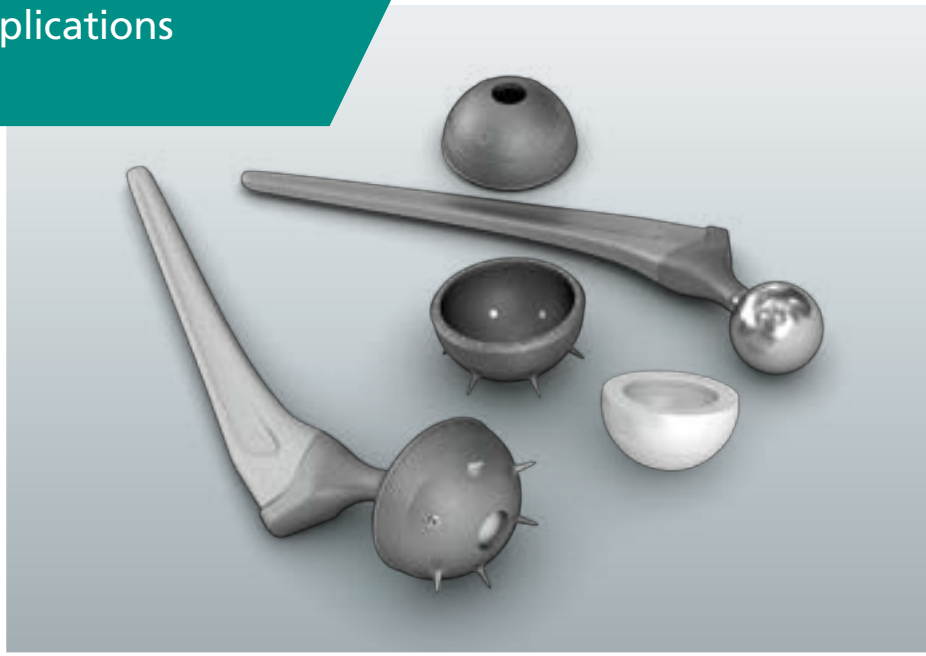
Business

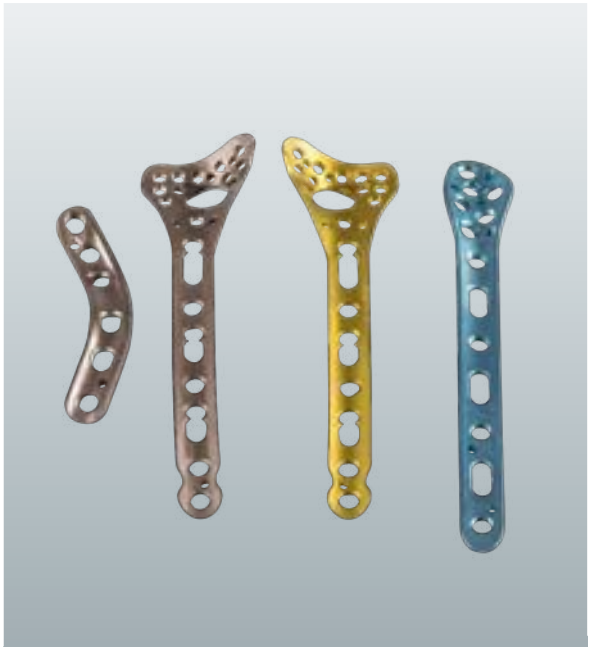
Brütsch·Rüegger Tools

Production Technology – Solutions for the medical Industry

Components, materials and applications

Tools. Next Level.





FUTURO performance loves perfection · SANDVIK Coromant · APPLITEC SWISS TOOLING · DIXI polytool · magafor · DC THREADING TECHNOLOGY · ISCAR

WALTER · VARDEX Advanced Threading Solutions · BECK MAPAL GROUP · EMUGE FRANKEN · GUHRING · sylvac · BAM · IFANGER

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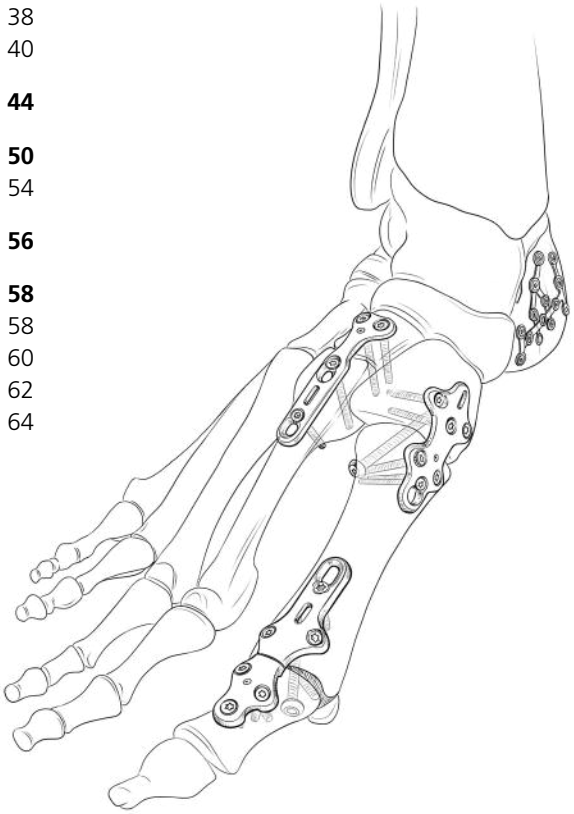


Materials and applications

Surface requirements
The assessment of surface quality predominantly depend on the type of product.

– **Implants** are often not polished at all; on the contrary, they are roughened to allow the implant to "merge" better with the body substance.
– For **surgical instruments**, the aim is to achieve the highest polished surface quality possible. This is important to minimise bacterial adhesion.

Materials determine the selection of the tool
Material selection is focussed on the required **thermal, chemical and mechanical properties of the materials**, the processability of the surfaces and the ability to sterilise them using conventional methods. Furthermore, enormous corrosion resistance and biocompatibility are also frequently demanded.

Titanium alloys, ceramics or fibre-reinforced plastics are frequently used. These materials usually pose a challenge for cutting tools because, in line with the requirements of medical technology, the very alloy components that would simplify the cutting process, such as sulphur and phosphorus, must not be present or only in very small percentages.

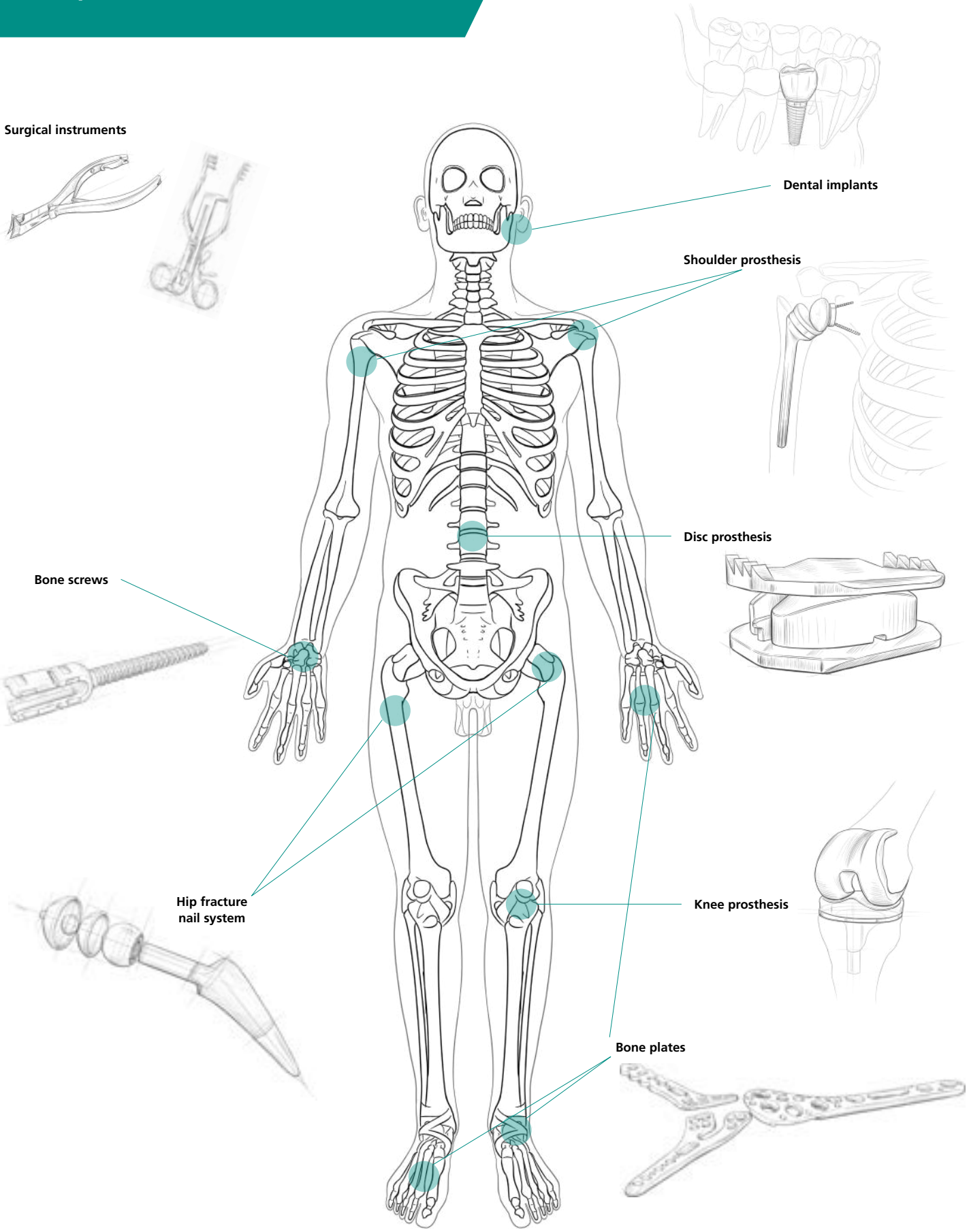
In addition, the **surfaces of the medical technology tools** must be specially treated and, if necessary, coated. To **prevent unwanted substance deposits on the component**, it is also important to ensure that this coating is harmless.

Plastics have to fulfil a wide range of requirements:
– heat resistance for sterilisation-proof plastics
– impermeability to X-rays
– low density for weight reduction in instruments
– colour-coding for size or application.

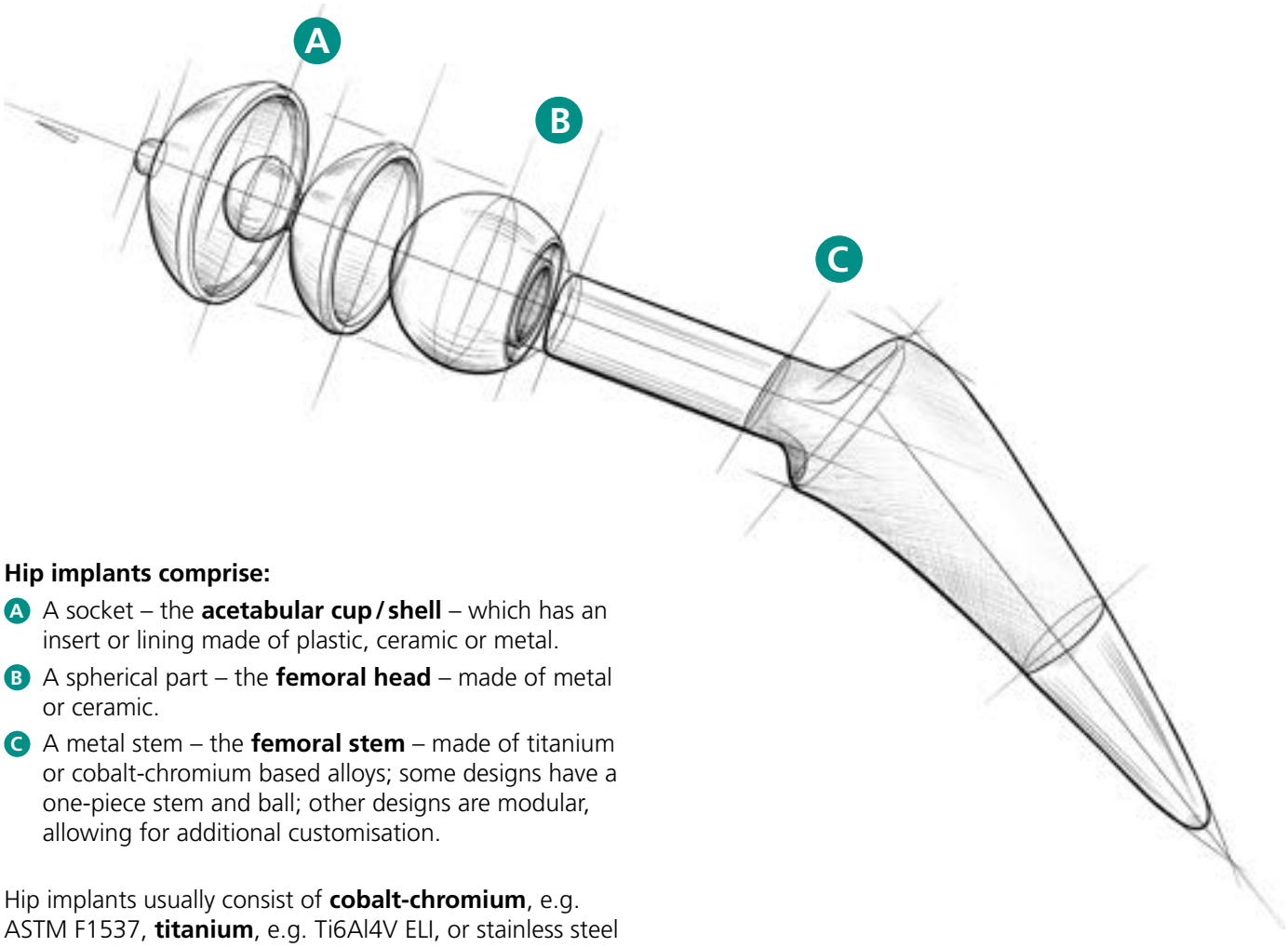
This leads to the use of thermosets and thermoplastics; **PEEK, PP, PPSU, UHMWPE** or **POM** are widely used. As they all have low thermal conductivity in common, the heat generated by the machining process must be dissipated with the chip.

Carbon fibre (reinforced) plastic, known as CFRP or carbon, consists of carbon fibres and a plastic matrix, usually epoxy resin. Machining is carried out by breaking the fibres. This material is sensitive to heat, as the matrix can degenerate. There is also a risk of CFRP delaminating.

Medical industry components



Hip joint machining



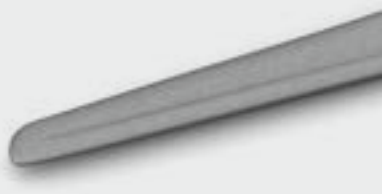
Hip implants comprise:

- A socket – the **acetabular cup / shell** – which has an insert or lining made of plastic, ceramic or metal.
- A spherical part – the **femoral head** – made of metal or ceramic.
- A metal stem – the **femoral stem** – made of titanium or cobalt-chromium based alloys; some designs have a one-piece stem and ball; other designs are modular, allowing for additional customisation.

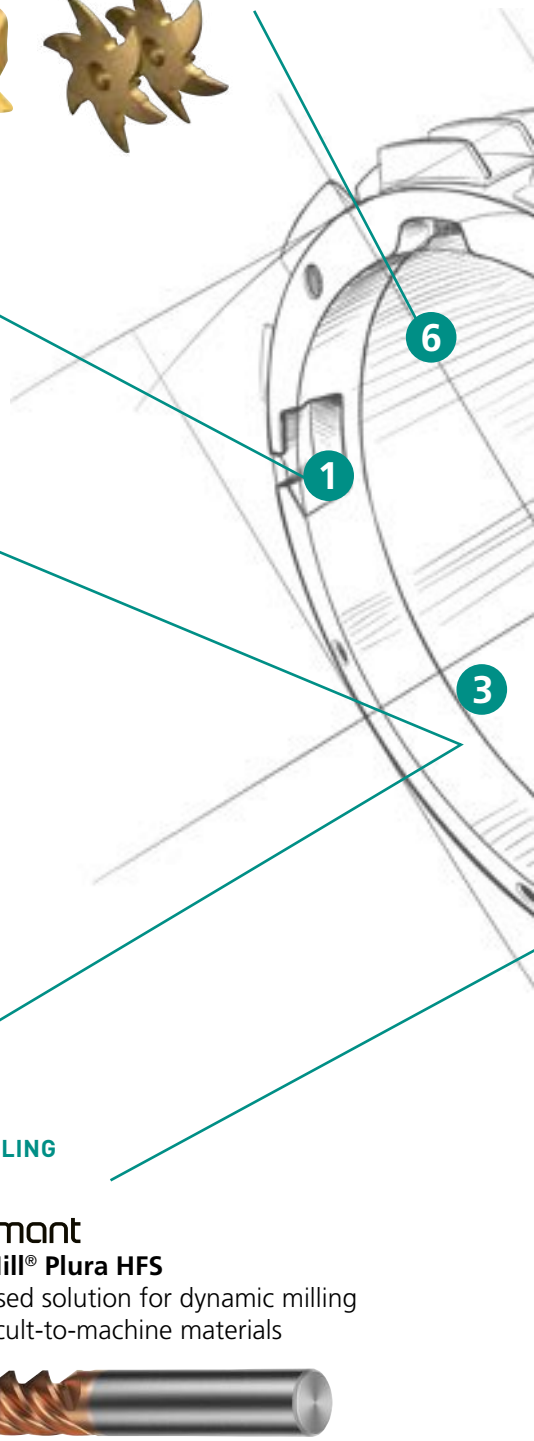
Hip implants usually consist of **cobalt-chromium**, e.g. ASTM F1537, **titanium**, e.g. Ti6Al4V ELI, or stainless steel for medical applications 316LVM.

