APRIL® System

Surgical technique
APRIL® Acetabular System

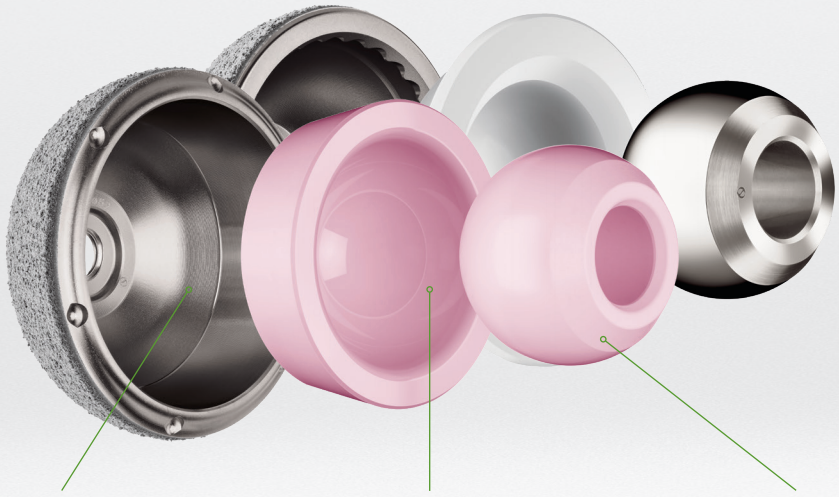
symbios
custom-made for you

INTRODUCTION

The APRIL® System of cementless pressfit cups

Concept

The APRIL® System consists of cementless pressfit metal-back cups, with a primary pressfit fixation, which can be used with ceramic or polyethylene inserts. The APRIL® cup is indicated for primary total hip replacement in patients with sufficient bone quality to ensure the stability of a cementless cup.
The instrumentation of the APRIL® cups is suitable for all surgical approaches and allows the implantation of all Symbios® cups.
Thus, some parts of the surgical technique described in this document are common to other cup systems (SERENITY® and HILOCK).



APRIL® Cup: Ceramic or Poly

Cementless pressfit cup in titanium alloy (Ti6Al4V), coated with porous titanium and hydroxyapatite.

- Gradual equatorial pressfit for increased primary fixation
- Complete system offering all bearings
- Shared external design of the Ceramic and Poly cups
- Choice of the bearing with the final implant
- 3 optional screws to secure the anchorage if needed

BIOLOX® Delta Insert

Truncated ceramic conical insert.

- Cup interior designed to facilitate insertion and avoid insert malposition

or

INLOCK X Insert

Highly-crosslinked polyethylene (INLOCK X) insert. 0° or 10° available.

- Cup interior designed with teeth to ensure long-term stability of the insert and to minimize micro-movements

Head

Femoral head selection:

- Material: stainless steel, cobalt-chrome, BIOLOX® Delta ceramic
- All diameters available depending on the cup size and the head material: Ø22.2, Ø28, Ø32, Ø36, Ø40
- Several offsets available depending on the selected femoral head

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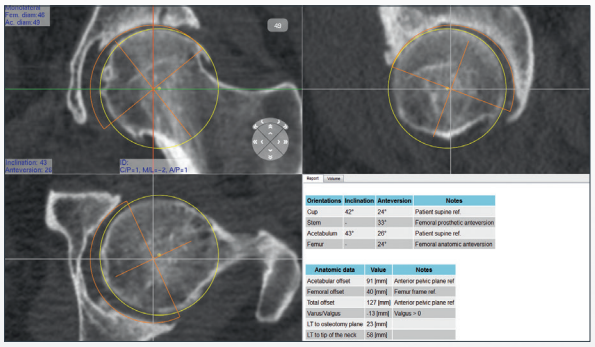
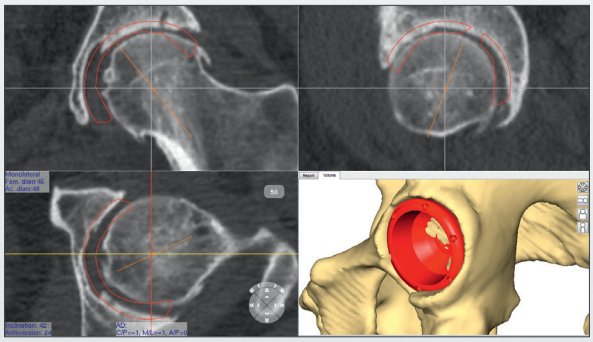
PRE-OPERATIVE PROCESS IN HIP-PLAN®

Analysis of the native acetabular anatomy



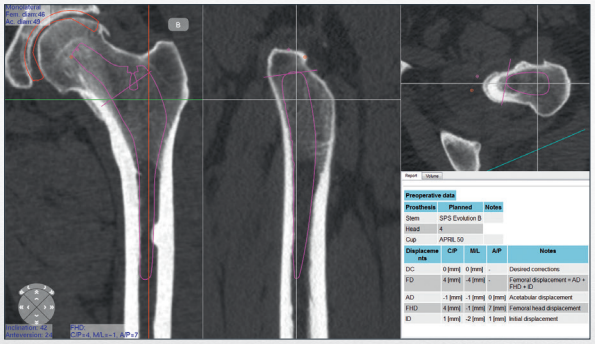
- Load the patient CT-scan in the HIP-PLAN® software.
- Determine the patient's femoral head and acetabular diameter.
- Define the native acetabular anteversion and inclination.

