandatory.

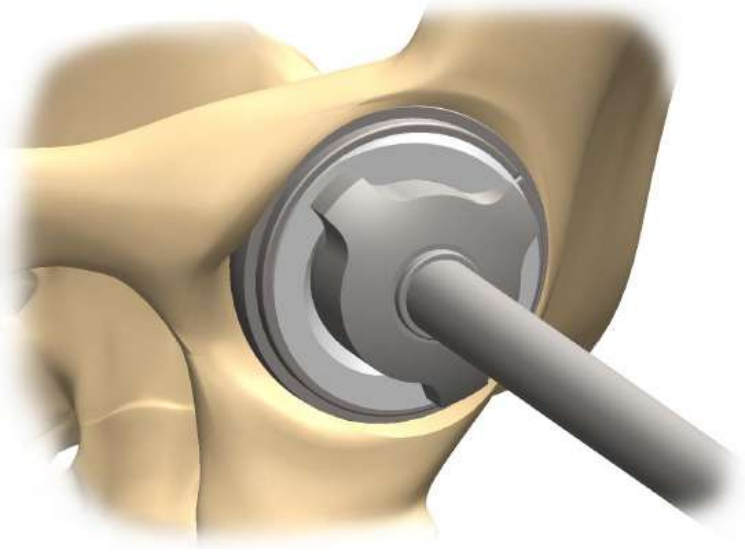


Figure 12

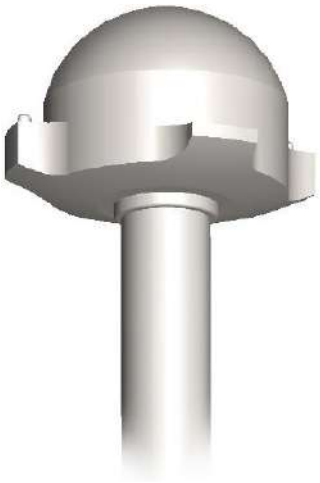


Figure 13

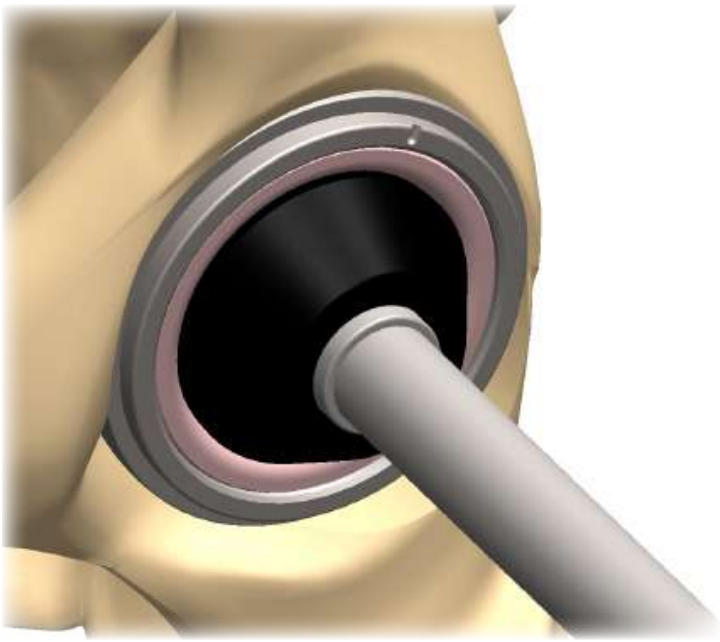


Figure 14

Insertion of the Ceramic-insert

Before final insertion of one of the three insert types into the EcoFit® cup the rim and the inner surface of the cup have to be cleaned thoroughly. Tissue and bone particles have to be removed. The following pictures are explaining the technique showing the BIOLOX® delta insert.

After a positioner for ceramic of the appropriated diameter had been mounted to the universal impactor, the insert is inserted into the cup (fig. 14).

The insert is conically locked into the EcoFit® cup (Fig. 15a). If a ceramic insert has to be removed in case of revision, only a PE insert may be inserted in the residual cup implant afterwards.

Make sure that the insert is fully seated (fig. 15b) before final reduction of the joint is performed (Fig. 16).