PROPERTIES

– Fixturing is a challenge
– Small batches production
– Forged and cast blanks for the stem
– Rod material for femoral head and acetabular cup
– The machines used for these components are mostly multi-axis machines, 3-axis lathes, vertical 5-axis machining centres and multi-task machines, (e.g. Mazak Intergrex E410e).



A Acetabular cup



1 MILLING

SANDVIK coromant
CoroMill® Plura HD
Optimised solution for milling difficult-to-machine materials

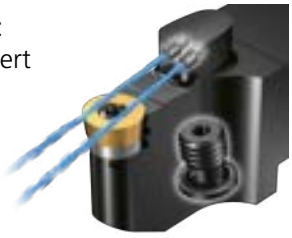
6 GROOVES, THREADS AND CHAMFERS

SANDVIK coromant
CoroMill® 327
Flexible application

3 CIRCULAR INTERPOLATION

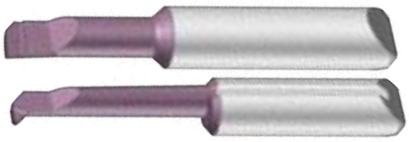
SANDVIK coromant
CoroMill®216 Ballnose
Circular interpolation

Round inserts R300
Pre-finishing/Finishing:
with positive round insert



CoroTurn 107 boring bars
with EasyFix™ clamping holders
Roughing: with T-Max P. Use high-pressure cooling
for chip control and process reliability.

IFANGER
Profiling turning bars
for inner contour MTKN/MTKH/MTKO



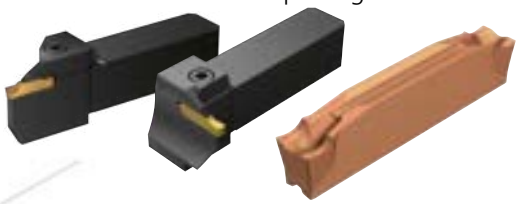
4 MILLING

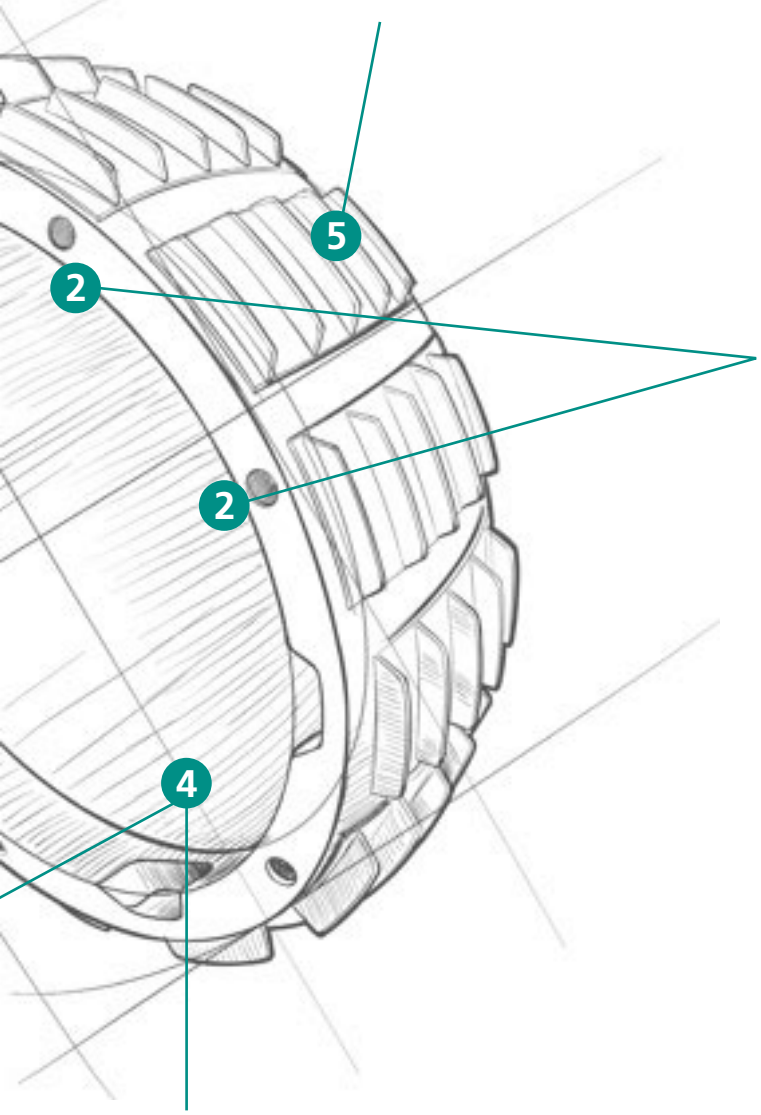
SANDVIK coromant
CoroMill® Plura HFS
Optimised solution for dynamic milling
of difficult-to-machine materials

5 PARTING OFF

SANDVIK coromant

CoroCut® 1–2
Versatile radial and axial parting off.





WALTER

WALTER MC128
Optimised solution for CoCr materials,
multi-flute concept enables high feed rates

2 DRILLING

SANDVIK coromant

CoroDrill® 860-SD
Highest performance and process reliability for nickel- and cobalt-based HRSA alloys, dia. **3.0 – 16.0 mm**

CoroDrill® 860-SM
Highest performance and process reliability for titanium-based alloys, dia. **3.0 – 16.0 mm**

CoroDrill® 862-GM-X2BL
Optimised multi-material drill, external coolant, dia. **0.3 – 3.0 mm**

CoroDrill® 862-GM-X2BM
Optimised multi-material drill, internal coolant, dia. **1.0 – 3.0 mm**

WALTER TITEX

WALTER DC180
Solid carbide drill with cooling channel, dia. **3.00 – 20.00 mm**

WALTER DB133
Solid carbide micro-drill with cooling channel, dia. **0.50 – 2.95 mm**

DC THREADING TECHNOLOGY

DC Swiss GWI 5000
For completely burr-free threads, even in difficult-to-machine materials

B Femoral head

3 PARTING OFF

SANDVIK coromant

CoroCut® 1–2

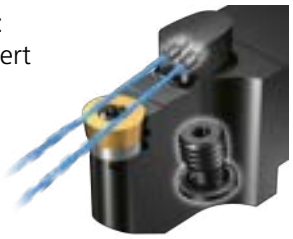
Versatile radial and axial parting off

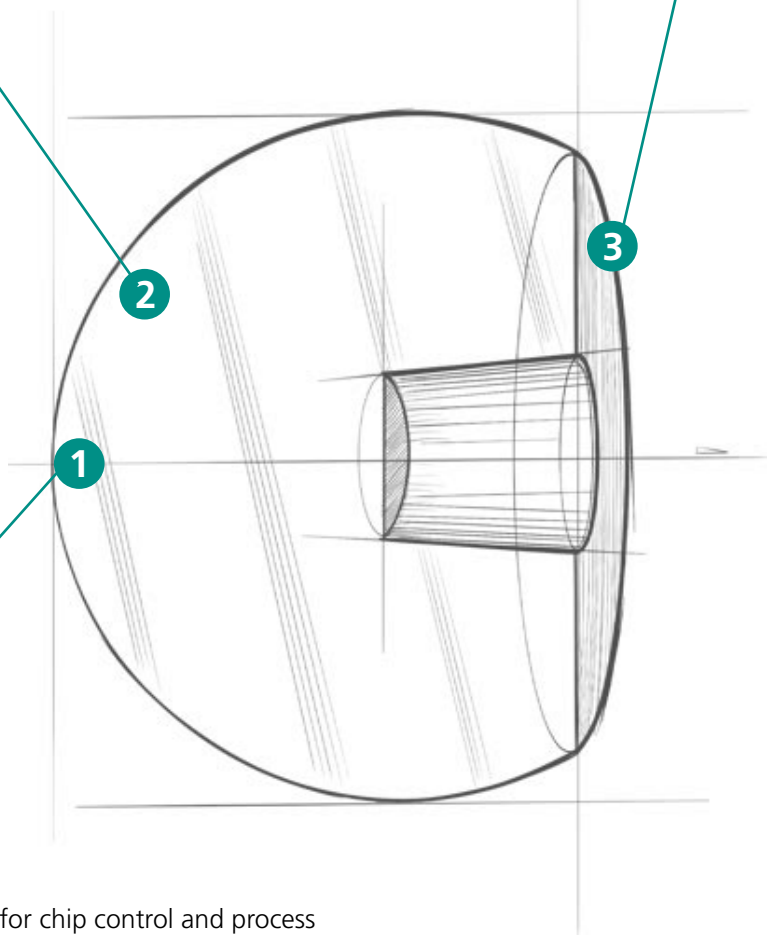
2 TURNING

SANDVIK coromant

Round Inserts 300

Pre-finishing/Finishing:
with positive round insert





2 ROUGHING

SANDVIK coromant

T-Max P

Use high-pressure cooling for chip control and process reliability

6 DRILLING

SANDVIK coromant

CoroDrill® 860-SD

Highest performance and process reliability for nickel- and cobalt-based HRSA alloys, dia. **3.0 – 16.0 mm**

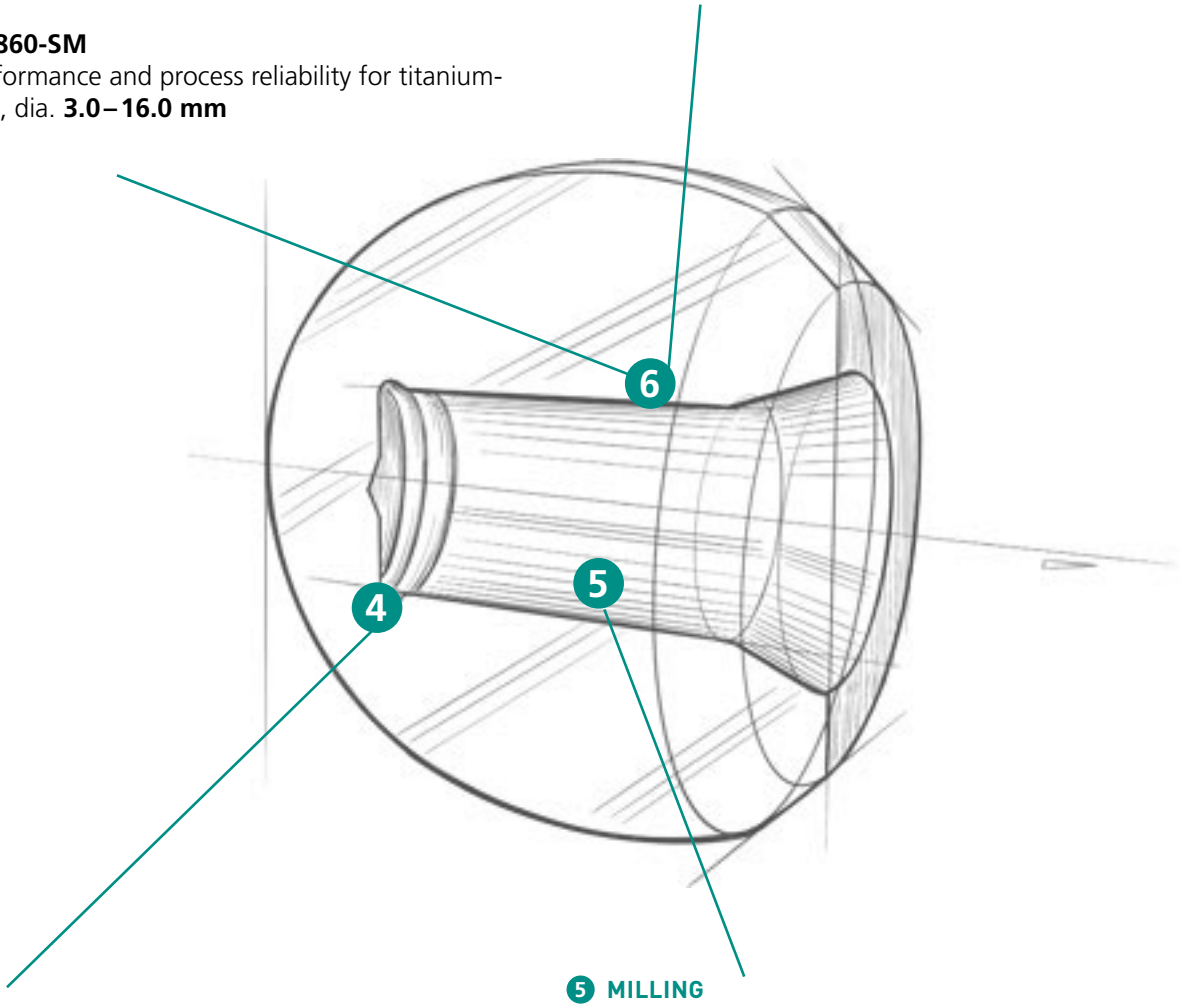
CoroDrill® 860-SM

Highest performance and process reliability for titanium-based alloys, dia. **3.0 – 16.0 mm**

WALTER TITEX

DC183 X·treme Evo 3

Maximum metal removal rate thanks to 3 cutting edges with innovative Krato tec™ multi-layer coating, dia. **3.0 – 16.0 mm**



4 INTERNAL TURNING

SANDVIK coromant

CoroTurn® XS Internal Turning

Diameters from 0.3 mm, longitudinal turning, parting & grooving and thread turning, tight tolerances

5 MILLING

SANDVIK coromant

CoroMill® Plura HFS

Optimised solution for dynamic milling of difficult-to-machine materials

WALTER

MC128 Supreme WJ30RA

Optimised solution for dynamic milling of difficult-to-machine materials

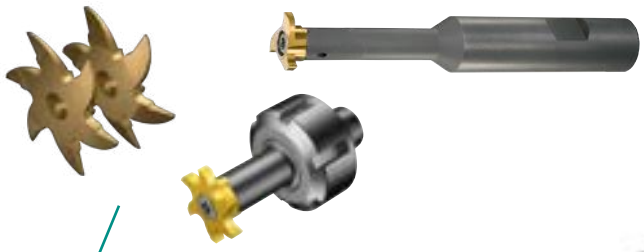
C Hip stem / Bone rasp

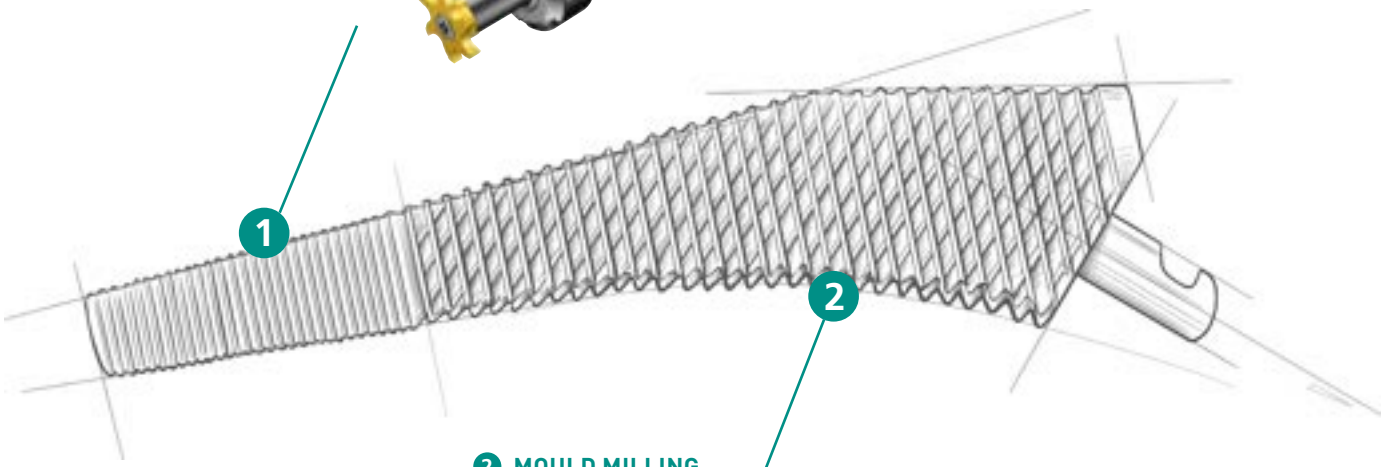
1 MILLING

SANDVIK Coromant

CoroMill® 327

Milling cutter, diameter: 9.7 – 34.7 mm





2 MOULD MILLING

FRANKEN Mould Cutter

Special tool as per customer specification

MATERIAL

Stainless steel according to ISO 5832-9

With the cementless variety, titanium has proven to be the material of choice for the prosthesis stem, which is anchored in the femur. **Stainless steel or cobalt-chromium-molybdenum prostheses** are usually used for the cemented variety.