3D cup planning



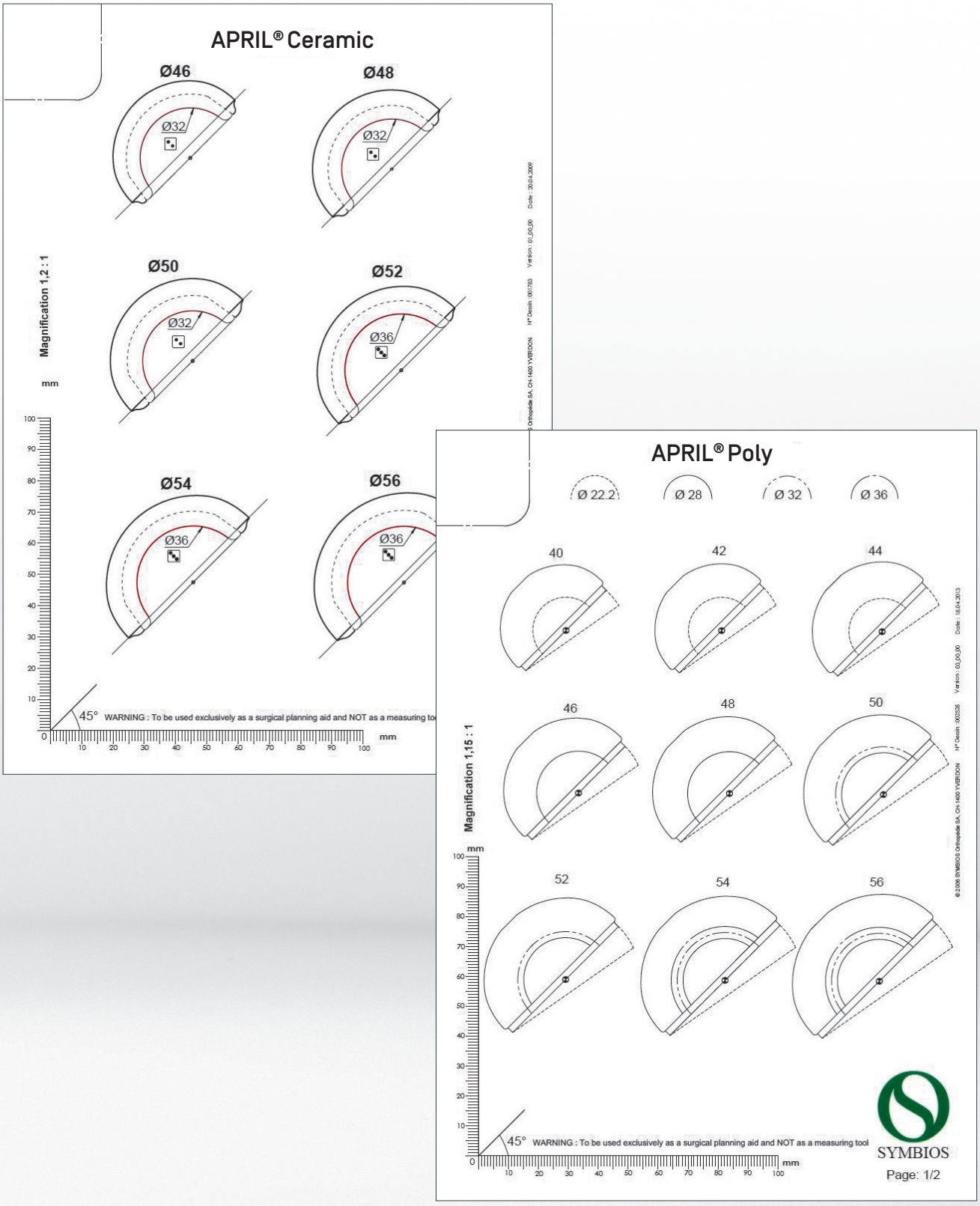
- Precisely determine in 3 dimensions the position of the cup, as well as its size, inclination and anteversion.
- Examine the functional behaviour of the implants using the combination of multi-plan views with the surface view of the pelvis, in order to avoid oversizing which could lead to postoperative conflict with the iliopsoas muscle.

Assessment of the final reconstruction



- Estimate the stability of the reconstructed joint (cup and stem) by assessing the functional outcome of reaming, position and size of the selected implants.
- Generate the planning report file.

PRE-OPERATIVE PLANNING
2D PLANNING WITH TEMPLATE



- Templates of all APRIL® cup sizes are provided with a 15% magnification factor.
- The use of templates on front-calibrated X-rays helps determine the size and orientation of the APRIL® cup.


symbios
7104 4020
2025101

SURGICAL TECHNIQUE

SURGICAL STEPS

In this surgical technique, some of the steps and instruments are common to the surgical technique of the SERENITY® and HILOCK cups.

Surgical technique

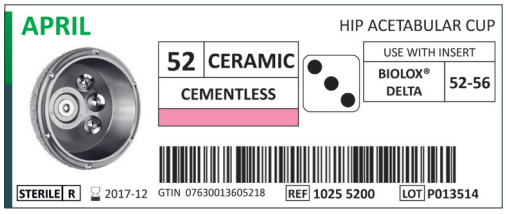
Appendices

STEP 1
MATERIAL PREPARATION

Implants

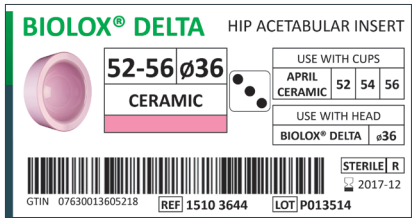
APRIL® Ceramic Cup
from Ø46 to Ø64 mm

X10
SIZES



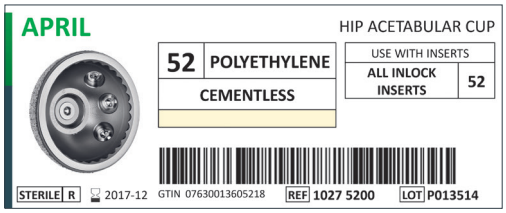
BIOLOX® Delta Insert
from Ø46-50 / Ø32 mm
to Ø58-64 / Ø40 mm

X4
SIZES



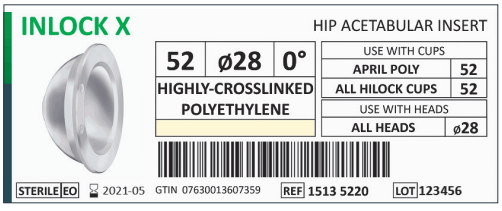
APRIL® Poly Cup
from Ø46 to Ø64 mm

X11
SIZES



INLOCK X Insert
from Ø46 / Ø28 mm
to Ø64 / Ø36 mm

X50
SIZES



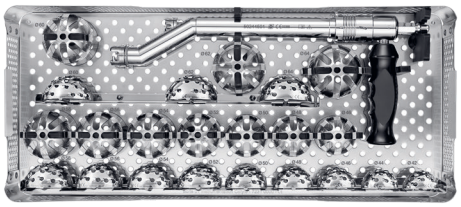
STEP 1
MATERIAL PREPARATION

Instrumentation

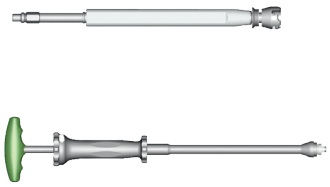
7231 0000 Cup Instrumentation

The Cup Instrumentation set is required for completing acetabular preparation up to the impaction of the APRIL® cup.

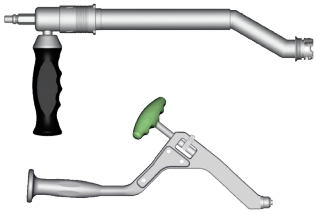
This set enables surgeons to manage all surgical approaches and to implant alternative Symbios® cup options.