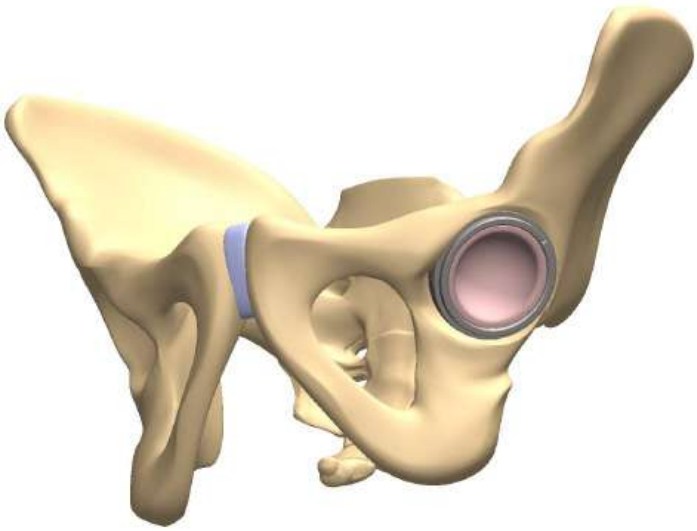


Figure 15a

Figure 15b

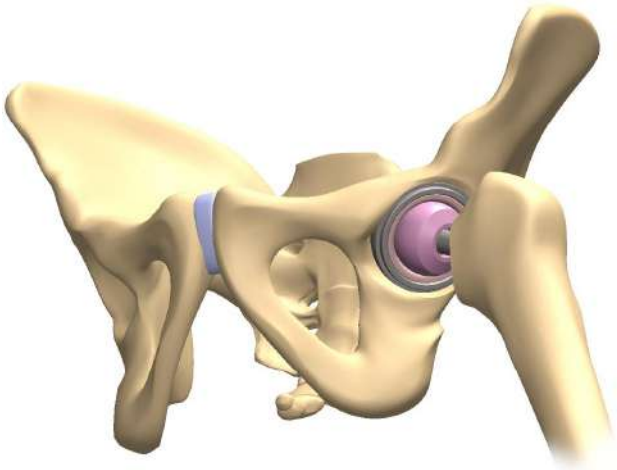


Figure 16

Application of screws

The stability of the primary fixation of the cup can be enhanced by the use of additional cancellous bone screws.

The screw holes are covered, so please remove the plug of the desirable screw hole or holes (Fig. 17a). Therefore use the special plug remover. Attach the tip of the remover to the plug. The clamps should be inserted into the plug (Fig. 17b) and then turned a little bit until a stable connection is reached.

Please unlock the plug by a slightly bending of the remover (Fig. 17c). The plug is captured by the tip of the remover and it can be pulled out (Fig. 18).

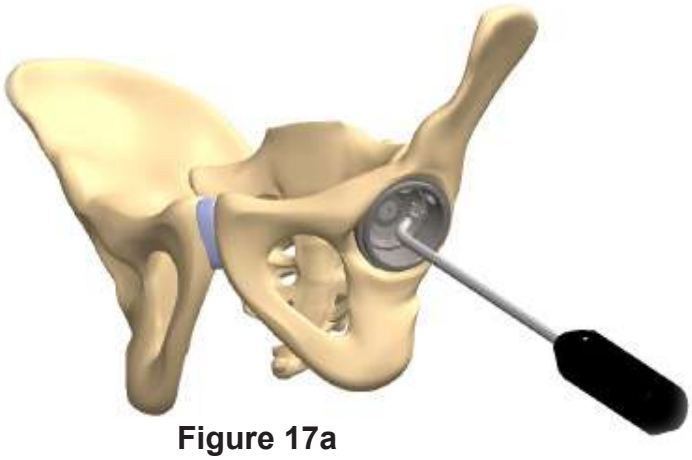


Figure 17a

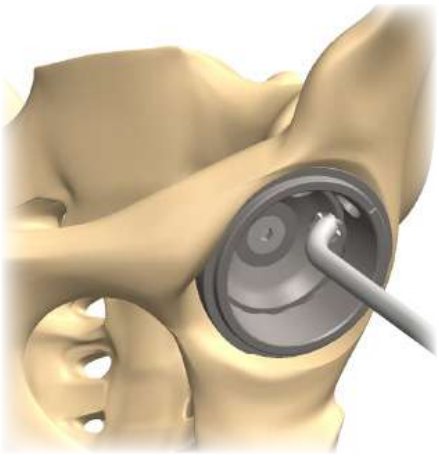


Figure 17c

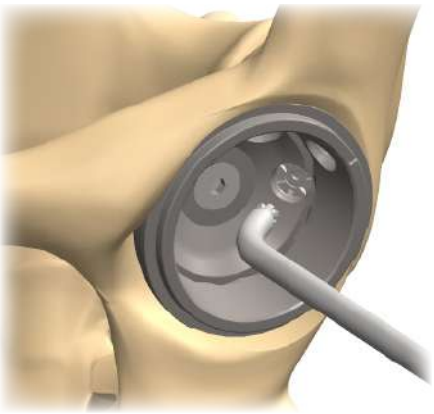
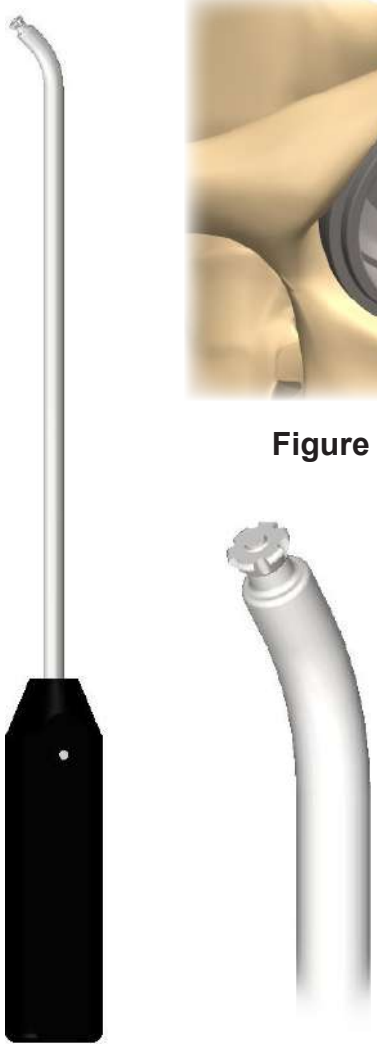