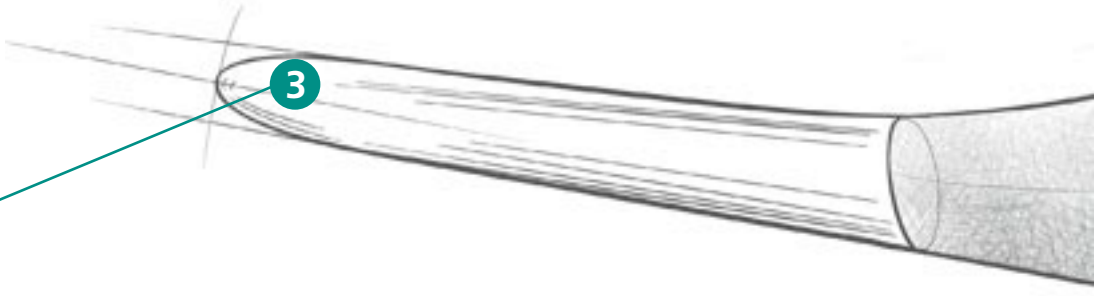
C Hip stem

2 MILLING

SANDVIK coromant

CoroMill® Plura HFS

Optimised solution for dynamic milling of difficult-to-machine materials



3 PROFILE MILLING

FRANKEN 2564

For difficult-to-machine materials

1 DRILLING

SANDVIK coromant

CoroDrill® 860-SM

Highest performance and process reliability for titanium-based alloys, dia. **3.0 – 16.0 mm**

WALTER TITEX

DC175 Supreme

With precision cooling, applied in aviation and medical technology, dia. **3.0 – 20.0 mm**

3 PROFILE MILLING

SANDVIK coromant

CoroMill® Plura ballnose

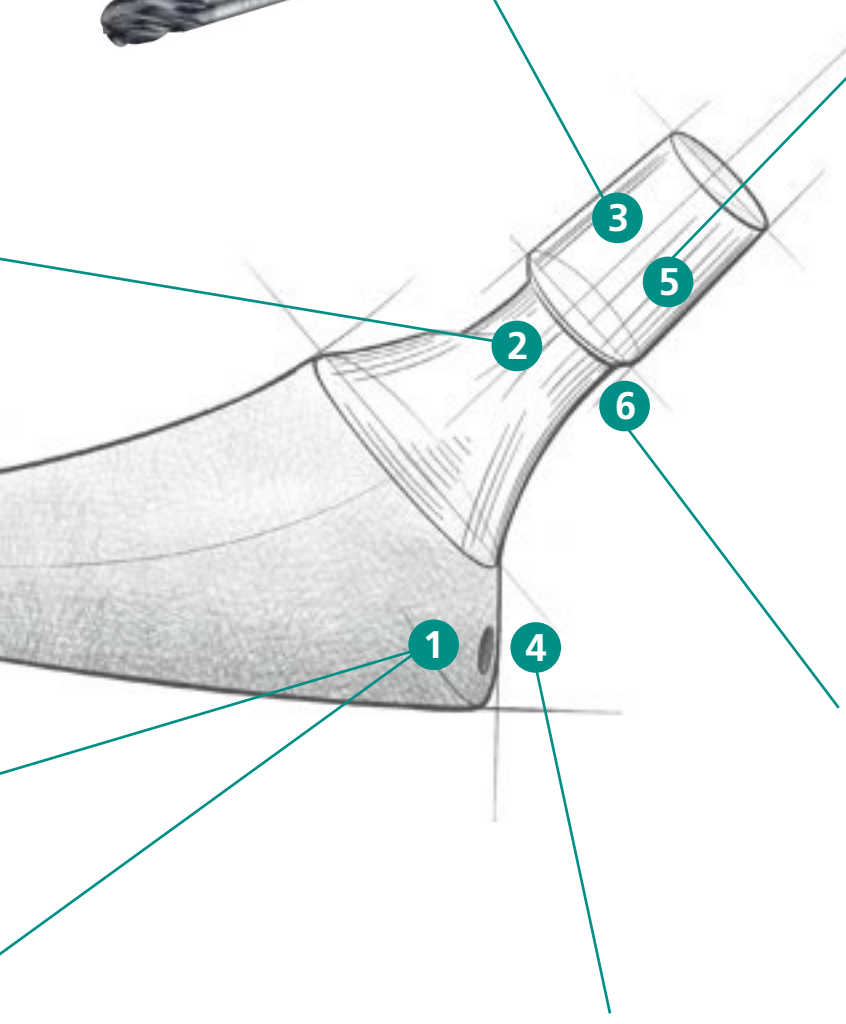
Optimised solution for profile milling of difficult-to-machine materials

5 PROFILE TURNING

SANDVIK coromant

CoroTurn® TR

High stability and accuracy for contour turning of difficult-to-machine materials



5 PROFILE TURNING

VARDEX Advanced Threading Solutions

V-Style

For profile turning of the cone

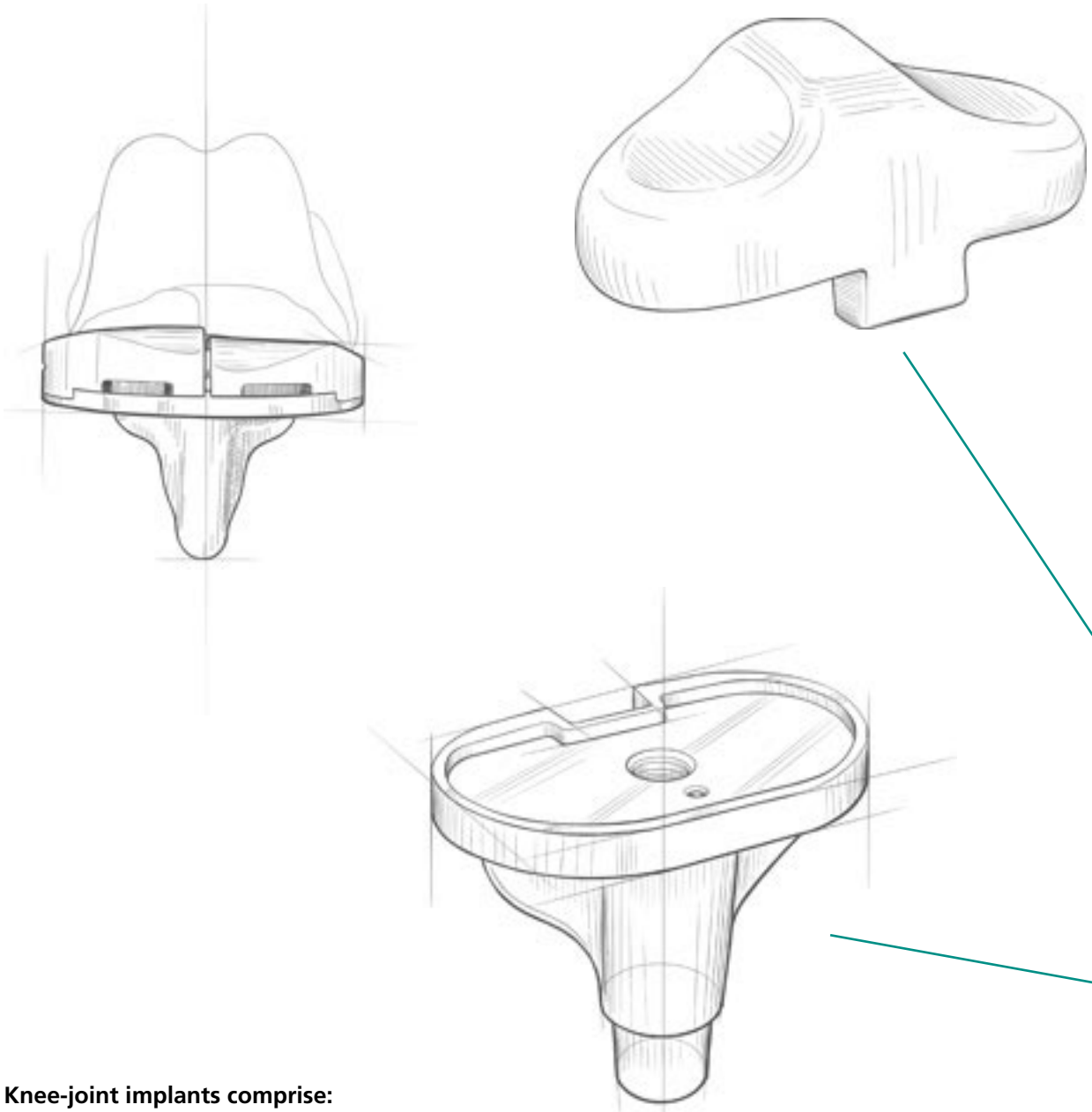
5 THREADING

DC THREADING TECHNOLOGY

SA390

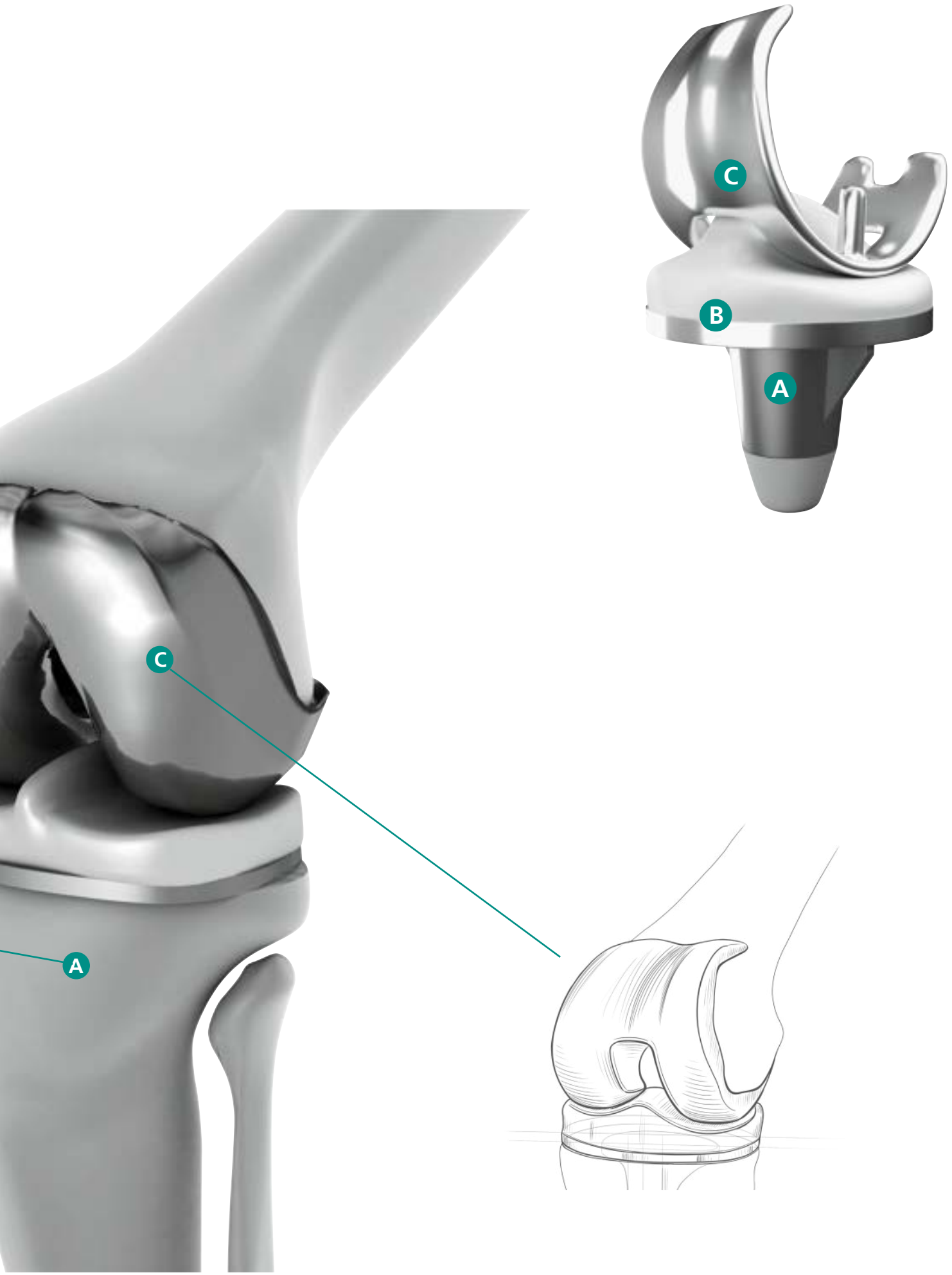
For special alloyed materials, nickel alloys with tensile strengths up to 1650 N/ mm^2

Knee-joint machining



Knee-joint implants comprise:

- **A** **Tibial part:** The lower leg part of the implant, usually made of metal, which is attached to the top of the shinbone (tibia).
- **B** **Knee joint spacer**: An insert or spacer, usually made of plastic, that lies between the tibial and femoral parts and acts as a buffer to allow smooth movement.
- **C** **Femoral knee joint**: The thigh part of the implant, which is attached to the end of the thigh bone (femur). This part is usually made of metal and forms the upper joint surface of the knee joint.


C
B
A
C
A

A Tibial part

1 MILLING EXTERNAL PROFILE

SANDVIK coromant
CoroMill® Plura HD
Optimised solution for end-milling difficult-to-machine materials

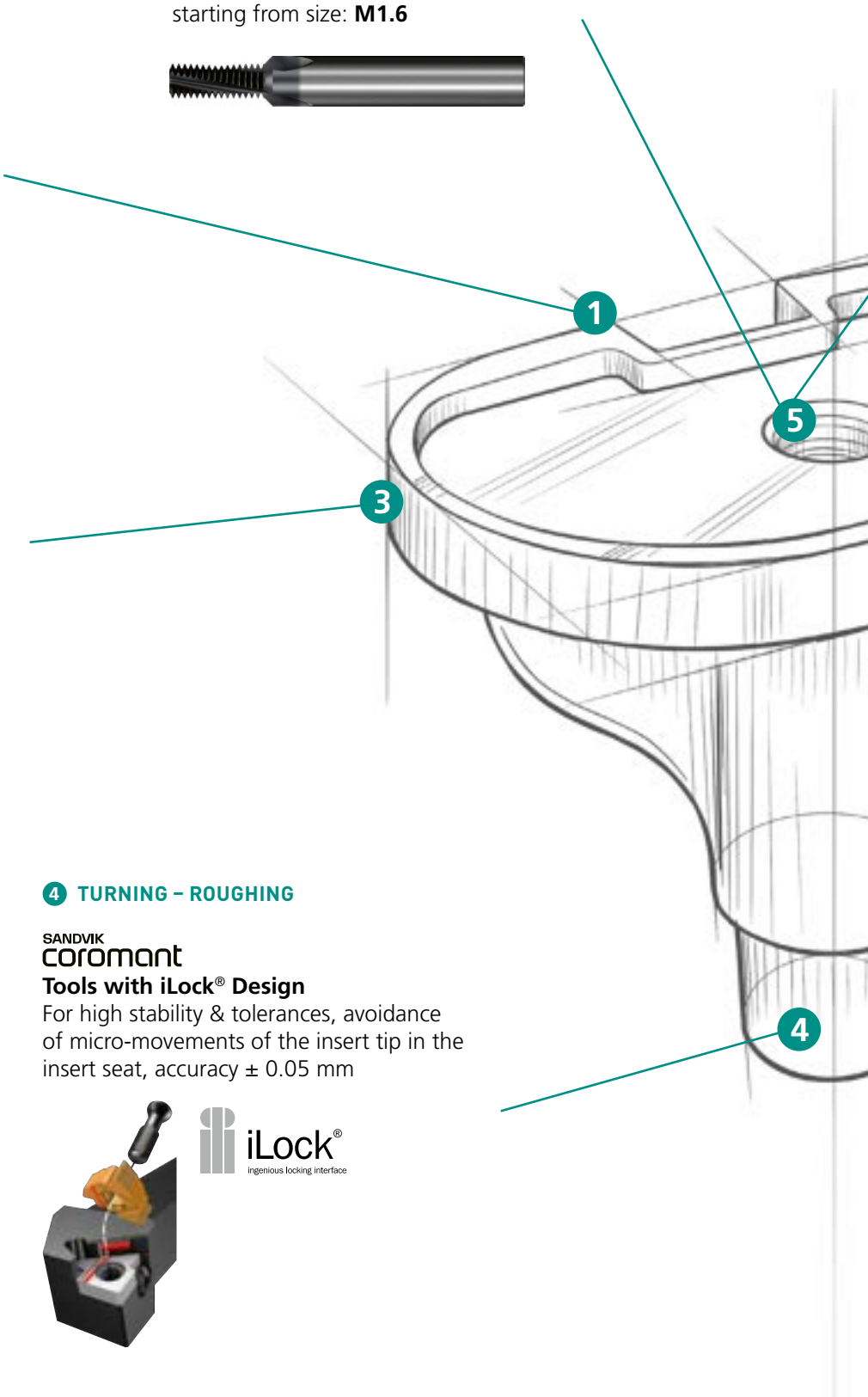
3 MILLING EXTERNAL PROFILE

SANDVIK coromant
CoroMill® Plura HFS
Optimised solution for dynamic milling of difficult-to-machine materials

WALTER
MD128 Supreme WJ30RA
For excellent surfaces in difficult-to-machine materials

5 THREADING

SANDVIK coromant
CoroMill® Plura
Optimised multi-material thread-milling cutters, starting from size: **M1.6**