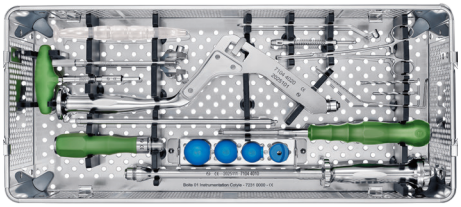
Level 1



Straight instruments



Offset instruments



Level 2

REQUEST FOR SMALL SIZES

APRIL® Ceramic Cup

1025 4000	APRIL® Ceramic Ø40
1025 4200	APRIL® Ceramic Ø42
1025 4400	APRIL® Ceramic Ø44

APRIL® Poly Cup

1027 4000	APRIL® Poly Ø40
1027 4200	APRIL® Poly Ø42
1027 4400	APRIL® Poly Ø44

BIOLOX® Delta Insert

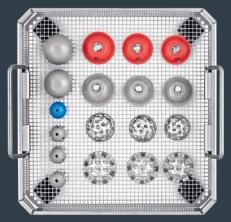
1510 2835	BIOLOX® Delta Insert 40-44 / Ø28 mm

INLOCK X Insert

Cup sizes	Ø22.2 0°	Ø22.2 10°
40	1513 4010	1513 4011
42	1513 4210	1513 4211
44	1513 4410	1513 4411

7310 0000 Small Reamers Instrumentation

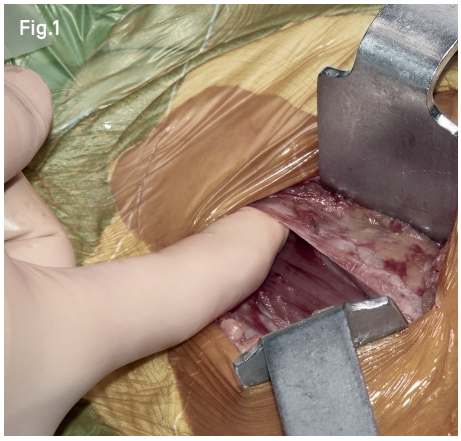
This instrumentation set is required for implanting a previously requested small APRIL® cup (size 40, 42 or 44).
This instrumentation box is delivered with the implants.



STEP 2
EXPOSURE

2.1. Surgical approach

- Determine the surgical approach according to indications and surgical preferences. [Fig.1]



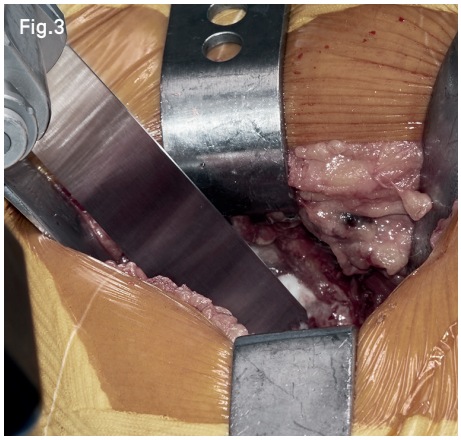
2.2. Opening of the joint capsule

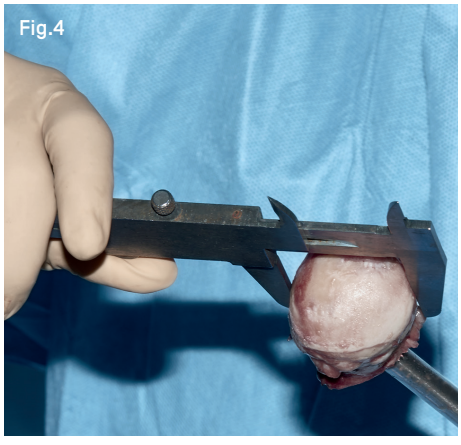
- After opening the joint capsule, remove soft tissue from around the femoral neck. [Fig.2]

2.3. Femoral head resection and extraction

- Carry out a femoral head osteotomy with an oscillating saw referring to the pre-operative plan. [Fig.3]
- Extract the femoral head.
- Measure the diameter of the femoral head to best estimate the size of the cup. [Fig.4]

› **HIP-PLAN® tip:** The height of the resection can be measured and compared to the height indicated in the pre-operative HIP-PLAN® planning report.





STEP 3
ACETABULAR PREPARATION


Fig.5

3.1. Acetabular preparation

- Perform a complete capsulectomy or extract sufficient capsule to enable reaming.
- Carefully expose the entire acetabulum using retractors appropriately positioned for the approach selected.
- Remove all fibrous and cartilaginous tissues as well as osteophytes that may interfere with the acetabular preparation. [Fig.5]

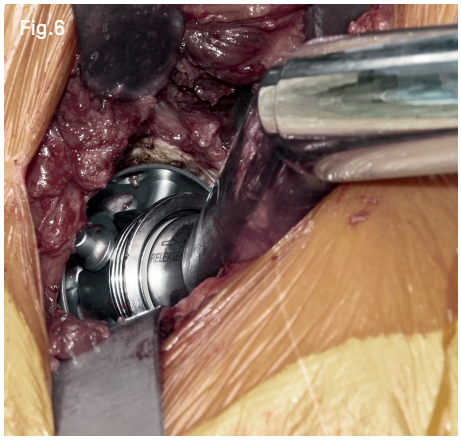


Fig.6

3.2. Reaming

› **Important:** The reamers are extremely sharp. Pre-assess reamer cutting ability.

- Prepare the acetabulum using acetabulum reamers, beginning with the smallest size (42 mm diameter) to find the fossa. [Fig.6]

› **Important:** The recommended inclination for the APRIL® cup is between 40° and 50°, and the recommended anteversion is between 10° and 20°.

- Gradually increase the diameter of the reamer (in 2 mm increments), taking into account the final anteversion and inclination of the cup until solid peripheral support is obtained and the subchondral bone begins to bleed. [Fig.7]

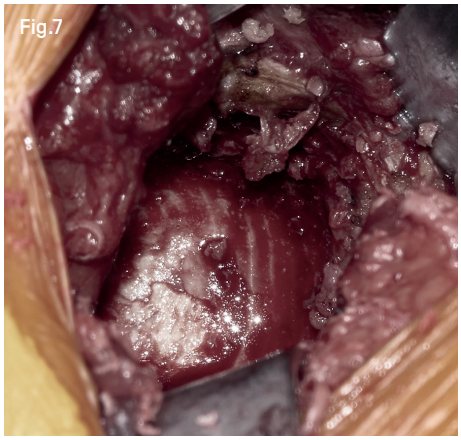


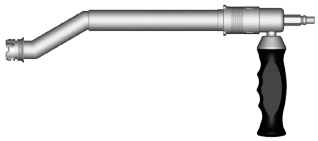
Fig.7

› **HIP-PLAN® tip:** Reaming can begin 2 sizes below the size indicated in the pre-operative HIP-PLAN® planning report.