Figure 17b



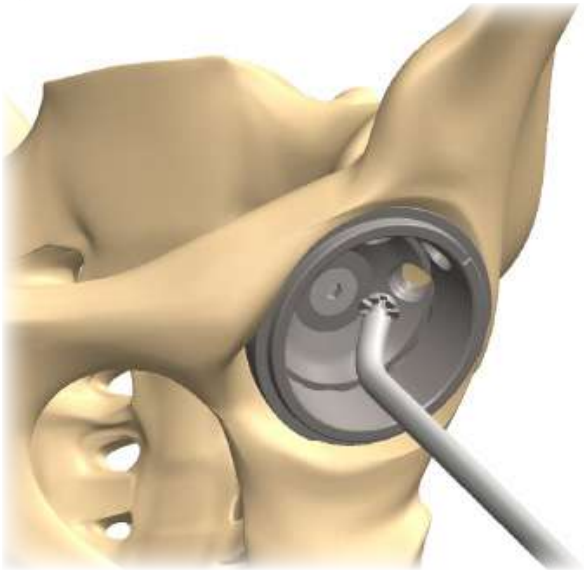


Figure 18

Application of screws

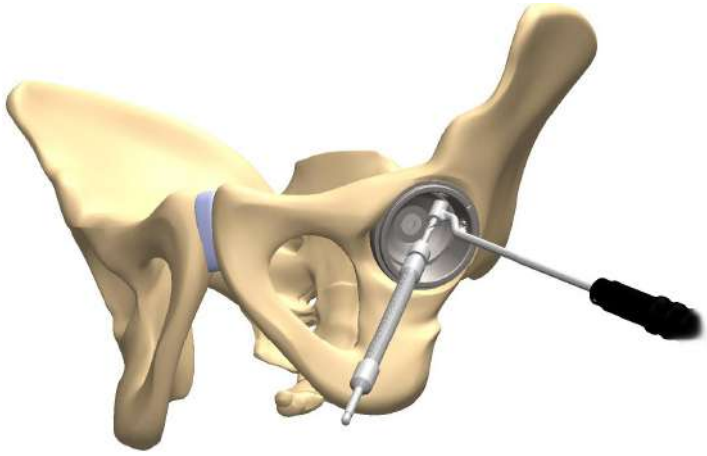
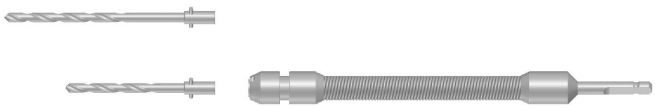


Figure 19

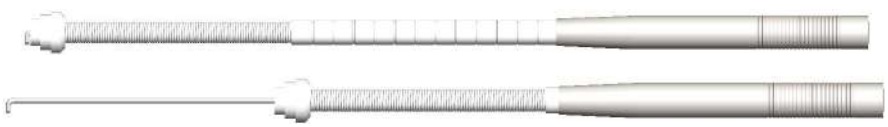
When you position the holes, please consider that the most suitable bone for screw fixation is situated in the cranio/posterior parts of the acetabulum, whereas a screw fixation in the os ischii or os pubis leads to an unsatisfactory fit of the screws. In case of inserting the cancellous bone screws in direction to the foramen ischiadicum, you may guard against an injury of the N. ischiadicus by an exact palpation of this part. When positioning the screws and drilling the holes, please act with utmost caution to avoid the penetration of the interior corticalis of the pelvis or the foramen ischiadicum. Please consider the run of the neurovascular structures.



For every chosen hole pilot holes are to be drilled. Because of the risk of artery injuries do not drill directly in anterior or medial direction. Please use the angled drill guide to pre-drill the screw holes. Screws can be angled up to 15 degrees.
Mount a drill bit to the flexible drill shaft and drill through the drill guide (Fig. 19).
Flexible drill shafts are allowed to be loaded with a maximum torque of 0,2Nm at a maximum bending of 45°. Pay attention that the flexible part is bent with a preferably uniform bending radius during application. The application with adjustments of narrow nonuniform or s-curved bendings can reduce the lifetime. The form stability of the flexible drill shaft is given for a torque of up to 0,5Nm.