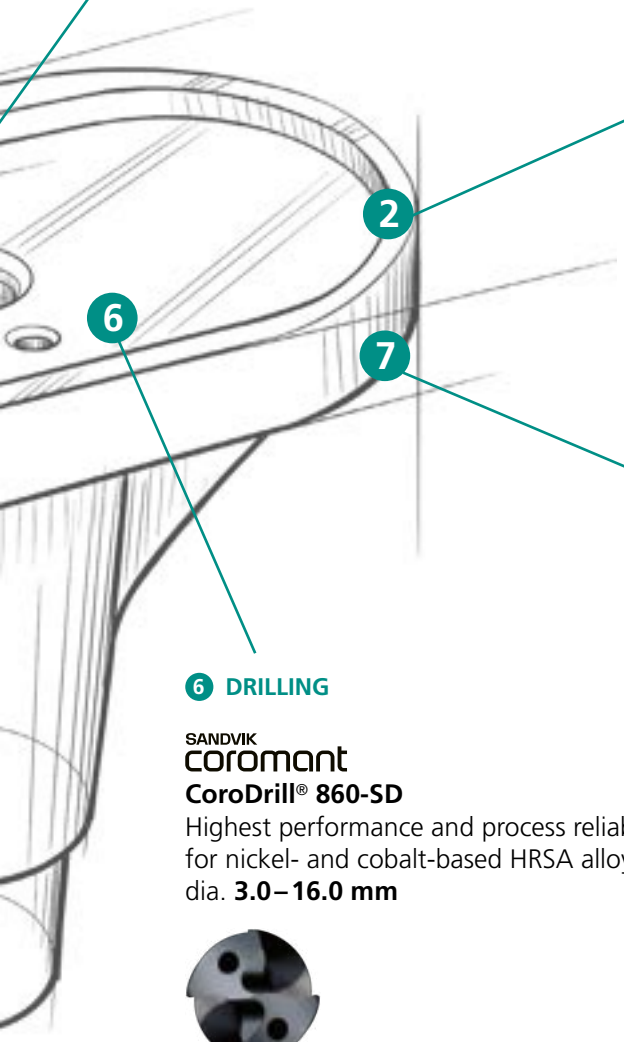
4 TURNING – ROUGHING

SANDVIK coromant
Tools with iLock® Design
For high stability & tolerances, avoidance of micro-movements of the insert tip in the insert seat, accuracy ± 0.05 mm

iLock®
ingenious locking interface

DC THREADING TECHNOLOGY

DC Swiss GWI 5000
For completely burr-free threads, even in difficult-to-machine materials



2 FACE MILLING

SANDVIK coromant

R215.H4
More than double the feed rate per tooth compared to a normal end mill thanks to the specially developed geometry

7 MILLING

GUHRING

G-Mold µ48 F
High-precision finishing cutter G-Mold µ 48 F, for highest component accuracy

6 DRILLING

SANDVIK coromant

CoroDrill® 860-SD
Highest performance and process reliability for nickel- and cobalt-based HRSA alloys, dia. **3.0 – 16.0 mm**

CoroDrill® 860-SM
Highest performance and process reliability for titanium-based alloys, dia. **3.0 – 16.0 mm**

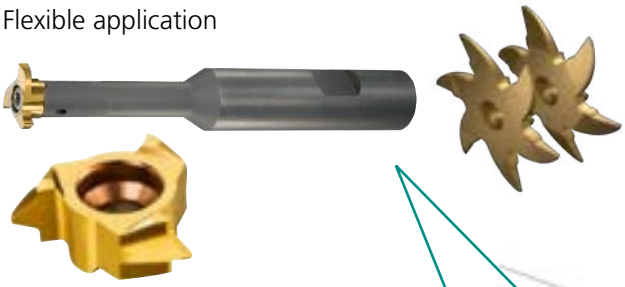
BECK MAPAL GROUP

BECK Drill-Reamer-Pyramid
Drilling and reaming in a single work step, dia. **3.97 – 16.05 mm**

A Tibial part

5 GROOVING, THREADING AND CHAMFERING

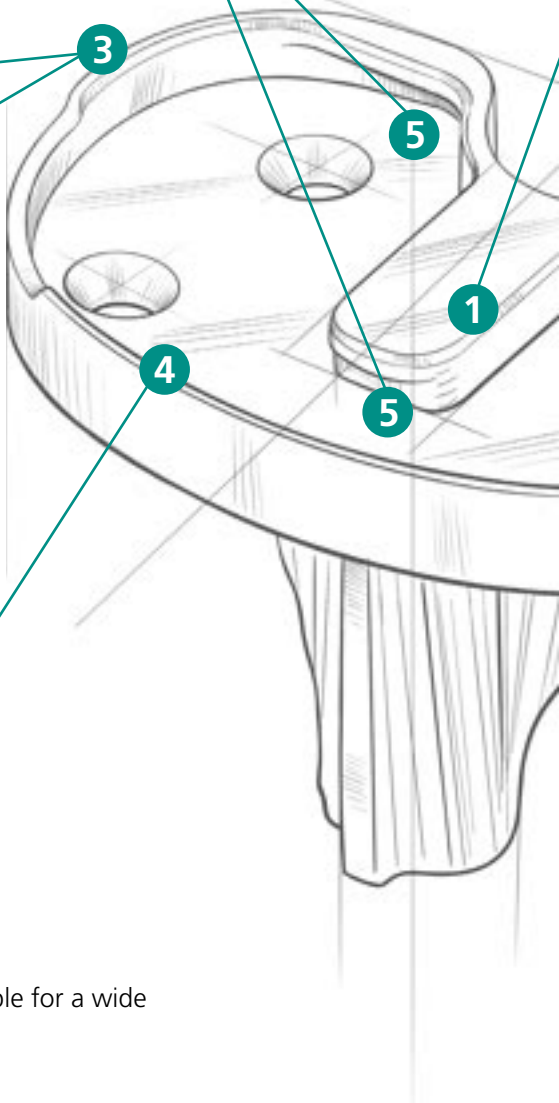
SANDVIK coromant
CoroMill® 327
Flexible application



3 PROFILE MILLING

SANDVIK coromant
CoroMill® Plura ballnose
Optimised solution for profile milling of difficult-to-machine materials

GUHRING
G-Mold 55 B
For profile milling of titanium and NiCo materials and other materials, dia. **1.0 – 12.0 mm**



4 CHAMFERING

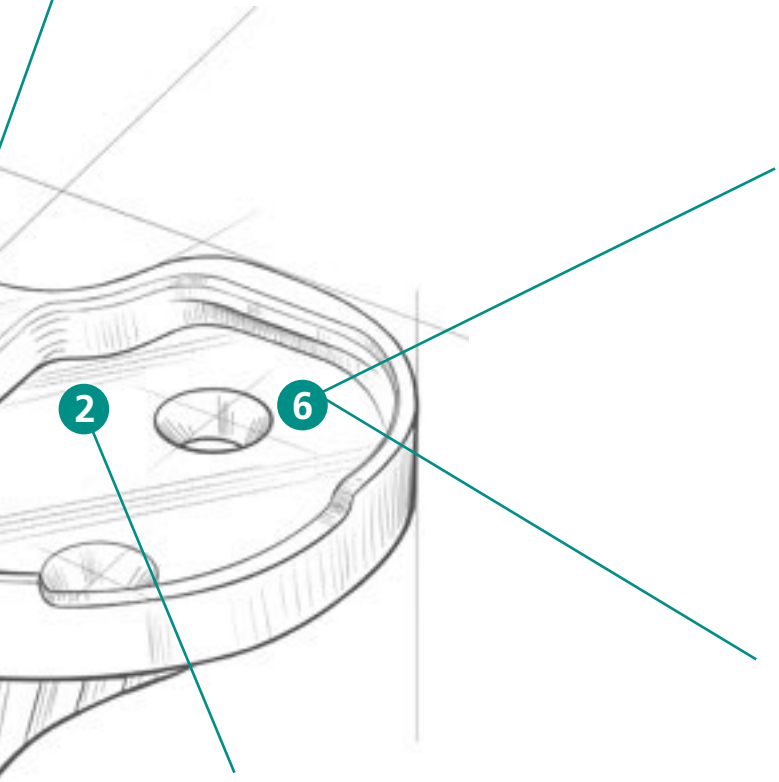
SANDVIK coromant
CoroMill® Plura 316
Geometry and grade suitable for a wide range of materials

1 FACE MILLING

SANDVIK coromant

CoroMill® Plura HFS
Optimised solution for dynamic milling of difficult-to-machine materials

CoroMill® 345
First choice for highly productive face milling



6 DRILLING

SANDVIK coromant

CoroDrill® 860-SD
Highest performance and process reliability for nickel- and cobalt-based HRSA alloys, dia. **3.0 – 16.0 mm**

CoroDrill® 860-SM
Highest performance and process reliability for titanium-based alloys, dia. **3.0 – 16.0 mm**

DIXI polytool

DIXI 1345HH
High-performance drill for ISO-M/ISO-S material groups, dia. **3.0 – 16.0 mm**

2 FACE MILLING – FINISHING

SANDVIK coromant

CoroMill® Plura HFS
Optimised solution for dynamic milling of difficult-to-machine materials

DIXI polytool

Toric milling cutter DIXI 7070
For finishing and milling NiCo materials, dia. **3.0 – 12.0 mm**

B Knee-joint spacer

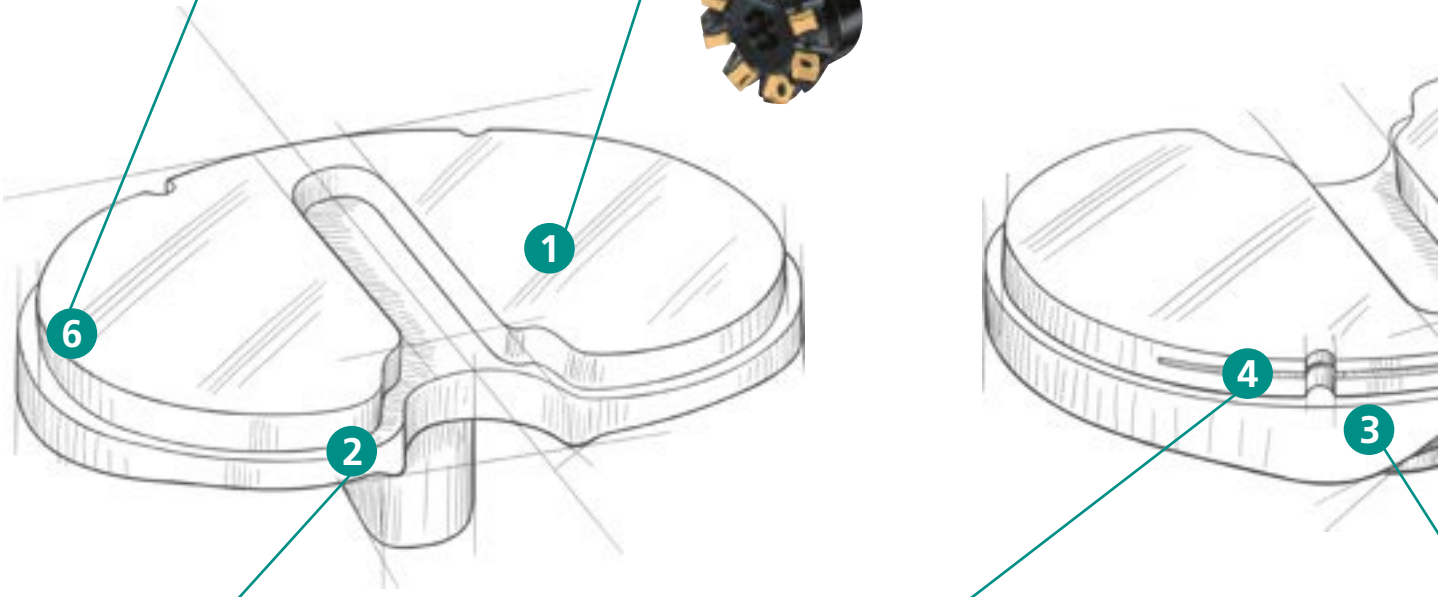
6 CHAMFERING

SANDVIK coromant
CoroMill® Plura 316
Geometry and grade suitable for a variety of materials 15° , 30° , 45°

1 FACE MILLING

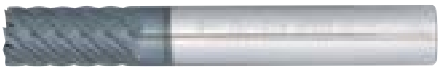
SANDVIK coromant
CoroMill® 345
Optimised grades 2040/1040/S30T for face milling

WALTER
M5009
Grade WSM 35G



2 SHOULDER MILLING

DIXI polycrystal
DIXI 7520
For finish milling NiCo materials



4 GROOVING

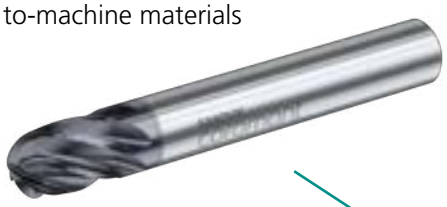
SANDVIK coromant
CoroMill® 327
Flexible application, grooves, threads and chamfers

7 PROFILE MILLING

SANDVIK coromant

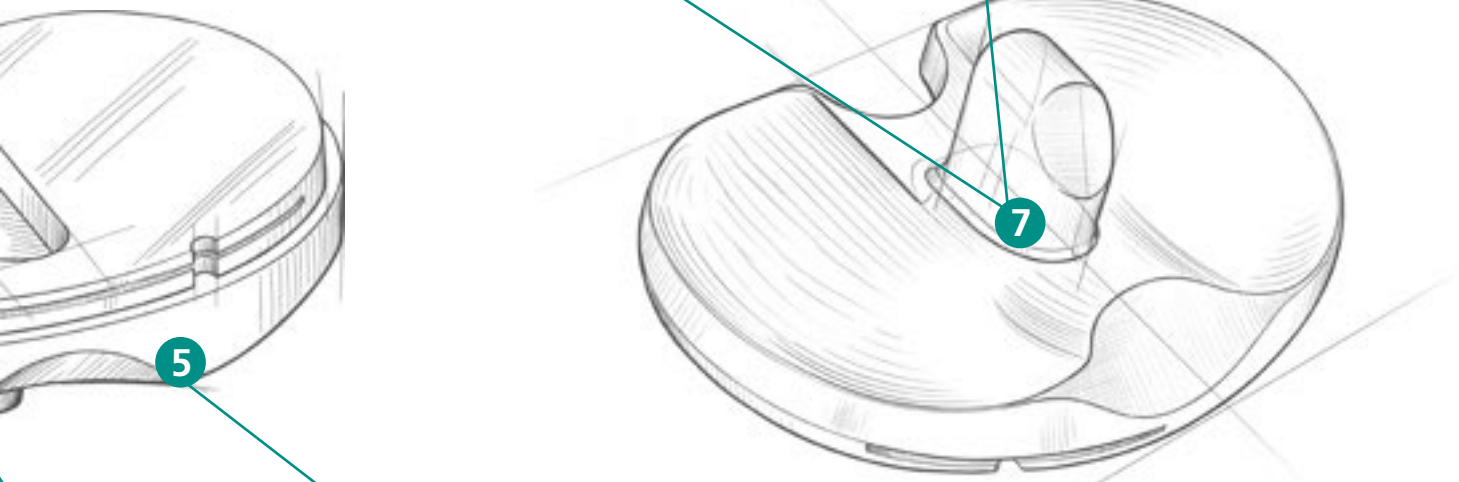
CoroMill® Plura ballnose

Optimised solution for profile milling of difficult-to-machine materials



MD839 RA Supreme

For efficient profile milling of ISO-M and ISO-S materials



5 SHOULDER AND PROFILE MICRO-MILLING

SANDVIK coromant

CoroMill® Plura

3 SHOULDER MILLING

SANDVIK coromant

CoroMill® Plura HFS

Optimised solution for dynamic milling of difficult-to-machine materials

B Knee-joint spacer

1 PRE-CONTOURING – ROUGHING

SANDVIK coromant

CoroMill® 216

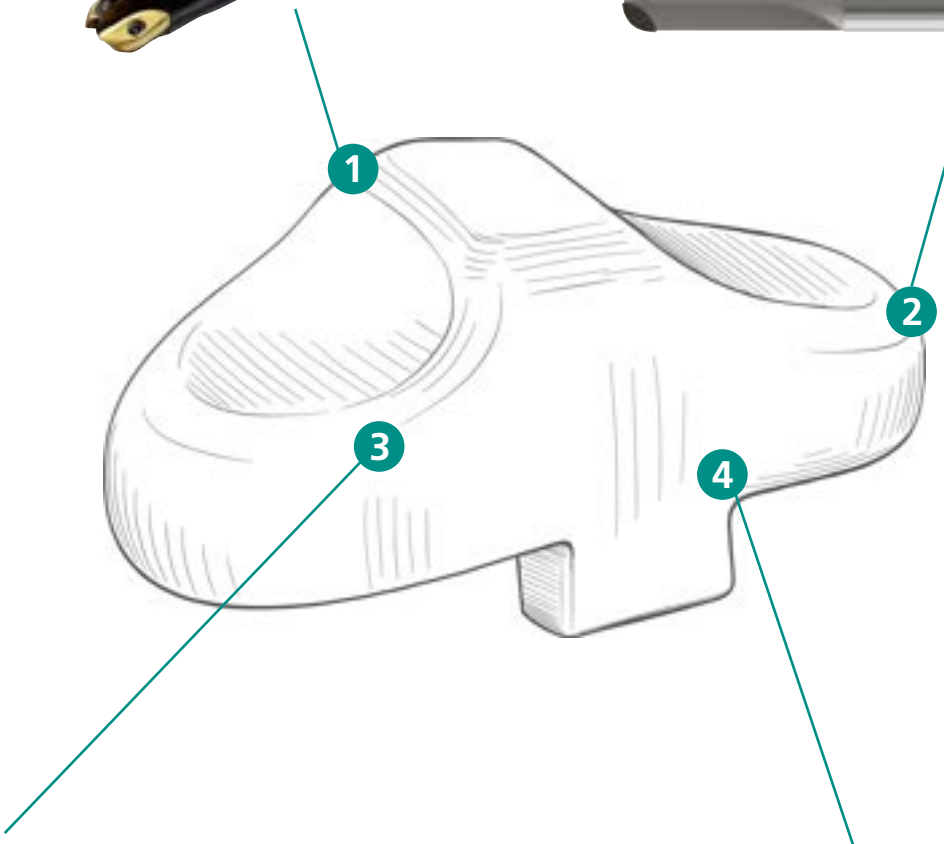
Roughing profile milling of curved surfaces