Instruments ^

Straight reamer-handle
7106 2110

or



Offset reamer-handle
7106 2109

Reamer
7102 54xx

STEP 4
SIZE CONTROL

4.1. Impactor assembly

Straight cup impactor

- Insert the stem into the body of the straight cup impactor. [Fig.8]

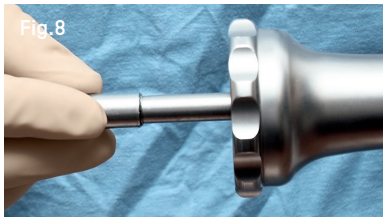


Fig.8

Offset cup impactor

- Insert the cardan (threaded from the tip) into the body of the offset cup impactor. [Fig.9]
- Once the cardan is in place, it is blocked by an anti-slip notch system. If this is not the case, push the cardan with your finger. [Fig.10]

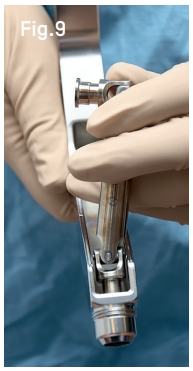


Fig.9

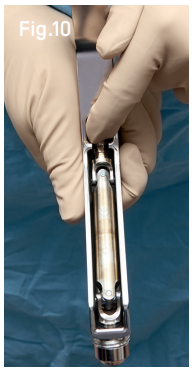


Fig.10

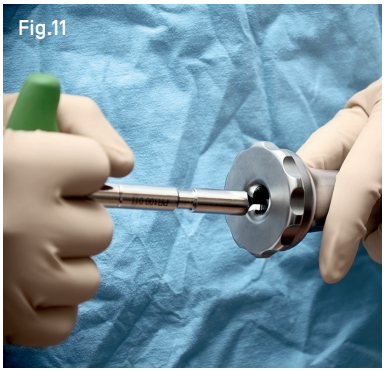


Fig.11

- Insert the T-handle into the cup impactor and twist clockwise until it clicks. This locks the thread in the straight cup impactor [Fig.11] or in the cardan of the offset cup impactor. [Fig.12]

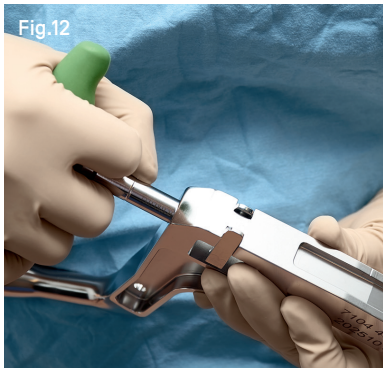


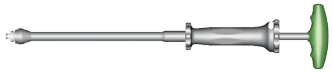
Fig.12

4.2. Trial cup assembly

- Screw the trial cup of the same size as the last reamer used on the impactor. [Fig.13]

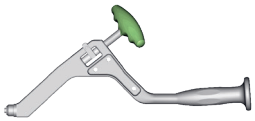
Fig.13

Instruments



Straight cup impactor
7104 4010

or



Offset cup impactor
7104 4020

Trial cup
7103 30xx

STEP 4
SIZE CONTROL

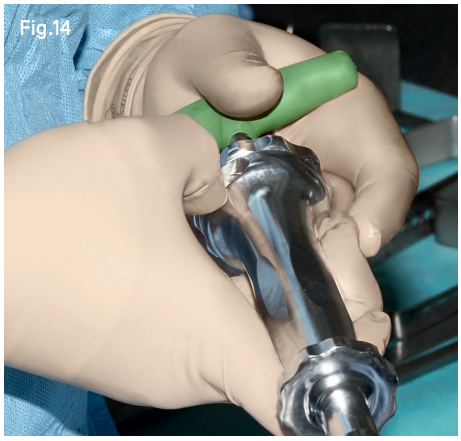


Fig.14


Fig.15

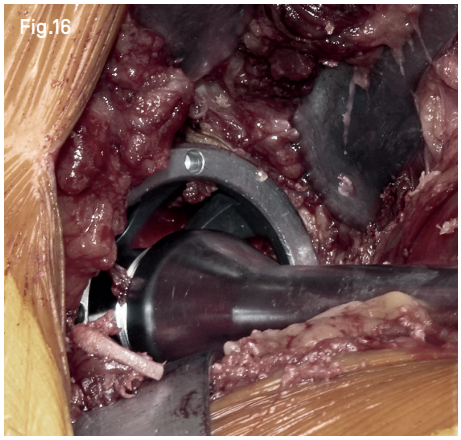


Fig.16

4.3. Positioning the trial cup

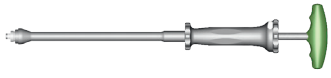
- Release the T-handle by pressing on the shaft button (straight cup impactor) [Fig.14] or simultaneously on both shaft buttons (offset cup impactor). [Fig.15]
- Impact the trial cup into the acetabulum to check the quality of the reaming and to validate the size of the chosen definitive cup. [Fig.16]
- Check for any trial cup overhang which might aggrevate soft tissue and optimal orientation. [Fig.16]

› **Important:** The trial cup is positioned in the acetabulum to check the sphericity of the reamed bone. Pressfit is not assessed with the trial cup.

4.4. Removal of the trial cup

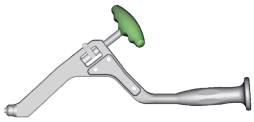
- Remove the trial cup from the acetabulum.
- Unscrew the T-handle to remove the trial cup.

Instruments ^



Straight cup impactor
7104 4010

or



Offset cup impactor
7104 4020

Trial cup
7103 30xx

STEP 5
DEFINITIVE CUP IMPACTION

5.1. Assembly of the cup on the impactor

- Depending on the selected bearing, choose the type of APRIL® cup:
  - APRIL® Ceramic cup
  - APRIL® Poly cup
- Remove the central screw at the bottom of the cup with the straight hex screwdriver bit assembled with the universal handle and keep it.
- Screw the APRIL® cup of the same size as the trial cup used on the impactor for the size control. The 3 holes of the cup have to be oriented towards the roof of the acetabulum. [Fig.17]
- Remove the T-handle by pressing on the shaft button (straight cup impactor) [Fig.14] or simultaneously on both shaft buttons (offset cup impactor). [Fig.15]


Fig.17

5.2. Cup impaction

- Impact the cup with a hammer, carefully orienting the cup in the position defined by the pre-operative planning and during reaming. [Fig.18]

› **Information:** The delimitation of the porous titanium and hydroxyapatite coating indicates the level of the cup pressfit.