Figure 20

Before inserting the cancellous bone screws the exact length of the screw is determined by using the special depth gauge. The length has to be determined exactly in order to avoid injuries of the soft tissue in the interior of the pelvis. Please insert the depth gauge and measure the length of the screw (Fig. 20). You can read the correct length from the handle of the depth gauge when the flexible measuring needle is seated correctly.



Application of screws

Please select the screw of the previously determined length. Use the cardan screw driver to lock the screws (Fig. 21).

Make sure that the head of the cancellous bone screw is completely counter-sunk into the hole of the EcoFit® cup to assure the correct positioning of the PE and ceramic insert.

The stability of the implant fit is checked by exercising pressure to the rim of the cup. This stability test must not show any visible motion of the EcoFit® cup. If the primary stability is still uncertain, an additional fixation of the screw or the use of a cemented acetabular component shall be considered.

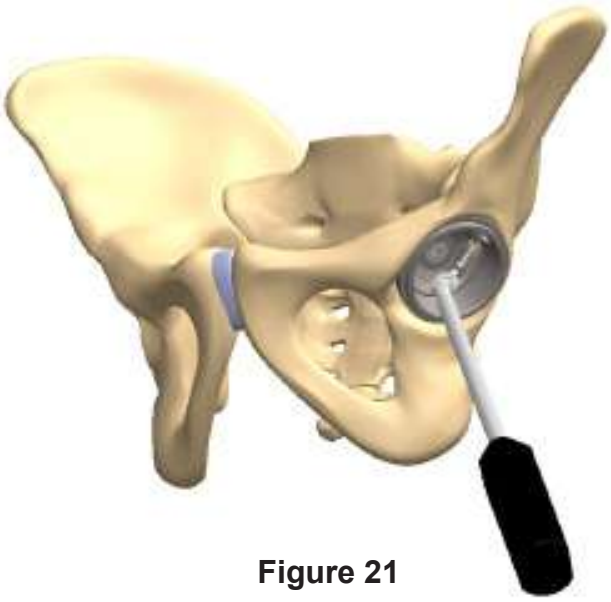


Figure 21

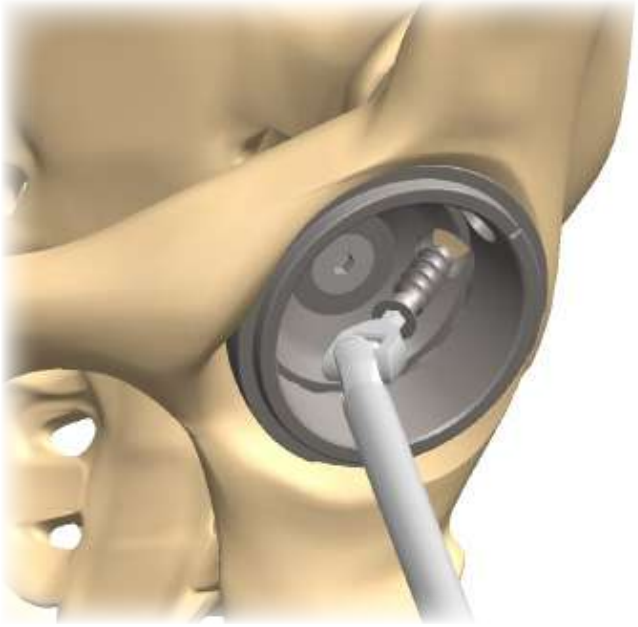


Figure 22

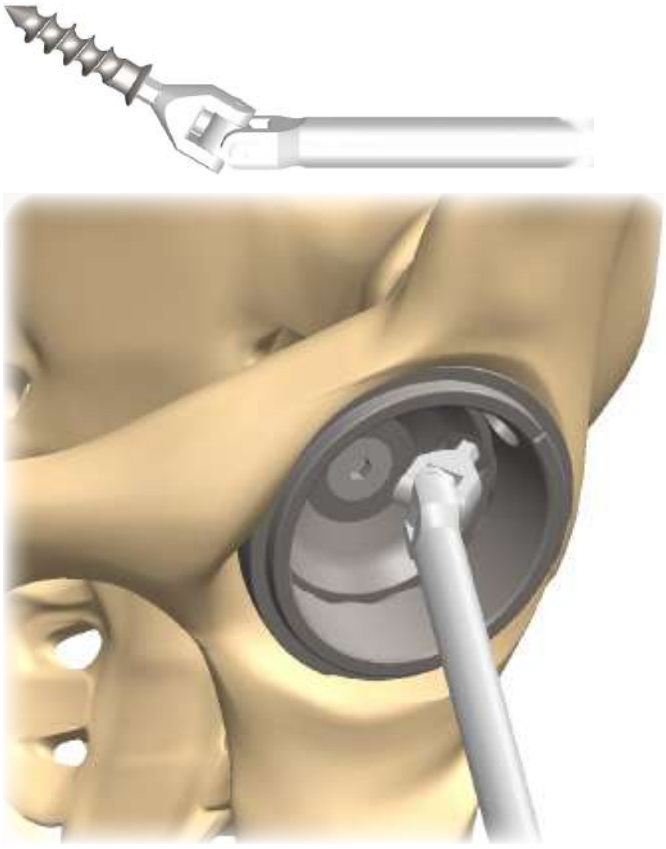


Figure 23

EcoFit® cup
PRODUCT-INFORMATION

IMPLANTS

EcoFit® cup, cementless

implatan®, $TiAl_6V_4$ acc. to ISO 5832-3 with implaFix® cpTi coating

REF standard	size	REF NH-Version
0220-004600	46mm	0220-014600
0220-004800	48mm	0220-014800
0220-005000	50mm	0220-015000
0220-005200	52mm	0220-015200
0220-005400	54mm	0220-015400
0220-005600	56mm	0220-015600
0220-005800	58mm	0220-015800
0220-006000	60mm	0220-016000
0220-006200	62mm	0220-016200
0220-006400	64mm	0220-016400
0220-006600	66mm	0220-016600
0220-006800	68mm	0220-016800

EcoFit® HA cup, cementless

implatan®, $TiAl_6V_4$ acc. to ISO 5832-3 with implaFix® cpTi coating and HA coating acc. to 13779-2

REF standard	size	REF NH-Version
0220-034600	46mm	0220-044600
0220-034800	48mm	0220-044800
0220-035000	50mm	0220-045000
0220-035200	52mm	0220-045200