2 MILLING

DIXI polytool

PCD / CVD / MCD-tipped milling cutters Monocrystalline

diamond ball end mill, for final processing of the tibial inlay



3 PRE-CONTOURING – ROUGHING

DIXI polytool

DIXI 7565-FC

Toric milling cutter with internal cooling, dia. **6 – 20 mm**

4 MILLING

DIXI polytool

DIXI 7561 / 7305 / 7315 / 7306 / 7307

Single-tooth end mill, dia. **1.0 – 12.0 mm**

C Femoral knee joint

1 MILLING

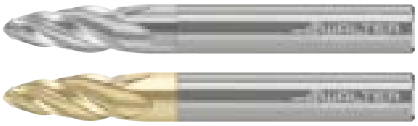
SANDVIK coromant

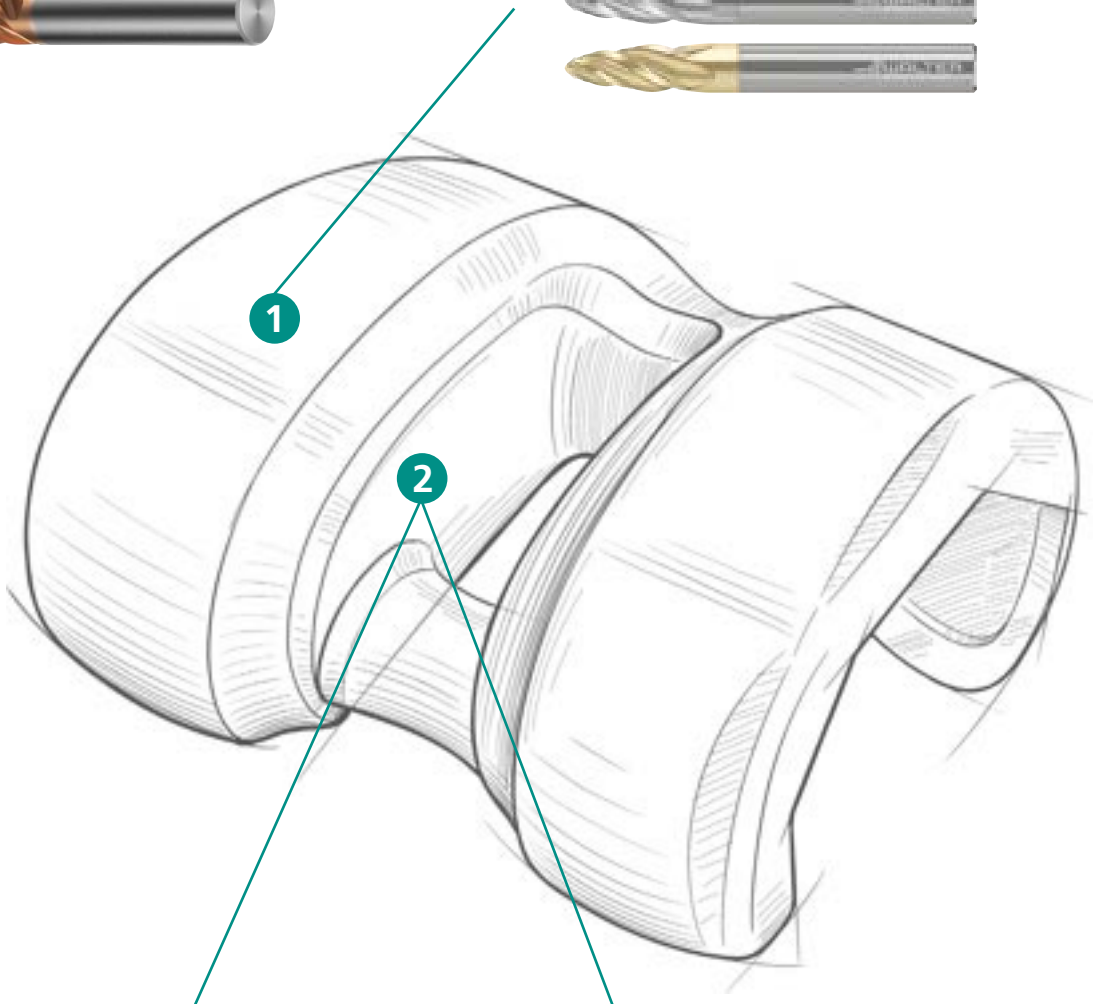
CoroMill® Plura HFS

Optimised solution for dynamic milling of difficult-to-machine materials

MD839 RA Supreme

For efficient profile milling of ISO-M and ISO-S materials



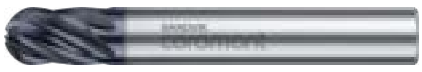


2 PROFILE MILLING

SANDVIK coromant

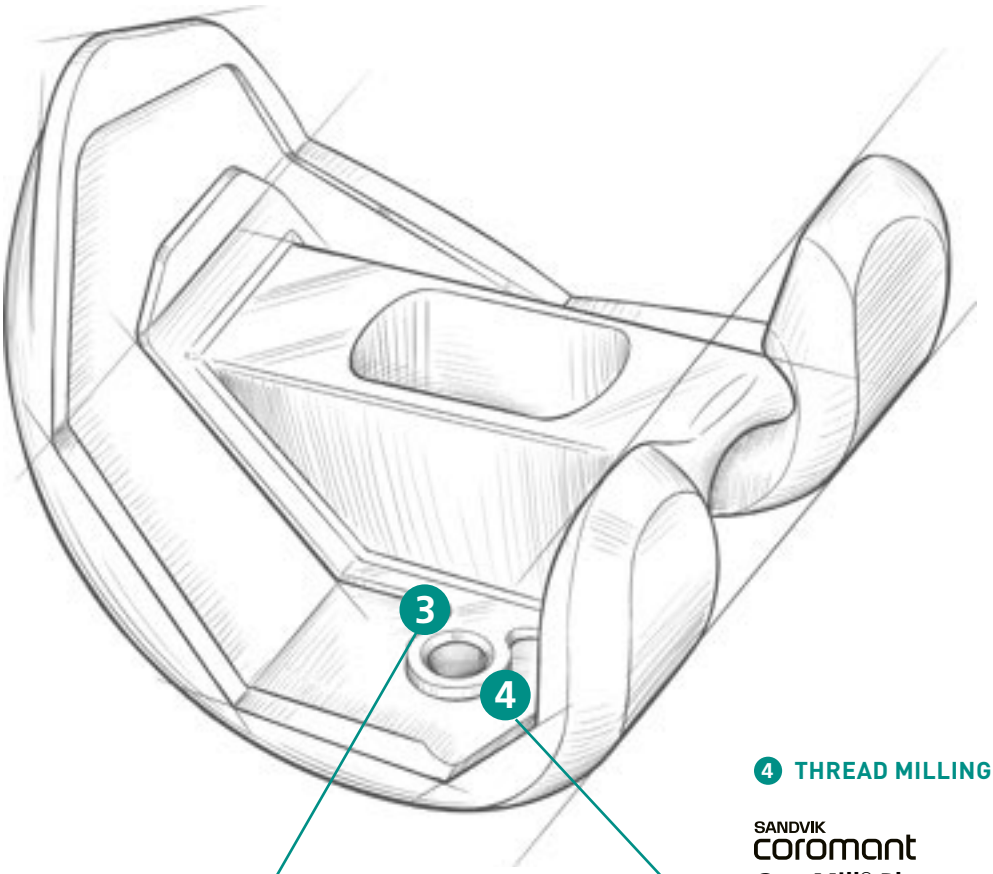
CoroMill® Plura ballnose

Finishing, optimised solution for profile milling of difficult-to-machine materials



Carbide ball nose end mill 2834A

Finish milling cutter for hard milling with at least 4 cutting edges or 4 flutes



3 DRILLING AND FINISH-REAMING

SANDVIK Coromant

CoroDrill® 862-GM-X2BL
Optimised multi-material drill, external coolant, dia. **0.3–3.0 mm**

BECK

BECK HNC-VA / HNC-TI
Outstanding accuracy and surface quality in ISO-M and ISO-S materials

4 THREAD MILLING

SANDVIK Coromant

CoroMill® Plura
Optimised multi-material thread milling cutter, starting from size: **M1.6**

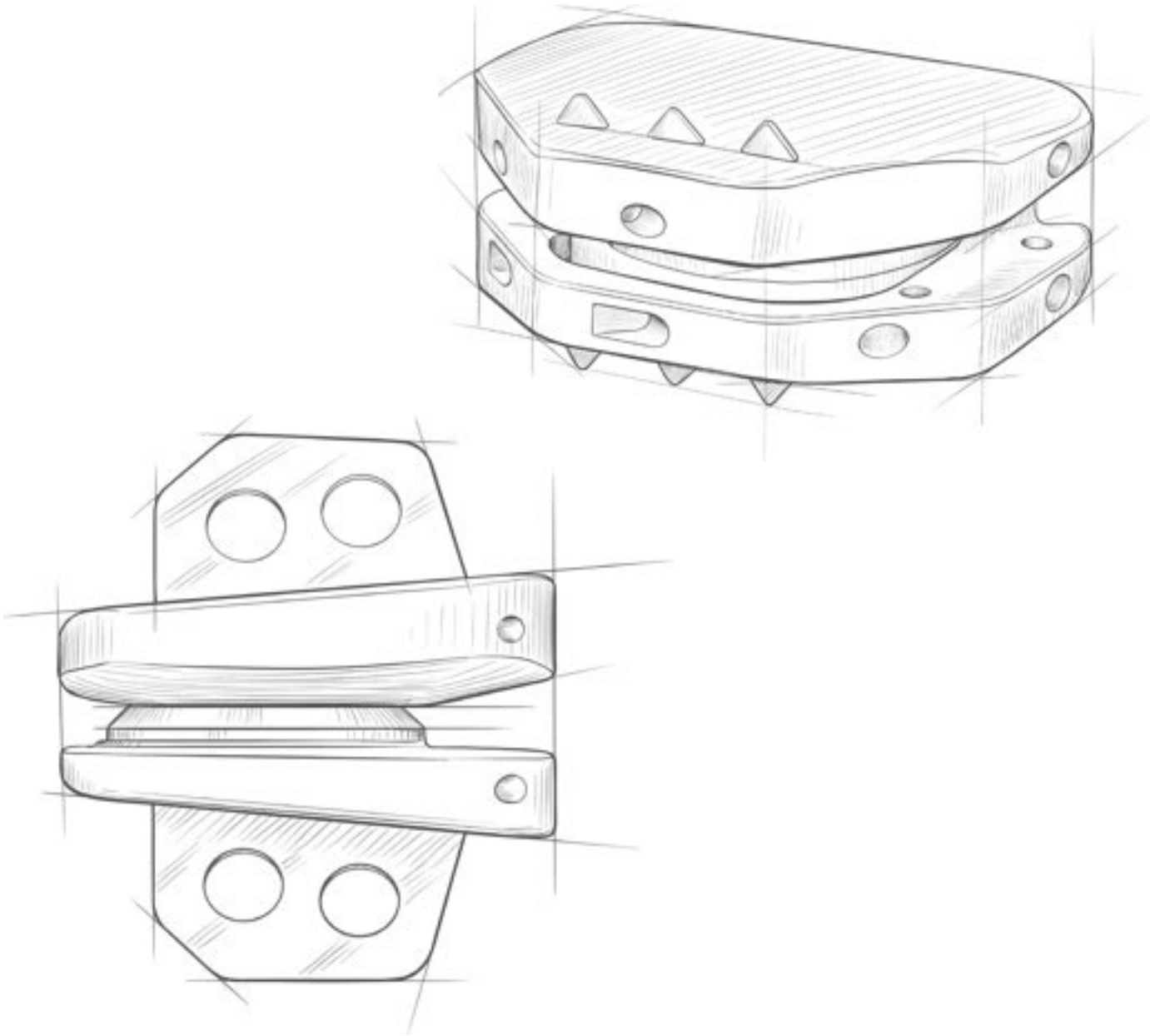
CoroMill® 326
Optimised multi-material thread milling cutter, starting from size: **M7**

DC THREADING TECHNOLOGY

GWI 5000
For completely burr-free threads, even in difficult-to-machine materials, dia. **M1.4–M6**

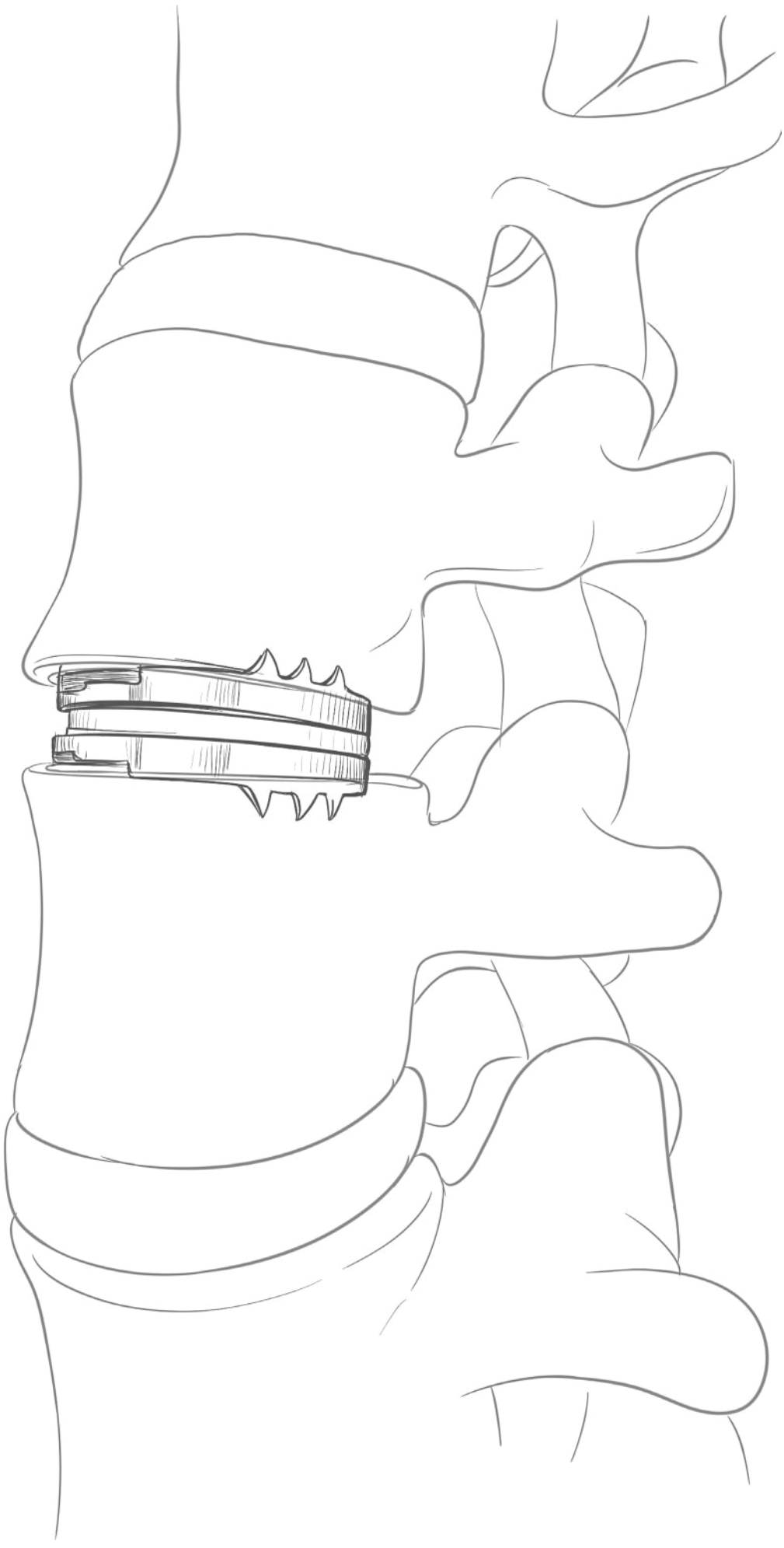
GWI 3000
For optimised chip removal, dia. **M1.4–M20**

Disc prosthesis



MATERIALS

– The artificial disc consists of two metal plates.
– **Titanium** or a **mixture of cobalt and chromium-molybdenum** is used for these plates.
– The plates are coated with a titanium alloy.
– The rough surface allows the prosthesis to fuse with the adjacent vertebral bodies.
– A polyethylene or metal core is located between the metal plates. This core can be imagined as halved spheres between the plates. This shape ensures the movement of the disc prosthesis.