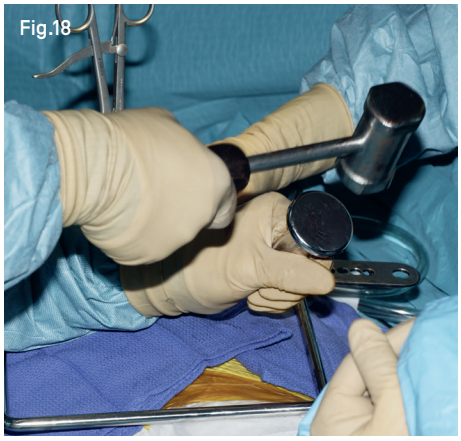


Fig.18

5.3. Removal of the impactor

- Remove the impactor from the cup by unscrewing the T-handle.
- Use the cardan-shaft hex screwdriver bit with the universal handle to insert the central screw that was previously removed, at the bottom of the cup, where the impactor was screwed. [Fig.19]

› **Important:** Carefully clean the cup to prevent any interposition between the cup and the insert.

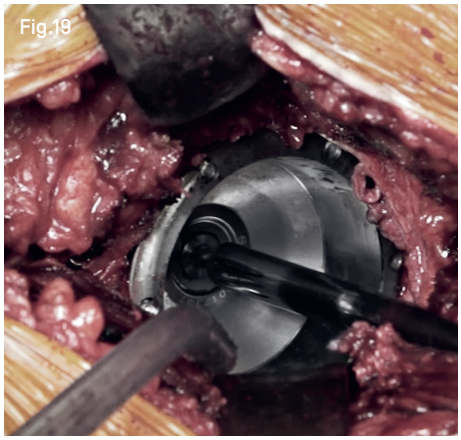
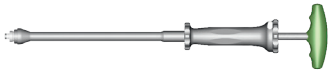


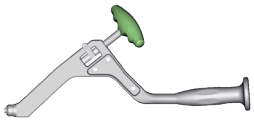
Fig.19

Instruments ^



Straight cup impactor
7104 4010

or



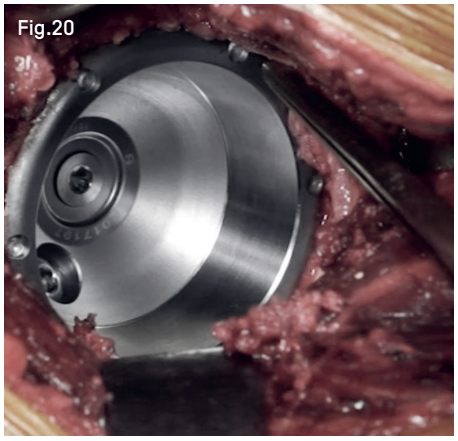
Offset cup impactor
7104 4020

Straight hex screwdriver bit
7104 6001
Cardan-shaft hex screwdriver bit
7104 6002

Universal handle
7105 5000

STEP 5
DEFINITIVE CUP IMPACTION

Fig.20

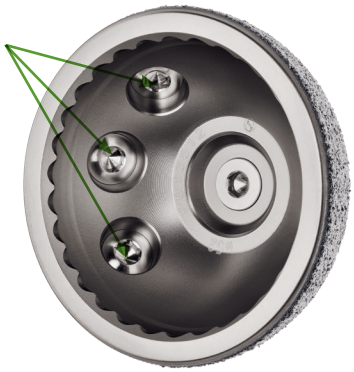


5.4. Control of the cup position

- Check the position of the cup in relation to the pre-operative planning and stability tests. [Fig.20]
- Secure the cup with screws in case of instability.

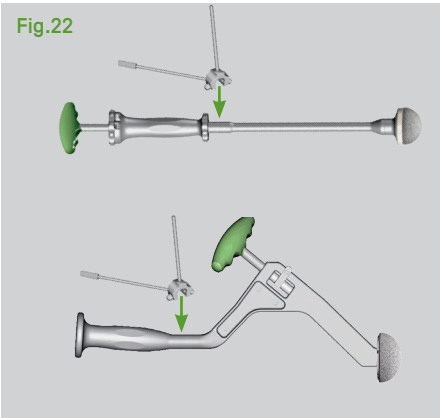
OPTIONAL: SCREW FIXATION

Fig.21



- Select the holes where the cup is to be anchored. [Fig.21]
- The Ø3.2 mm drill bit of 40 mm, held by the flexible shaft, is controlled by the drill guide as it passes through the selected holes into the acetabulum. If a longer screw is needed, use the Ø3.2 mm drill bit of 60 mm.
- Use the measurer to determine the length of the screw.
- Use the screw holder to insert the selected spongious bone screw in the hole and screw with a screwdriver bit assembled with the universal handle.

Fig.22



OPTIONAL: CUP POSITIONER

- Place the cup referencing guide on the cup impactor shaft, just below the handle. [Fig.22]
- Screw onto the shaft to fasten the guide.

Instruments

Flexible shaft
7104 6010

Drill bit Ø3.2 mm x 40 mm
7102 4001
Drill bit Ø3.2 mm x 60 mm
7102 4002

Drill guide Ø3.2mm
7105 1006

Measurer
7105 3001

Screw holder
7104 7004

Cup positioner
7105 2016

STEP 6
INSERT IMPACTION

6.1. Insertion of the insert in the cup

- Following the impaction of the final cup, the trial inserts can be placed in the cup to confirm the size of the insert, evaluate joint stability, and range of motion. Please ask your sales representative before the operation for the Trial liners instrumentation (7107 0000, 7108 0000, 7109 0000, 7101 0000).
- APRIL® Ceramic: Insert the ceramic insert using the suction cup. [Fig.23]
- APRIL® Poly: Insert the INLOCK X insert by hand.

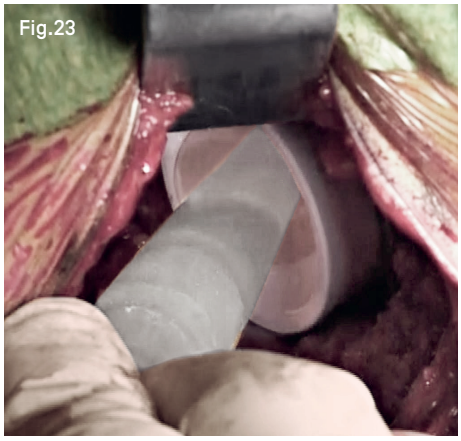


Fig.23

6.2. Impaction of the insert

- Use the insert impaction end-cap corresponding to the selected head compatible with the insert, assembled with the screwable impactor, to impact the insert in the cup. [Fig.24]

› **Important:** Impact the insert on-axis into the cup to avoid insert malposition.