0220-035400	54mm	0220-045400
0220-035600	56mm	0220-045600
0220-035800	58mm	0220-045800
0220-036000	60mm	0220-046000
0220-036200	62mm	0220-046200
0220-036400	64mm	0220-046400
0220-036600	66mm	0220-046600
0220-036800	68mm	0220-046800

spongiosa screw flat head Ø 6,5mm

implatan®, $TiAl_6V_4$ acc. to ISO 5832-3

REF	length
0280-1015	15mm
0280-1020	20mm
0280-1025	25mm
0280-1030	30mm
0280-1035	35mm
0280-1040	40mm
0280-1045	45mm

The spongiosa screws are included in the shipment till length 50mm. We are providing lengths till 80mm on request.

BIOLOX® delta-cup insert

BIOLOX® delta ceramic Al_2O_3 and ZrO_2
acc. to ISO 6474-2

REF	size
0220-3239	insert 32/39 (46-48mm)
0220-3244	insert 32/44 (50-54mm)
0220-3644	insert 36/44 (50-54mm)
0220-3248	insert 32/48 (56-58mm)
0220-3648	insert 36/48 (56-58mm)
0220-4048*	insert 40/48 (56-58mm)
0220-3252	insert 32/52 (60-68mm)
0220-3652	insert 36/52 (60-68mm)
0220-4052*	insert 40/52 (60-68mm)

*only available on request

PE cup insert 0°

UHMWPE acc. to ISO 5834-2

REF	size
0280-2039	Einsatz 28/39 (46-48mm)
0280-2044	Einsatz 28/44 (50-54mm)
0280-3444	Einsatz 32/44 (50-54mm)
0280-2048	Einsatz 28/48 (56-58mm)
0280-3448	Einsatz 32/48 (56-58mm)
0280-4448	Einsatz 36/48 (56-58mm)
0280-2052	Einsatz 28/52 (60-68mm)
0280-3452	Einsatz 32/52 (60-68mm)
0280-4452	Einsatz 36/52 (60-68mm)

IMPLANTS

PE cup insert 10°

UHMWPE acc. to ISO 5834-2

REF	size
0280-2139	insert 28/39 (46-48mm)
0280-2144	insert 28/44 (50-54mm)
0280-2148	insert 28/48 (56-58mm)
0280-3144	insert 32/44 (50-54mm)
0280-3148	insert 32/48 (56-58mm)
0280-4548	insert 36/48 (56-58mm)
0280-2152	insert 28/52 (60-68mm)
0280-3152	insert 32/52 (60-68mm)
0280-4552	insert 36/52 (60-68mm)

implacross® PE cup insert 0°

crosslinked UHMWPE

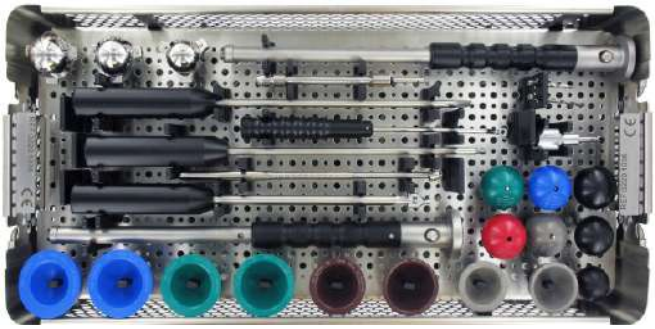
REF	size
0223-2839	insert 28/39 (46-48mm)
0223-3239	insert 32/39 (46-48mm)
0223-3244	insert 32/44 (50-54mm)
0223-3644	insert 36/44 (50-54mm)
0223-3248	insert 32/48 (56-58mm)
0223-3648	insert 36/48 (56-58mm)
0223-3252	insert 32/52 (60-68mm)
0223-3652	insert 36/52 (60-68mm)