Disc prosthesis

2 MILLING

SANDVIK Coromant

CoroMill® Plura HFS Titanium

6-flutes solution optimised for machining of titanium alloys

3 MICROMACHINING

GUHRING

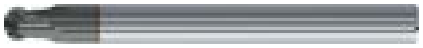
RF100 Mikrodiver

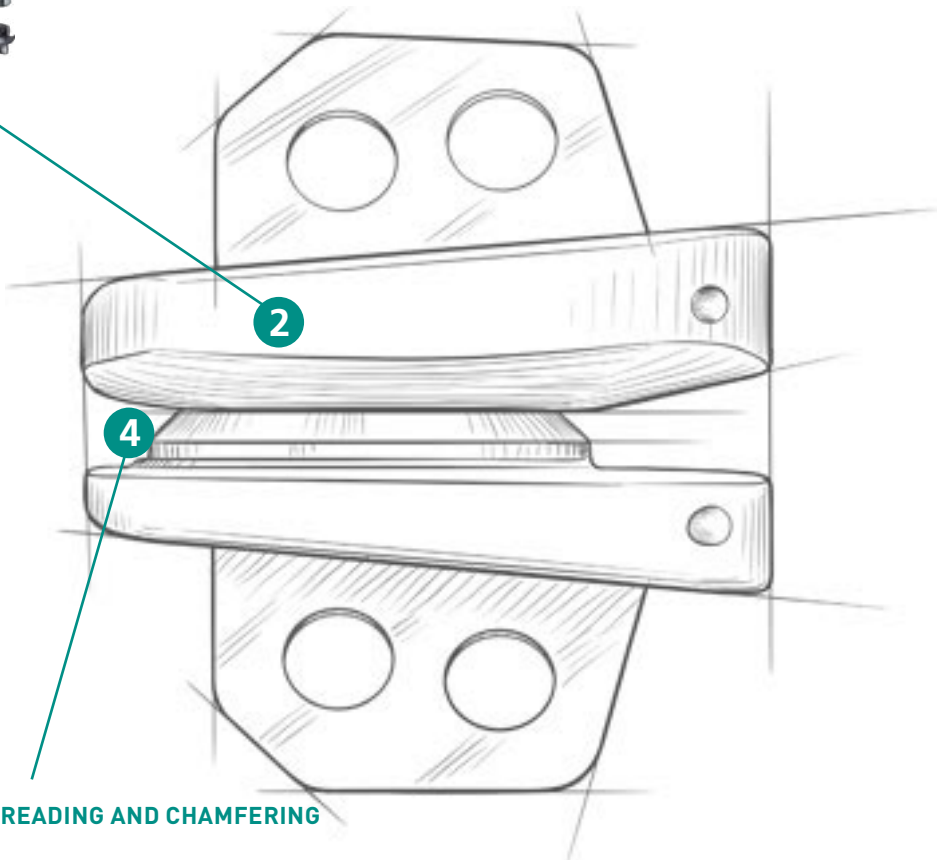
Optimum chip removal thanks to peripheral cooling, dia. **0.5–3.0 mm**, **R 0.05-R0.5**

DIXI polytool

7532 XIDUR

XIDUR coating improves tool life even at high temperatures in difficult-to-machine materials



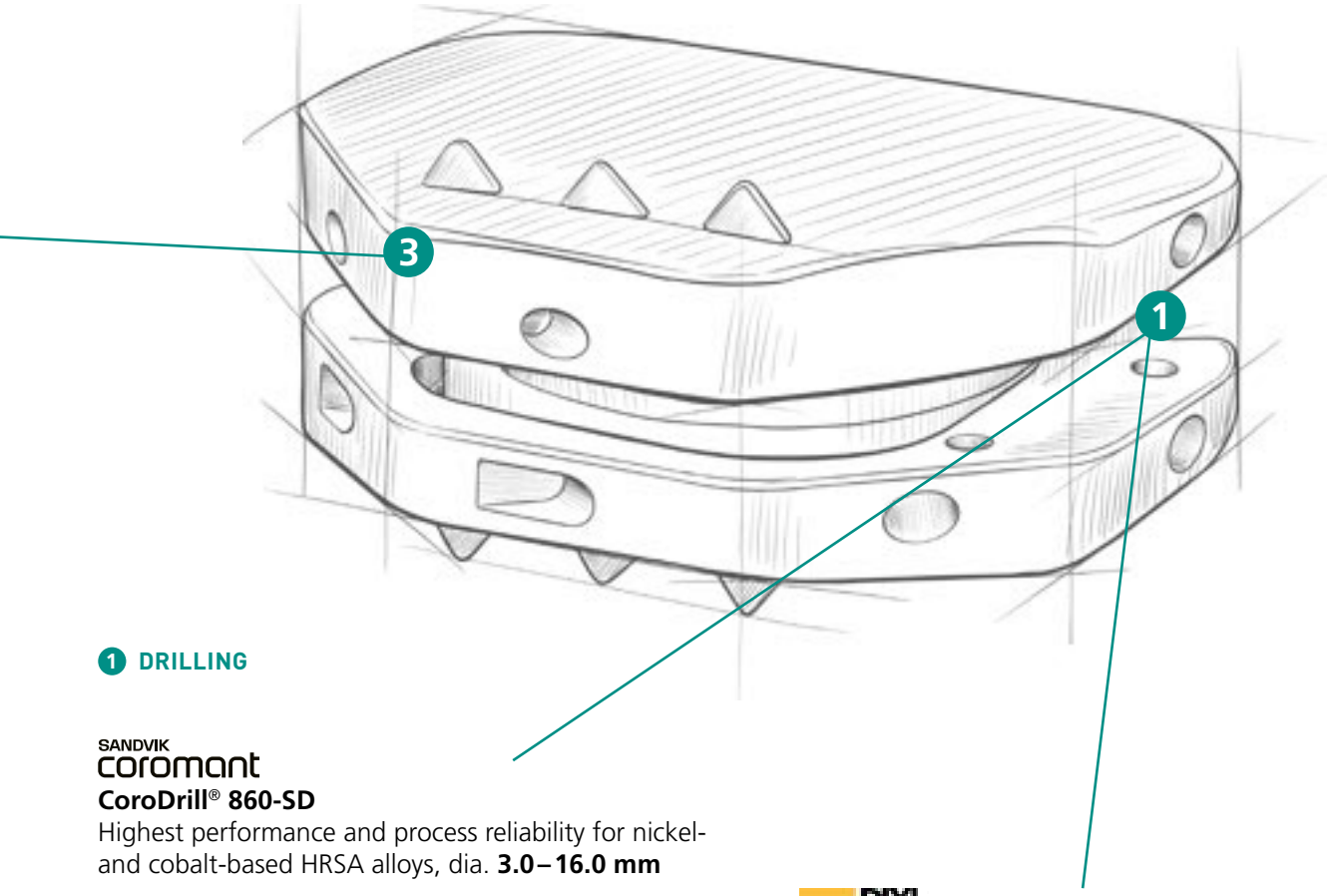


4 GROOVING, THREADING AND CHAMFERING

SANDVIK Coromant

CoroMill® 327

Groove milling, flexible application



1 DRILLING

SANDVIK Coromant

CoroDrill® 860-SD
Highest performance and process reliability for nickel- and cobalt-based HRSA alloys, dia. **3.0 – 16.0 mm**

CoroDrill® 860-SM
Highest performance and process reliability for titanium-based alloys, dia. **3.0 – 16.0 mm**

CoroDrill® 862-GM-X2BL
Optimised multi-material drill, without internal coolant, dia. **0.3 – 3.0 mm**

CoroDrill® 862-GM-X2BM
Optimised multi-material drill, with internal coolant, dia. **1.0 – 3.0 mm**

DIXI

DIXI 1145-HH TiAlN
High-performance tool with internal coolant, dia. **0.8 – 14.0 mm**

DIXI 1280 XIDUR
For difficult-to-machine materials up to 65 HRC, dia. **0.25 – 12.0 mm**

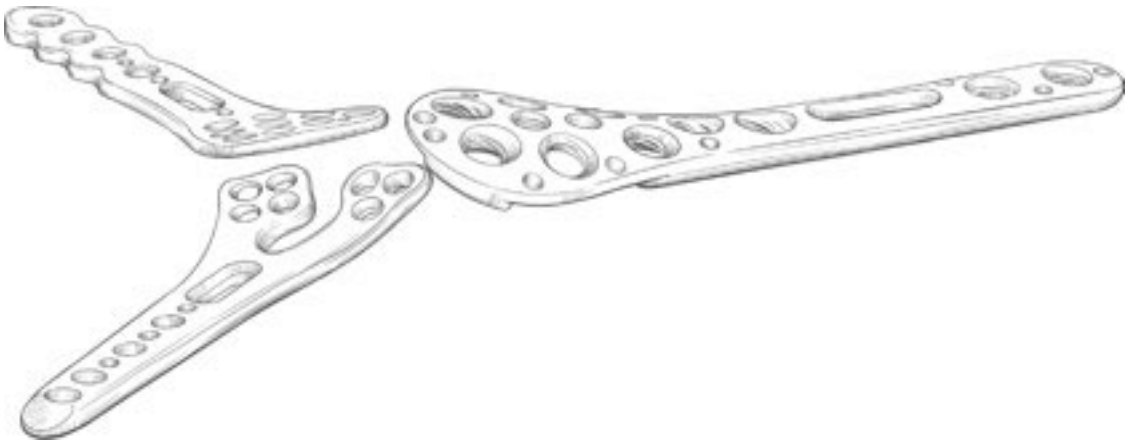
Bone plates

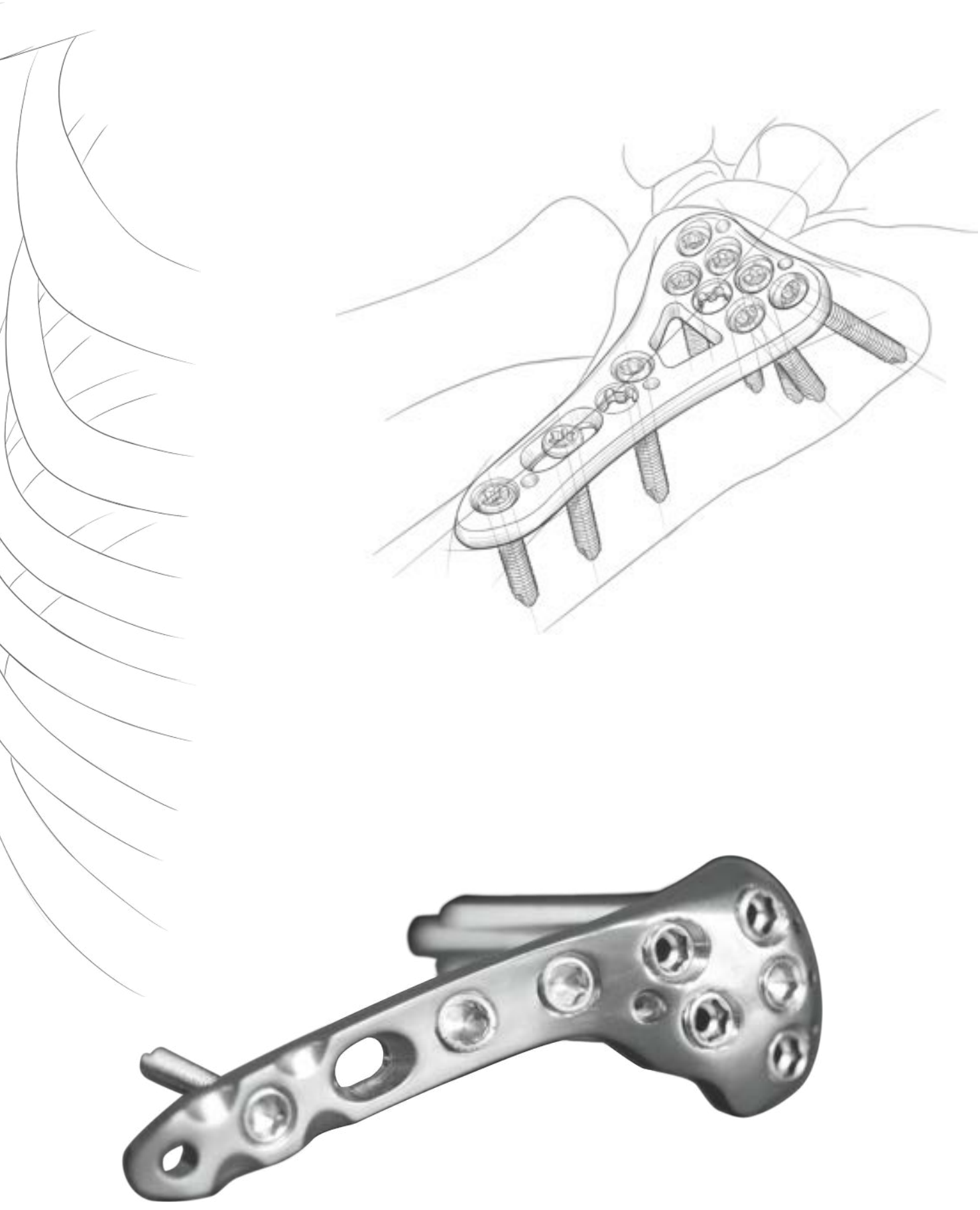
Component material: alloyed titanium grade 5/23 (3.7165).
Titanium is the main material for trauma implants thanks to its low allergy risk and excellent biocompatibility.

Optimum chip removal is a key criterion for tools used in titanium machining.

The most important requirement is a **closed surface** in which no germs and bacteria can accumulate. This is typically achieved by **polishing**. The best possible surface quality after machining is therefore crucial for the subsequent polishing process.

The service life of an implant in the body largely depends on its dimensional precision and surface quality.





Bone plates

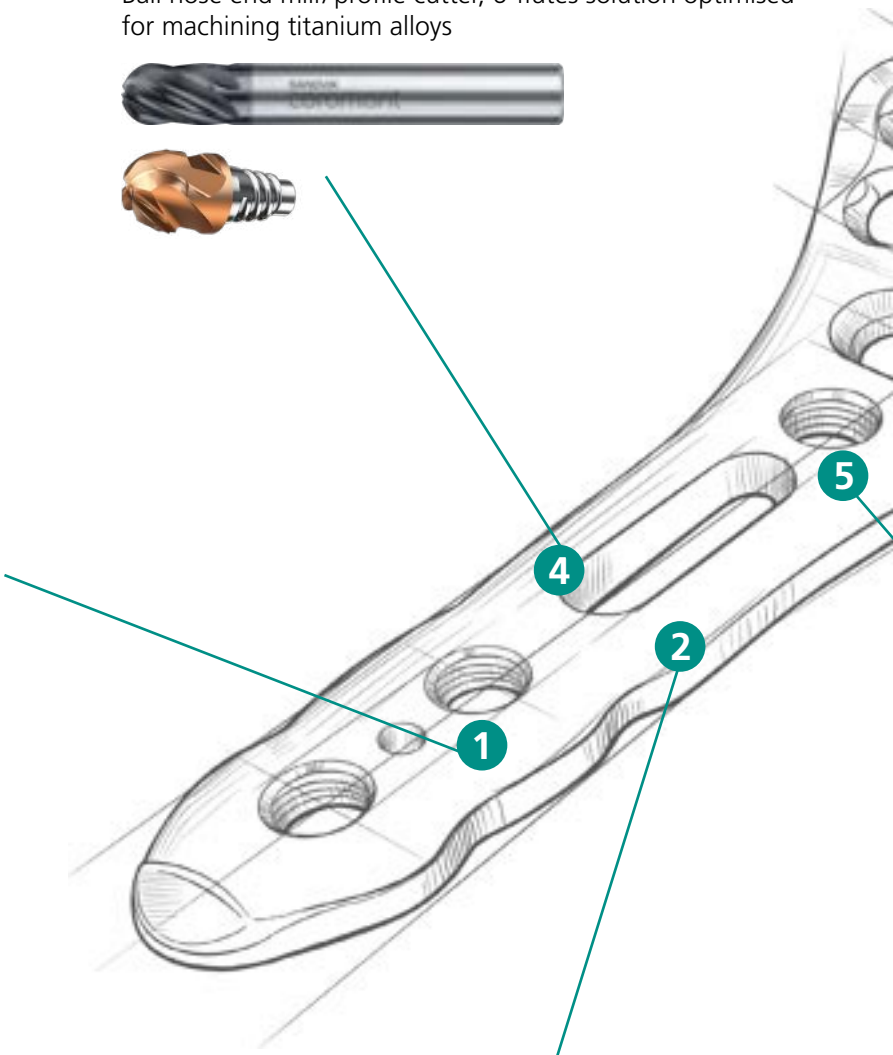
1 DRILLING

ISCAR SUMOCHAM
Replaceable head drilling system with internal coolant, from dia. **4.00 mm**

WALTER DC180
Solid carbide drill with cooling channel, dia. **3.00–20.00 mm**

4 PROFILE MILLING

SANDVIK Coromant
CoroMill® Plura / CoroMill® 316
Ball nose end mill/profile cutter, 6-flutes solution optimised for machining titanium alloys



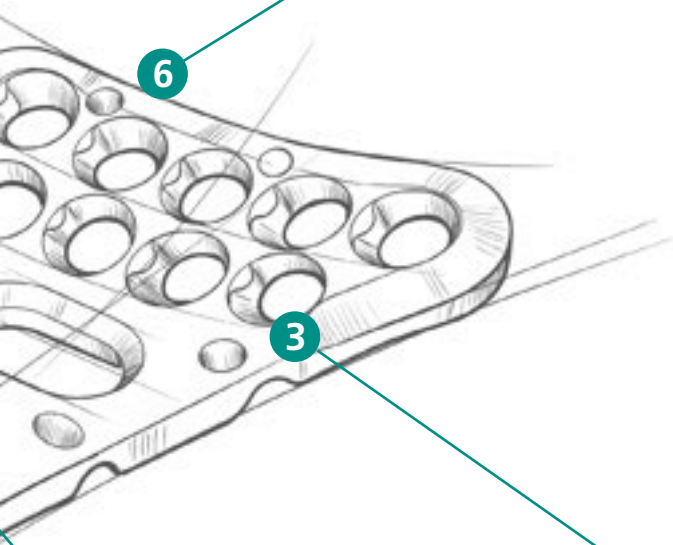
2 MILLING

SANDVIK Coromant
CoroMill® Plura HFS Titanium
6-flutes solution optimised for machining of titanium alloys

3 MILLING

SANDVIK coromant
CoroMill® 316
For milling

magafor
Magafor 8550H 848H
For milling small radii, R0.1 – R1.0,
for ISO-M and ISO-S materials



3 THREAD MILLING

SANDVIK coromant
CoroMill® 326
Optimised multi-material thread milling cutter,
starting from size: **M1.6**

CoroMill® 326
Optimised multi-material thread milling cutters,
starting from size: **M7**