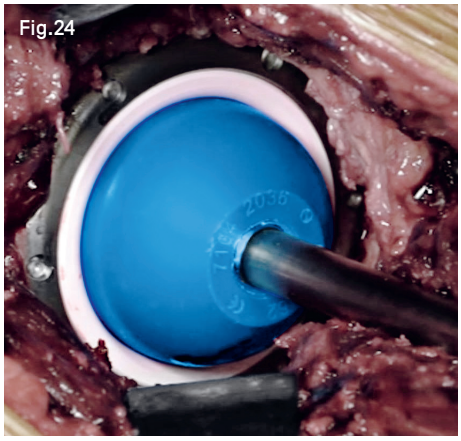


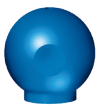
Fig.24

Prepare the femur by referring both to the stem-specific surgical technique and to the pre-operative planning if available.

Instruments ^

Suction cup for Ceramic Insert
7104 4002

Screwable impactor
7004 1000



Insert impaction end-cap Ø28
7104 2028
Insert impaction end-cap Ø32
7104 2032
Insert impaction end-cap Ø36
7104 2036

STEP 7
TRIAL REDUCTION

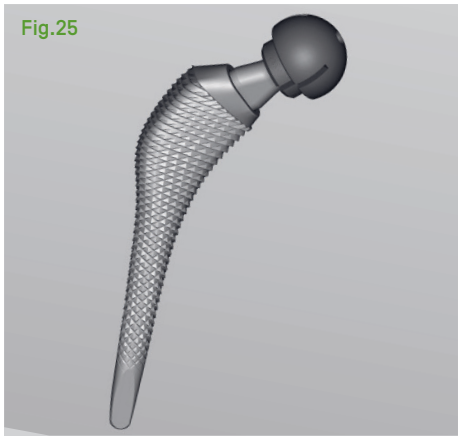


Fig.25

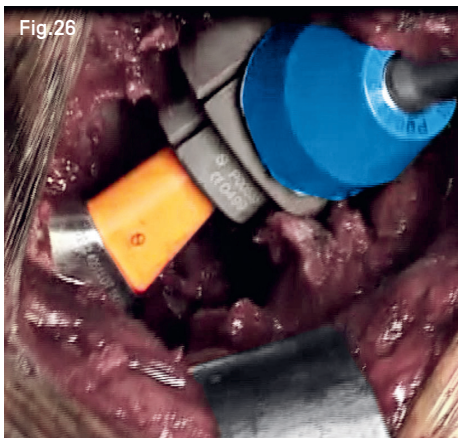


Fig.26

7.1. Performing the trial reduction

- Once the femoral preparation is completed and the stem size is determined, trials can be carried out on the rasp with a trial neck or directly onto the definitive stem.
- Insert the trial head with the selected offset on the neck of the stem or on the trial neck of the rasp. [Fig.25]
- Engage the trial insert onto the trial head.
- Using the insert impaction end-cap assembled with the screwable impactor, perform the reduction of the trial head in the insert/trial insert. [Fig.26]
- Perform functional tests to control the mobility and stability of the joint and change the trial head offset if necessary.

7.2. Extraction of trial implants

- Dislocate the hip joint to disassemble the trial head and the insert/trial insert.
- Remove all trial implants.

STEP 8
FINAL REDUCTION

8.1. Head impaction

- Clean and dry the neck of the stem.
- According to the reduction trials, select the appropriate head and place it onto the neck.
- Impact the head on the stem by using the head impaction end-cap. [Fig.27]

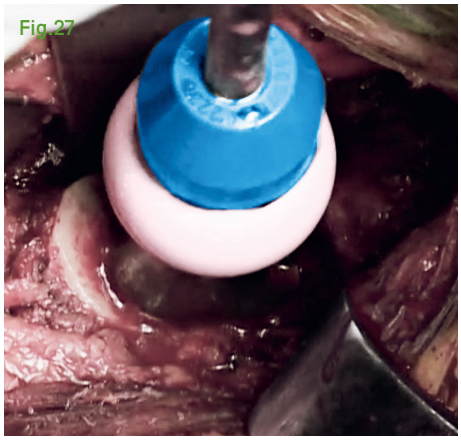


Fig.27

8.2. Final reduction

- Perform the final reduction of the implant with the head impaction end-cap. [Fig.28]
- Conduct joint function and stability tests with all definitive implants.

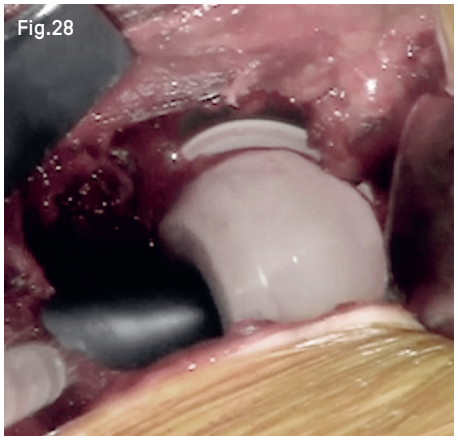


Fig.28

8.3. Closure

- Close the joint and the wound following standard procedure. [Fig.29]

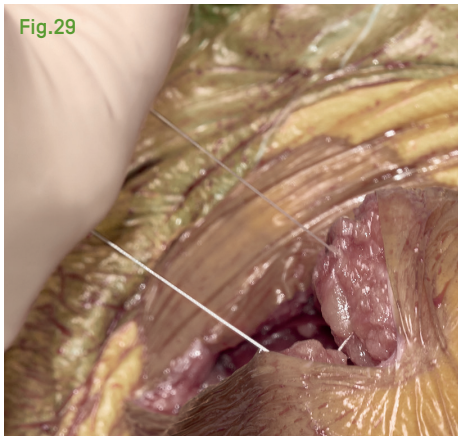


Fig.29

APPENDICES

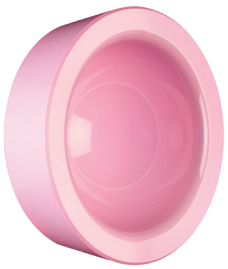
APPENDIX 1
IMPLANT REFERENCES

APRIL® Ceramic
Cementless pressfit acetabular cup
Titanium alloy (Ti6Al4V-ISO 5832-3)
Coatings: Porous titanium and hydroxyapatite

Sizes	Ref.	Compatible inserts	Compatible heads			
			Ø28	**Ø32**	**Ø36**	**Ø40***
40*	1025 4000*	40-44	●			
42*	1025 4200*					
44*	1025 4400*					
46	1025 4600	46-50		●		
48	1025 4800					
50	1025 5000					
52	1025 5200	52-56			●	
54	1025 5400					
56	1025 5600					
58	1025 5800	58-64			●	●
60	1025 6000					
62	1025 6200					
64	1025 6400					

*Only available upon request

Compatibility
The APRIL® Ceramic acetabular cups are compatible only with BIOLOX® Delta ceramic inserts sold by Symbios.