implacross® PE cup insert 10°

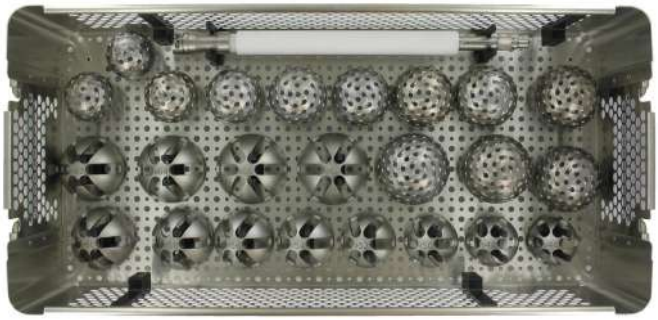
crosslinked UHMWPE

REF	size
0224-2839	insert 28/39 (46-48mm)
0224-3239	insert 32/39 (46-48mm)
0224-3244	insert 32/44 (50-54mm)
0224-3644	insert 36/44 (50-54mm)
0224-3248	insert 32/48 (56-58mm)
0224-3648	insert 36/48 (56-58mm)
0224-3252	insert 32/52 (60-68mm)
0224-3652	insert 36/52 (60-68mm)

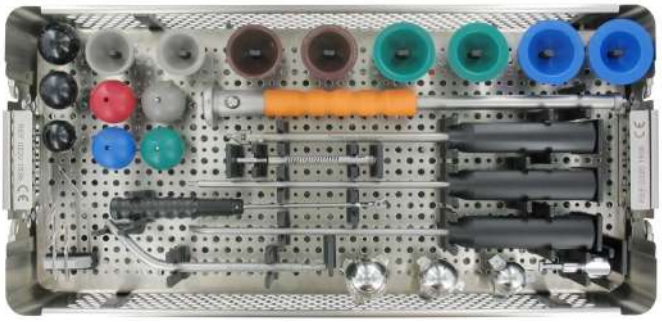
INSTRUMENTS



0220-1036
EcoFit® Cup container 36mm (top)



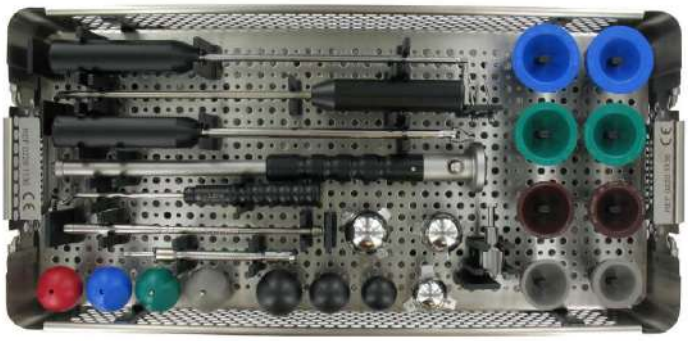
0220-1036
EcoFit® Cup container 36mm (bottom)



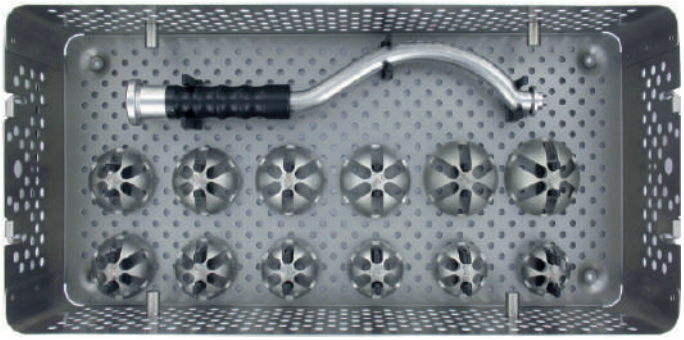
0220-1936
EcoFit® Cup container (top)

0220-1936
EcoFit® Cup container (bottom)