5 MICROMACHINING

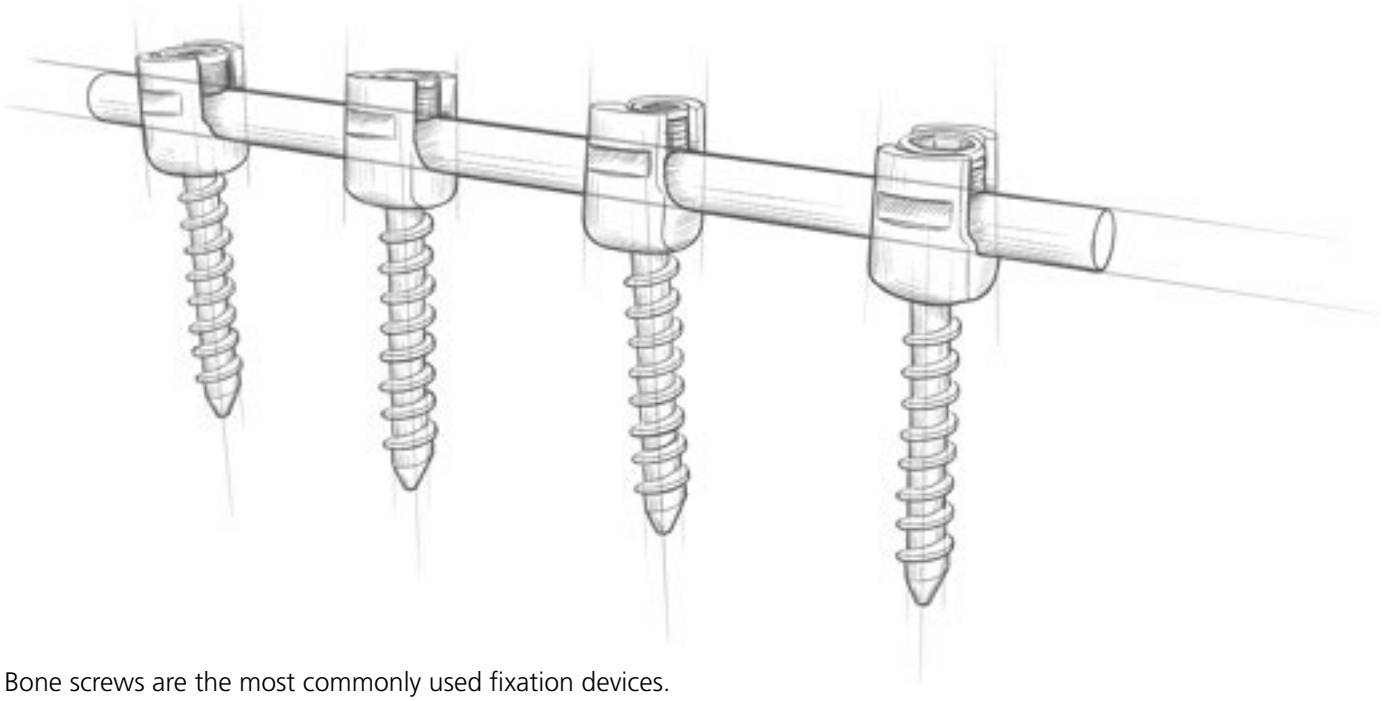
SANDVIK coromant
CoroMill® Plura
Shoulder and ball nose end mills
for materials with hardness ≤ 63 HRc

DIXI polytool
DIXI 7343 7353
Shoulder and toric micro end mill for titanium
and NiCo alloys, dia. **0.3 – 12.0 mm**

WALTER
TC630
Orbital thread milling cutter **M1.6 to M20,**
all ISO materials up to 48 HRC,
with DeVibe anti-vibration technology

DC THREADING TECHNOLOGY
GWI5000
For pure titanium and titanium alloys

Bone screws



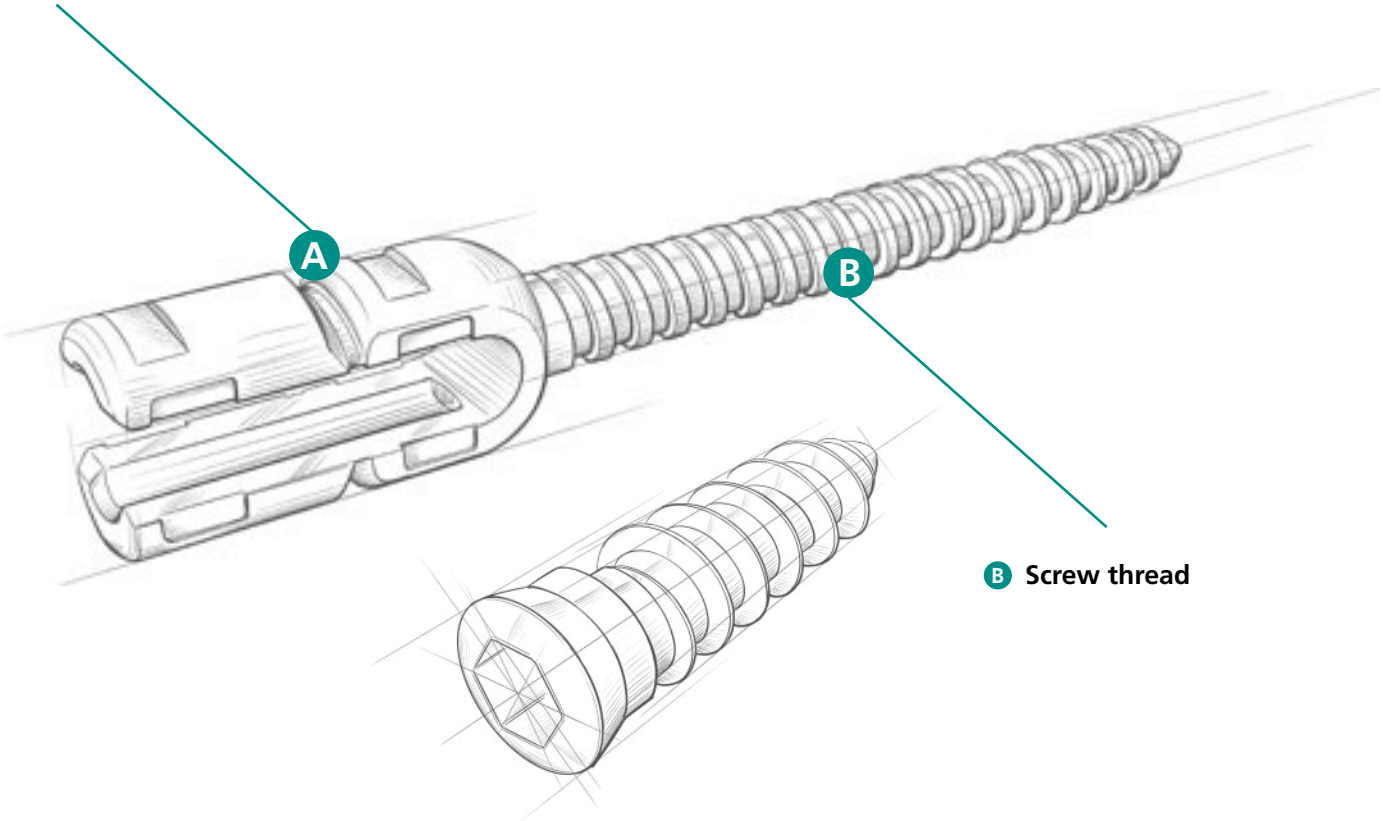
Bone screws are the most commonly used fixation devices. They are usually the only ‘hardware’ in reparative or reconstructive surgery.
More commonly, they are used with other hardware devices, particularly plates, to fixate the associated device to bone.

Facts and component characteristics
The bone screw bar (diameter commonly 4 to 12 mm (0.157 to 0.472 inch) is usually made of **titanium (Ti6Al4V ELI)** or **stainless steel (316LVM)**.

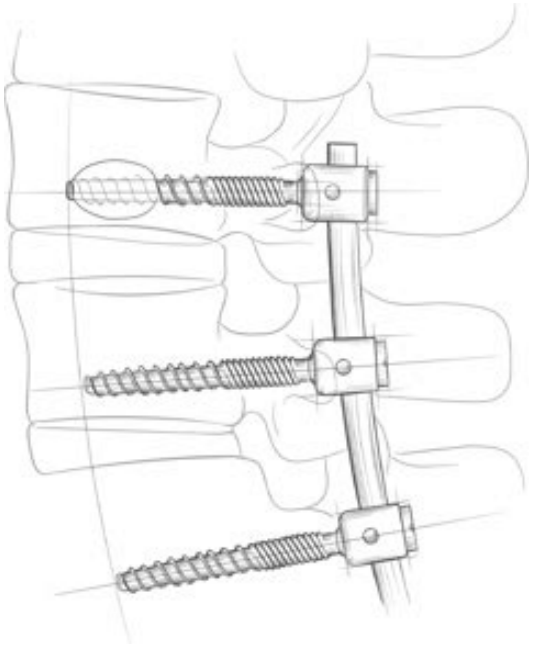
PROPERTIES

– Long slender components, many different sizes
– Fixturing is challenging with the secondary spindle
– Batch production generally from 30 to over 1000 units
– Threads machined by whirling. Critical operation

Ⓐ **Tulip head**



Ⓑ **Screw thread**



Plain turning Swissmachining

Bone screw
dia. 4 × 20 mm, titanium

Monoaxial screw
dia. 16 × 70 mm, titanium

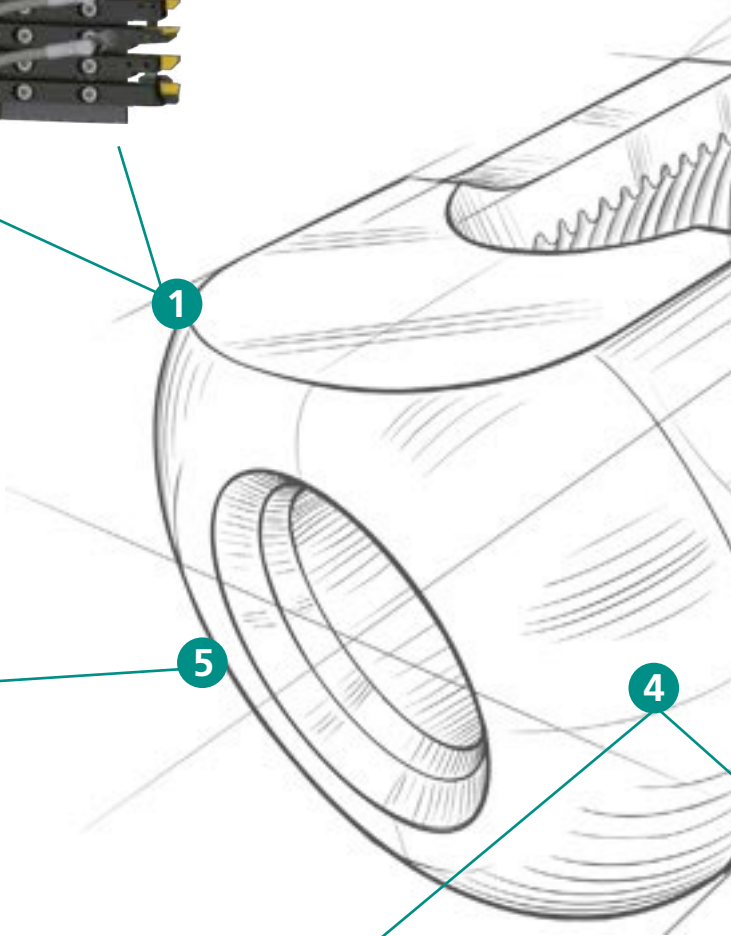
Locating screw
dia. 4 × 120 mm, titanium

A Tulip head

1 EXTERNAL TURNING

SANDVIK Coromant
QS-HP-System
With external turning, the QS-HP system ensures fast clamping, high surface quality, excellent chip control and a very long tool life.

APPLITEC SWISS TOOLING
MODU-LINE
Modular system with precise repositioning and automatic axial thrust



5 DRILLING

SANDVIK Coromant
CoroDrill® 862-GM-X2BL
Optimised multi-material drill, external coolant, dia. **0.3 – 3.0 mm**

CoroDrill® 862-GM-X2BM
Optimised multi-material drill, internal coolant, dia. **1.0 – 3.0 mm**

DIXI polytool
DIXI 1151 SPIRAL DRILL WITH 3 BLADES
For the production of precise holes with excellent roundness and straightness, for titanium alloys, dia. **1.0 – 14.0 mm**

4 CONTOUR TURNING

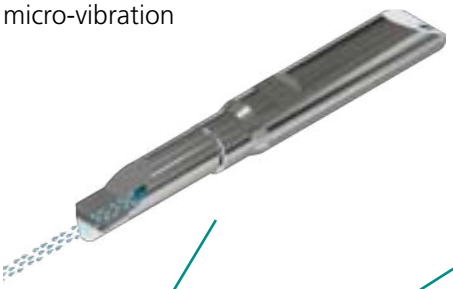
SANDVIK Coromant
CoroCut 1–2
For contour turning of titanium alloys

2 INTERNAL TURNING

APPLITEC SWISS TOOLING

IN-LINE

Versatile internal turning with minimised micro-vibration



SANDVIK coromant

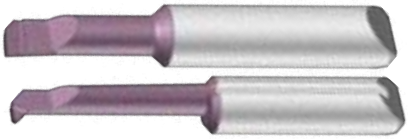
CoroTurn® XS

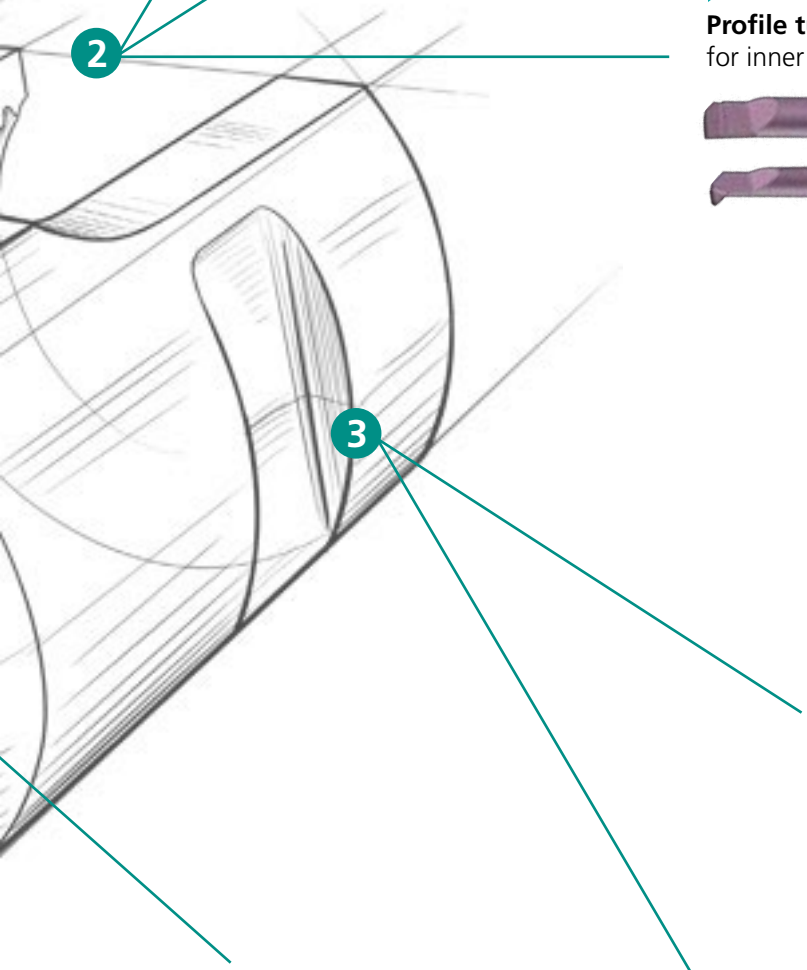
Internal turning with CoroTurn® XS is stable and there are no problems with chips wrapped around the tool. In addition, the machine operator does not need to be present during this work step.