BIOLOX® Delta Insert
Truncated conical insert
Ceramic (Al2O3 + ZrO2-ISO 6474-2)

Sizes	Ref.	Compatible heads			
		Ø28	**Ø32**	**Ø36**	**Ø40***
40-44/Ø28	1510 2835	●			
46-50/Ø32	1510 3239		●		
52-56/Ø36	1510 3644			●	
58-64/Ø36	1510 3648			●	
58-64/Ø40*	1510 4048*				●

*Only available upon request

APPENDIX 1
IMPLANT REFERENCES

APRIL® Poly
Cementless pressfit acetabular cup
Titanium alloy (Ti6Al4V-ISO 5832-3)
Coatings: Porous titanium and hydroxyapatite

Sizes	Ref.	Compatible heads			
		Ø22.2	**Ø28**	**Ø32**	**Ø36**
40*	1027 4000*	•			
42*	1027 4200*	•			
44*	1027 4400*	•			
46	1027 4600		•		
48	1027 4800		•		
50	1027 5000		•	•	
52	1027 5200		•	•	
52 EXT	1027 5201				•
54	1027 5400		•	•	•
56	1027 5600		•	•	•
58	1027 5800		•	•	•
60	1027 6000		•	•	•
62	1027 6200		•	•	•
64	1027 6400		•	•	•

*Only available upon request

Spongious Bone Screw
Spongious bone screws
Titanium alloy (Ti6Al4V-ISO 5832-3)
Screw diameter Ø6.5 mm

Sizes	Ref.	Length
L 15	8001 6515	15 mm
L 20	8001 6520	20 mm
L 25	8001 6525	25 mm
L 30	8001 6530	30 mm
L 35	8001 6535	35 mm
L 40	8001 6540	40 mm
L 45	8001 6545	45 mm
L 50	8001 6550	50 mm
L 55	8001 6555	55 mm
L 60	8001 6560	60 mm

APPENDIX 1
IMPLANT REFERENCES

INLOCK X
Insert
Highly-crosslinked polyethylene
(Chirulen® 1020 X-ASTM F2565)

Cup sizes	**Ø22.2 0°**	**Ø22.2 10°**	**Ø28 0°**	**Ø28 10°**	**Ø32 0°**	**Ø32 10°**	**Ø36 0°**	**Ø36 10°**
40*	1513 4010*	1513 4011*	-	-	-	-	-	-
42*	1513 4210*	1513 4211*	-	-	-	-	-	-
44*	1513 4410*	1513 4411*	-	-	-	-	-	-
46	-	-	1513 4620	1513 4621	-	-	-	-
48	-	-	1513 4820	1513 4821	-	-	-	-
50	-	-	1513 5020	1513 5021	1513 5030	1513 5031	-	-
52	-	-	1513 5220	1513 5221	1513 5230	1513 5231	-	-
52 EXT	-	-	-	-	-	-	1513 5240	1513 5241
54	-	-	1513 5420	1513 5421	1513 5430	1513 5431	1513 5440	1513 5441
56	-	-	1513 5620	1513 5621	1513 5630	1513 5631	1513 5640	1513 5641
58	-	-	1513 5820	1513 5821	1513 5830	1513 5831	1513 5840	1513 5841
60	-	-	1513 6020	1513 6021	1513 6030	1513 6031	1513 6040	1513 6041
62	-	-	1513 6220	1513 6221	1513 6230	1513 6231	1513 6240	1513 6241
64	-	-	1513 6420	1513 6421	1513 6430	1513 6431	1513 6440	1513 6441

*Only available upon request

Compatibility
The INLOCK X inserts are compatible with all HILOCK cups and the APRIL® Poly cup.

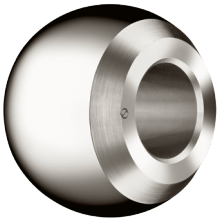
APPENDIX 1
IMPLANT REFERENCES

BIOLOX® Delta Head
Ceramic head (Al2O3 + ZrO2-ISO 6474-2), compatible with 12/14 5°40' taper

Sizes — Offset in mm

	-4	-3.5	+0	+3.5	+4	+7	+8
Ø28	-	2014 2801	2014 2802	2014 2803	-	-	-
Ø32	2014 3201	-	2014 3202	-	2014 3203	2014 3204	-
Ø36	2014 3601	-	2014 3602	-	2014 3603	-	2014 3604
Ø40*	2014 4001*	-	2014 4002*	-	2014 4003*	-	2014 4004*

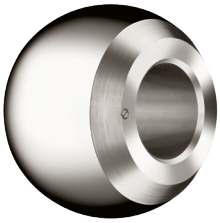
*Only available upon request



Cobalt-Chrome Head
Cobalt-Chrome head (CoCrMo-ISO 5832-12), compatible with 12/14 5°40' taper

Sizes — Offset in mm

	-4	-3.5	-2	+0	+3.5	+4	+7	+8
Ø22.2	-	-	2010 2201	2010 2202	-	2010 2204	-	-
Ø28	-	2010 2801	-	2010 2802	2010 2803	-	2010 2804	-
Ø32	2010 3201	-	-	2010 3202	-	2010 3203	-	2010 3204
Ø36	2010 3601	-	-	2010 3602	-	2010 3603	-	2010 3604



Stainless Steel Head
Stainless steel head (ISO 5832-9), compatible with 12/14 5°40' taper