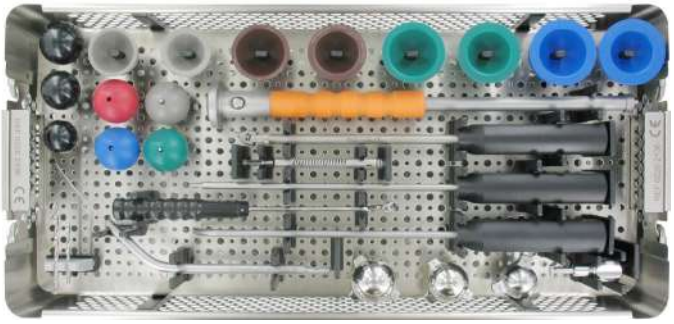
INSTRUMENTS



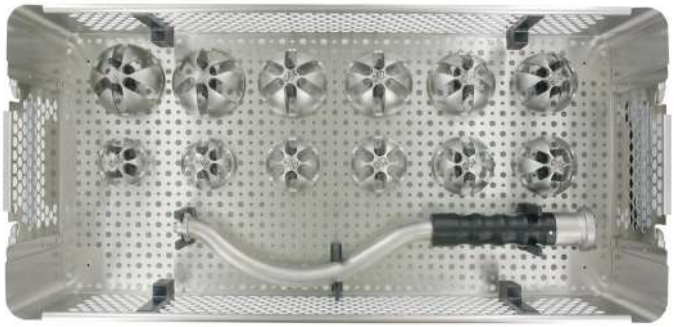
0220-1136
EcoFit® Cup GIS® container 36mm (top)



0220-1136
EcoFit® Cup GIS® container 36mm (bottom)



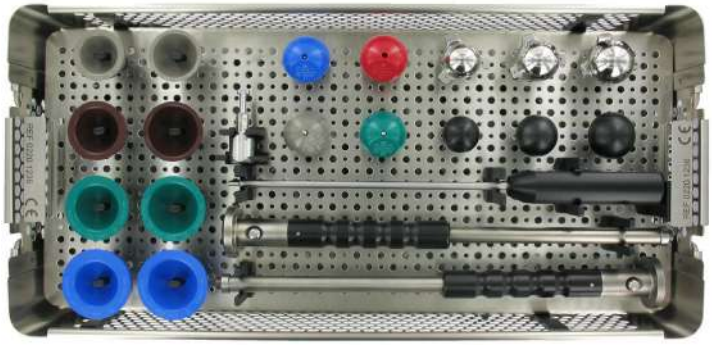
0220-2136
EcoFit® Cup GIS® container (top)



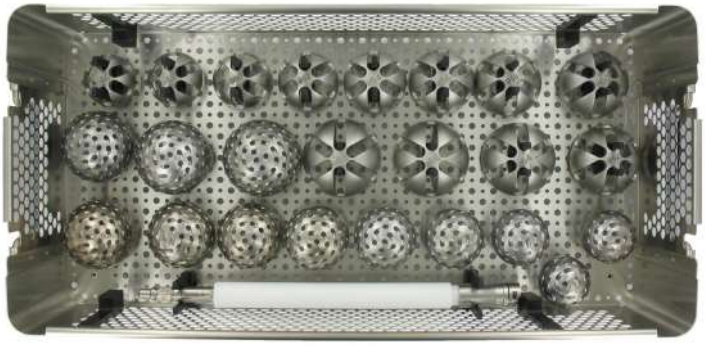
0220-2136
EcoFit® Cup GIS® container (bottom)

NOTE: The containers 0220-1136 and 0220-2136 have always to be delivered with container 7999-0800.

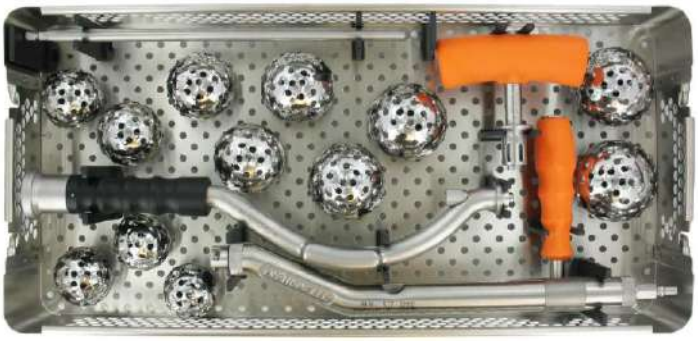
INSTRUMENTS



0220-1236
EcoFit® NH Cup container 36mm (top)



0220-1236
EcoFit® NH Cup container 36mm (bottom)



7999-0800
GIS® acetabulum reamer container with curved cup impactor

0220-0040
Trial container for ceramic insert 40mm
only available on request

CONTAINER 0220-1036/0220-1936/0220-1136/0220-2136/0220-1236

acetabulum reamer low profile
(not in container 02201136 und 02202136)

2950-3046 / 2960-3046	Ø 46mm
2950-3048 / 2960-3048	Ø 48mm
2950-3050 / 2960-3050	Ø 50mm
2950-3052 / 2960-3052	Ø 52mm
2950-3054 / 2960-3054	Ø 54mm
2950-3056 / 2960-3056	Ø 56mm
2950-3058 / 2960-3058	Ø 58mm
2950-3060 / 2960-3060	Ø 60mm
2950-3062 / 2960-3062	Ø 62mm
2950-3064 / 2960-3064	Ø 64mm
2950-3066 / 2960-3066	Ø 66mm
2950-3068 / 2960-3068	Ø 68mm