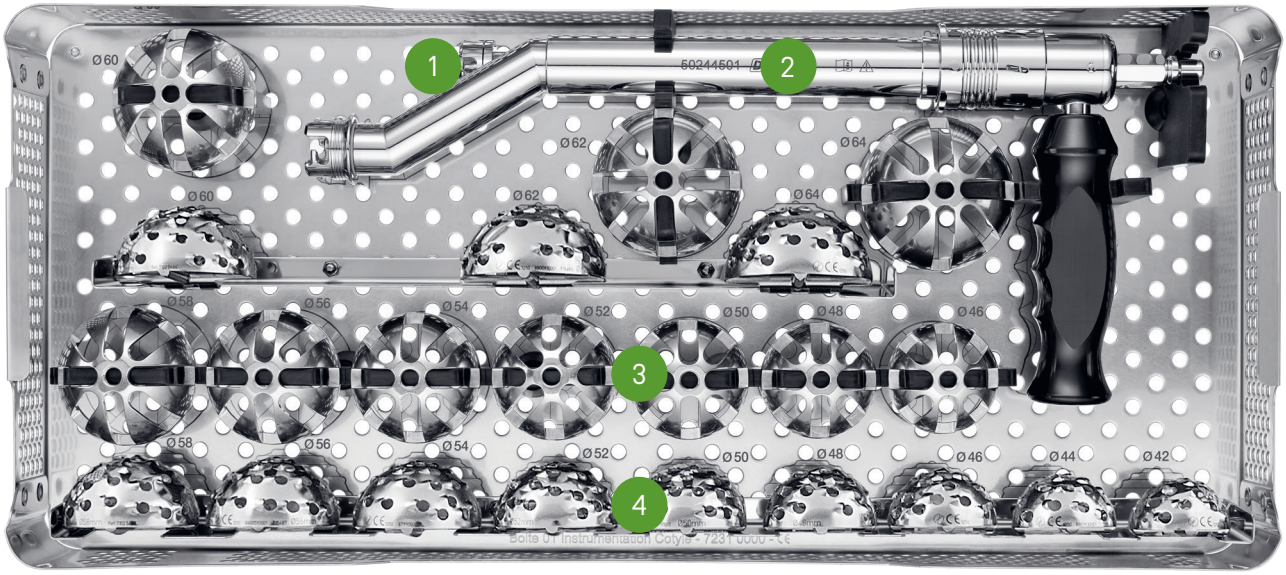
Sizes — Offset in mm

	-4	-3.5	+0	+3.5	+4	+7	+8
Ø28	-	2011 2801	2011 2802	2011 2803	-	2011 2804	-
Ø32	2011 3201	-	2011 3202	-	2011 3203	-	2011 3204

APPENDIX 2
INSTRUMENT REFERENCES

Cup Instrumentation

REF 7231 0000



Level 1

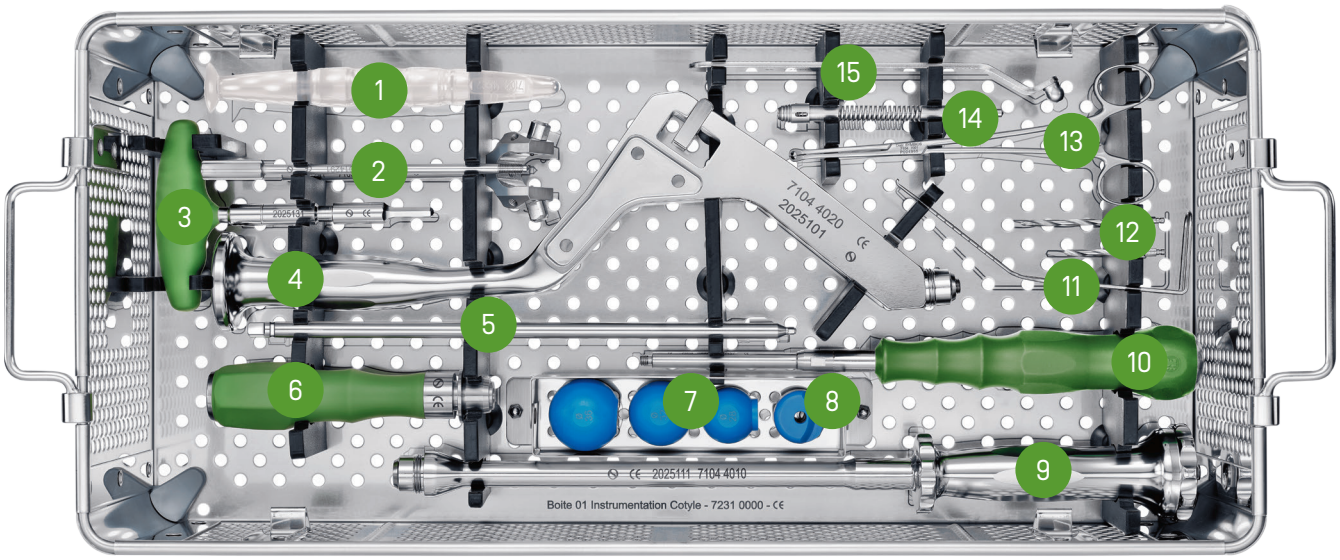
	Description	Reference	Quantity
1	Straight reamer-handle	7106 2110	1
2	Offset reamer-handle	7106 2109	1
3	Trial cup Ø46	7103 3046	1
	Trial cup Ø48	7103 3048	1
	Trial cup Ø50	7103 3050	1
	Trial cup Ø52	7103 3052	1
	Trial cup Ø54	7103 3054	1
	Trial cup Ø56	7103 3056	1
	Trial cup Ø58	7103 3058	1
	Trial cup Ø60	7103 3060	1
	Trial cup Ø62	7103 3062	1
	Trial cup Ø64	7103 3064	1

	Description	Reference	Quantity
4	Reamer Ø42	7102 5442	1
	Reamer Ø44	7102 5444	1
	Reamer Ø46	7102 5446	1
	Reamer Ø48	7102 5448	1
	Reamer Ø50	7102 5450	1
	Reamer Ø52	7102 5452	1
	Reamer Ø54	7102 5454	1
	Reamer Ø56	7102 5456	1
	Reamer Ø58	7102 5458	1
	Reamer Ø60	7102 5460	1
	Reamer Ø62	7102 5462	1
	Reamer Ø64	7102 5464	1

APPENDIX 2
INSTRUMENT REFERENCES

Cup Instrumentation

REF 7231 0000



Level 2

	Description	Reference	Quantity
1	Suction cup for Ceramic Insert	7104 4002	1
2	Cup positioner	7105 2016	1
3	T handle	PR100 011	1
4	Offset cup impactor	7104 4020	1
5	Cardan-shaft hex screwdriver bit	7104 6002	1
	Straight hex screwdriver bit	7104 6001	1
6	Universal handle	7105 5000	1
7	Insert impaction end-cap Ø28	7104 2028	1
	Insert impaction end-cap Ø32	7104 2032	1
	Insert impaction end-cap Ø36	7104 2036	1
8	Repositioner end-cap	7105 2020	1
9	Straight cup impactor	7104 4010	1
10	Screwable impactor	7004 1000	1
11	Measurer	7105 3001	1
12	Drill bit Ø3.2 mm x 40 mm	7102 4001	2
	Drill bit Ø3.2 mm x 60 mm	7102 4002	2
13	Screw holder	7104 7004	1
14	Flexible shaft	7104 6010	2
15	Drill guide Ø3.2 mm	7105 1006	1

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