The acetabulum reamer low profile are available in 1mm steps on request.

trial shell

2950-2346	Ø 46mm
2950-2348	Ø 48mm
2950-2350	Ø 50mm
2950-2352	Ø 52mm
2950-2354	Ø 54mm
2950-2356	Ø 56mm
2950-2358	Ø 58mm
2950-2360	Ø 60mm
2950-2362	Ø 62mm
2950-2364	Ø 64mm
2950-2366	Ø 66mm
2950-2368	Ø 68mm

INSTRUMENTS

handle for acetabulum reamer
(not in container 02201136 und 02202136)
2950-2010

shell impactor
0282-0020 (2x)

shell impactor (optional)
0282-0030 (2x)

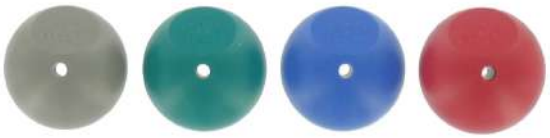
handle curved
(only in container 02201136 and 02202136)
7512-2202

positioner PE Liner 10°

0282-0003	Ø 28mm
0282-0004	Ø 32mm
0282-0036	Ø 36mm

impactor for cup insert

0282-0002	Ø 28mm
0282-0007	Ø 32mm
0282-0009	Ø 36mm



trial head snap taper 12/14

7962-3600 / 7965-3600	36mm, short
7962-3605 / 7965-3605	36mm, medium
7962-3610 / 7965-3610	36mm, long
7962-3615 / 7965-3615	36mm, extra long

trial insert 0°

0225-2839	Ø 28/39mm
0225-3239	Ø 32/39mm
0225-3244	Ø 32/44mm
0225-3248	Ø 32/48mm
0225-3252	Ø 32/52mm
0225-3644	Ø 36/44mm
0225-3648	Ø 36/48mm
0225-3652	Ø 36/52mm

INSTRUMENTS

trial insert extractor
1260-0009

screw driver long 3,5mm
0280-1006

flexible screw driver 3,5mm
(not in container 02201236)
0270-1002

plug remover (not in container 02201236)
0220-1011

angled drill guide 3,2mm
(not in container 02201236)
0282-1001

drill bit 3,2mm (not in container 02201236)

0282-1005	56mm (container 02201036 and 02201136)
0282-1070	70mm (container 02201036 and 02201136)
0282-3240	40mm (container 02201936 and 02202136)
0282-3260	60mm (container 02201936 and 02202136)

flexible drill shaft (not in container 02201236)
0282-1000 (container 02201036 and 02201136)
0282-2110 (container 02201936 and 02202136)

depth gauge
(only in container 02201036 and 02201136)
0282-1007

depth gauge two-piece
(only in container 02201936 and 02202136)
0282-1009

INSTRUMENTS

CONTAINER 7999-0800

cup impactor curved constrained
2950-0606

ic-T-handle Zimmer-Jakobs
4223-0023

ic adapter with hexagon ball 8mm
7512-3608

offset handle for acetabular reamer GIS®
7512-1700

acetabulum reamer solid profile

7512-1746	Ø 46mm
7512-1748	Ø 48mm
7512-1750	Ø 50mm
7512-1752	Ø 52mm
7512-1754	Ø 54mm
7512-1756	Ø 56mm
7512-1758	Ø 58mm
7512-1760	Ø 60mm
7512-1762	Ø 62mm
7512-1764	Ø 64mm
7512-1766	Ø 66mm
7512-1768	Ø 68mm

INSTRUMENTS

CONTAINER 0220-0040

trial head taper 12/14

7965-4000	Ø 40mm S
7965-4005	Ø 40mm M
7965-4010	Ø 40mm L
7965-4015	Ø 40mm XL

trial insert 0°

0225-4048	Ø 40/48mm
0225-4052	Ø 40/52mm

impactor for cup insert

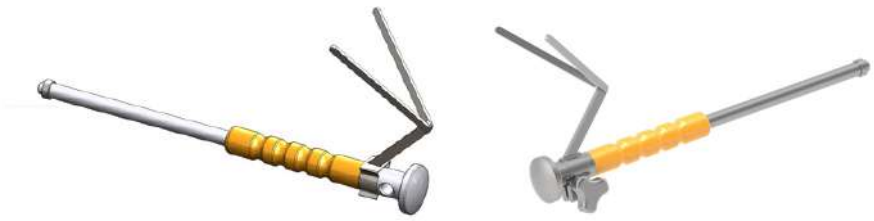
0282-0040	Ø 40mm

Only available on request!

ADDITIONAL SINGLE INSTRUMENT

alignment guide
7512-2203 for curved handle
(current version: with screw)

7512-2204 for straight handle
(current version: with screw)



Only available on request!

NOTES

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