IFANGER

Profile turning bars

for inner contour MTKN/MTKH/MTKO





3 MILLING

SANDVIK coromant

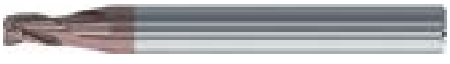
CoroMill® Plura HFS Titanium

4-flutes solution optimised for machining of titanium alloys

DIXI polytool

DIXI 7343 7353

Shoulder and toric micro end mills for titanium and NiCo alloys, dia. **0.3 – 12.0 mm**

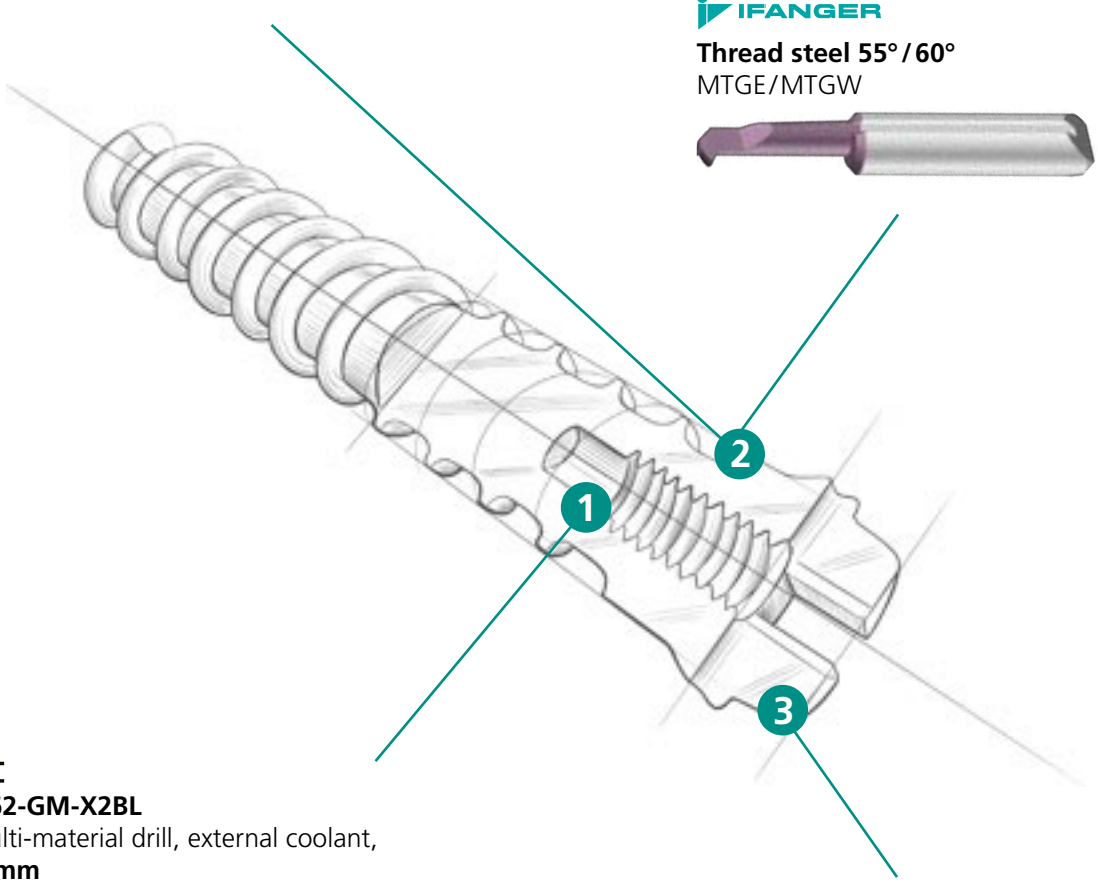


APPLITEC SWISS TOOLING

ZX Geometry

For excellent chip control in difficult materials

B Monoaxial bone screw



2 THREADING

DC THREADING TECHNOLOGY

DC Swiss GWI 5000
For completely burr-free threads, even in difficult-to-machine materials, dia. **M1.4–M6**

SANDVIK coromant

CoroMill® Plura
Optimised multi-material thread milling cutter, dia. **M1.6**

IFANGER

Thread steel 55° / 60°
MTGE/MTGW

1 DRILLING

SANDVIK coromant

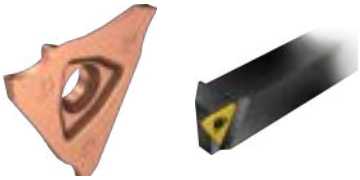
CoroDrill® 862-GM-X2BL
Optimised multi-material drill, external coolant, dia. **0.3–3.0 mm**

CoroDrill® 862-GM-X2BM
Optimised multi-material drill, internal coolant, dia. **1.0–3.0 mm**

3 PARTING OFF

SANDVIK coromant

CoroCut® 3
Precision parting-off of thin-walled or fragile components

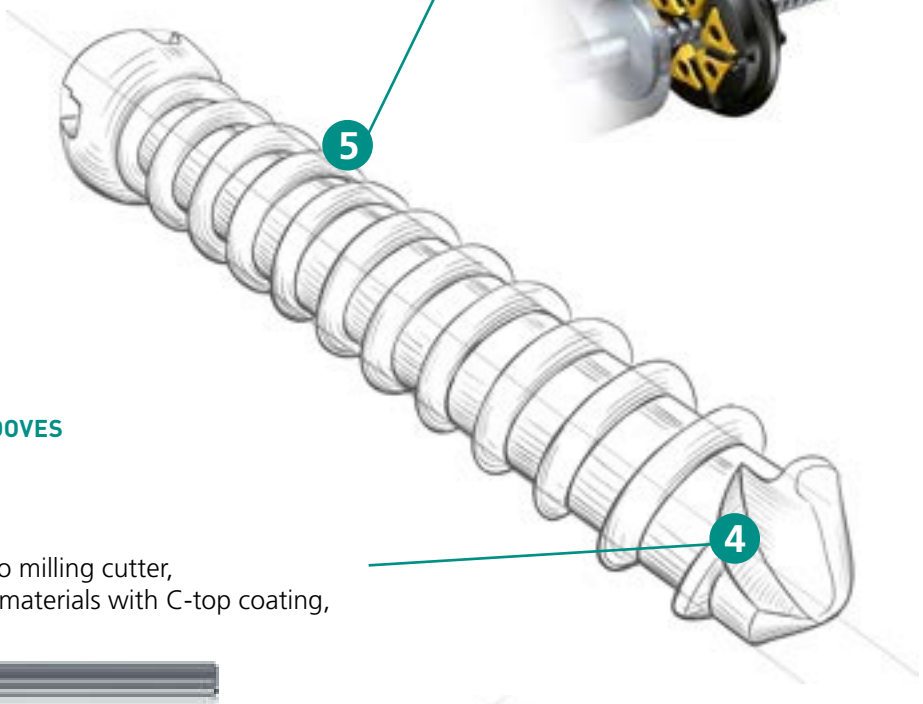


5 THREAD WHIRLING

SANDVIK coromant

CoroMill® 325

Thread whirling for thread cutting on long and and slender components

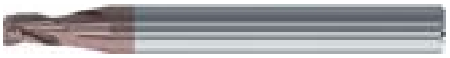


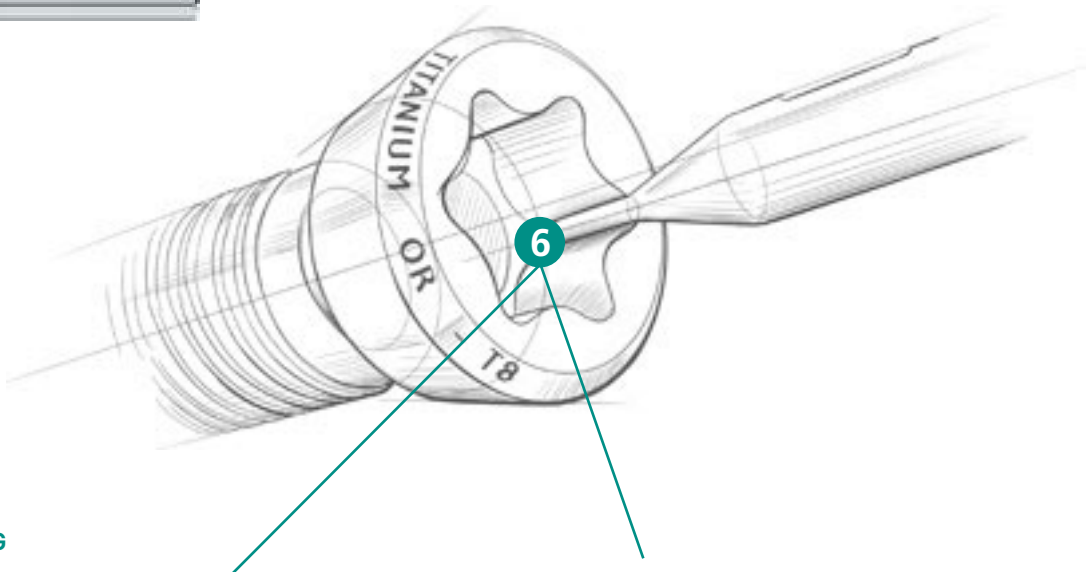
4 MILLING OF GROOVES

DIXI polytool

DIXI 7353

Torus shoulder micro milling cutter, especially for ISO-S materials with C-top coating, dia. **0.4 – 12.0 mm**





6 MICROMACHINING

SANDVIK coromant

CoroMill® Plura

Shoulder and ball nose end mills for various materials with hardness ≤ 63 HRc

VARDEX Advanced Threading Solutions

MicroBroach

For the key contour of screw heads

IFANGER

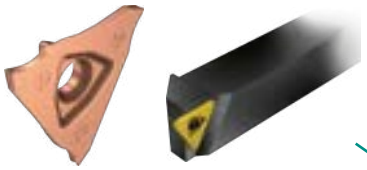
Shoulder turning steel optional

MTEE

B Monoaxial bone screw

3 GROOVING

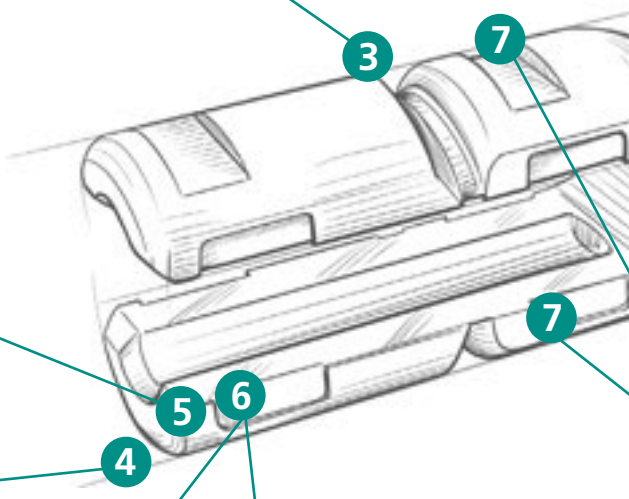
SANDVIK coromant
CoroCut® 3
Precision grooving of thin-walled or fragile components



5 DRILLING

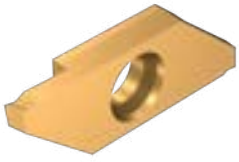
SANDVIK coromant
CoroDrill® 862-GM-X2BL
Drilling, optimised multi-material drill, external coolant, dia. **0.3–3.0 mm**

CoroDrill® 862-GM-X2BM
Drilling, optimised multi-material drill, internal coolant, dia. **1.0–3.0 mm**



4 PARTING OFF

SANDVIK coromant
CoroCut® XS
Versatile system for parting off in small parts production



6 INTERNAL TURNING

SANDVIK coromant
CoroTurn® 107
Precision cooling with nozzles for optimised chip removal and maximum surface quality

IFANGER
Shoulder steel optional
MTEE

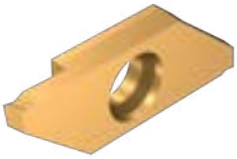
1 TURNING – ROUGHING

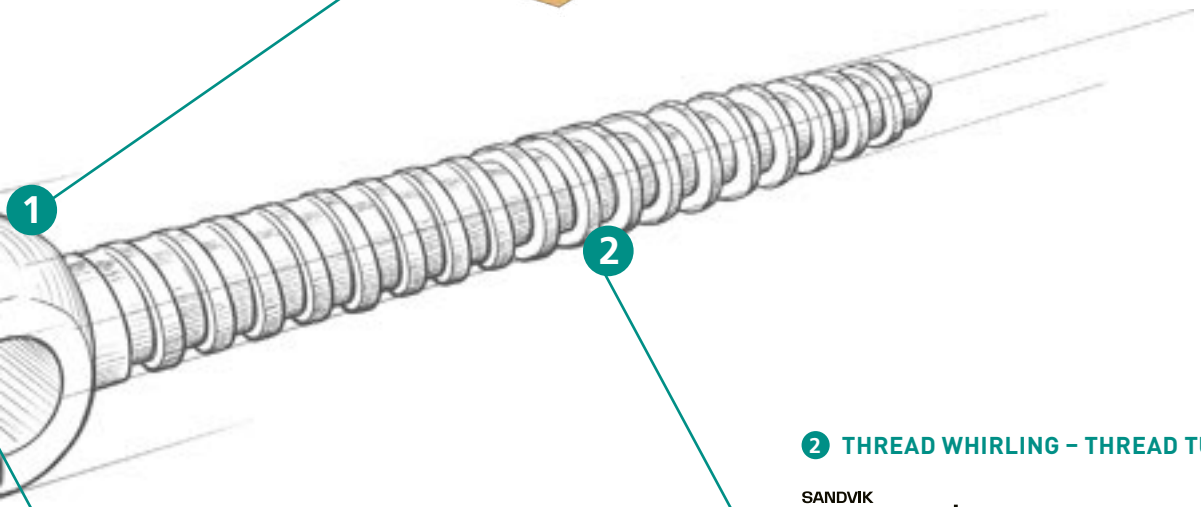
SANDVIK coromant

CoroTurn® 107

Optimised for roughing slender components

CoroCut® XS





7 MILLING OF GROOVES

DIXI polytool

DIXI 7353

C-TOP coated for difficult-to-machine materials

2 THREAD WHIRLING – THREAD TURNING

SANDVIK coromant

CoroMill® 325

Thread whirling for thread cutting on long and and slender components

APPLITEC SWISS TOOLING

TOP LINE 766ZX

With honed blade for thread turning in difficult materials

Dental implants

Dental implants are usually made of **titanium**.
However, ceramic implants can be an alternative for high-risk patients with intolerances and other chronic pre-existing conditions. As long-term studies are still pending, titanium implants are preferable if possible.

THE GREATEST ADVANTAGES OF PURE TITANIUM

– High biocompatibility
– Excellent tissue compatibility
– No allergies, no rejection
– Rapid integration into the jawbone
– High implant stability
– Extremely durable, break-resistant and long-lasting
– Light and elastic

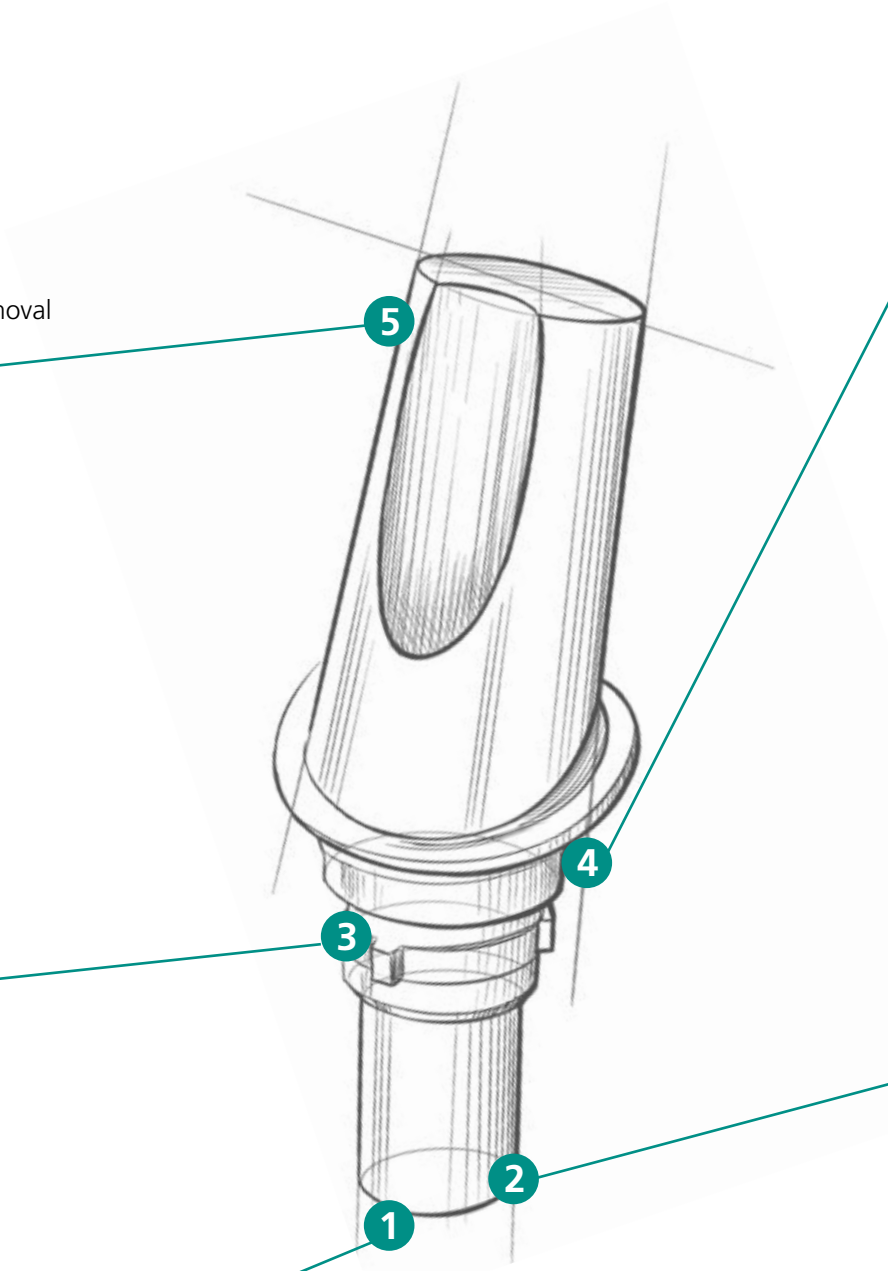
Short turning

Dental implant
dia. 6 × 11 mm, titanium

Lamina hook
dia. 24 × 20 mm, titanium

Dental implant base
dia. 7 × 12 mm, titanium

Dental implants



5 MICROMACHINING

GUHRING

Mikrodiver / MicroMill µ 55 U
With peripheral cooling for optimal chip removal

3 TURNING

SANDVIK coromant

CoroTurn® 107
Turning and profile turning,
diameter: 6–40 mm, RE ≥ 0.02 mm

CoroCut® XS
Turning, profile turning and back turning,
diameter: 1–8 mm, RE ≥ 0.03 mm

1 MICRO-DRILLING

SANDVIK coromant

CoroDrill® 862-GM-X2BL
Optimised multi-material drill, external coolant,
dia. **0.3–3.0 mm**

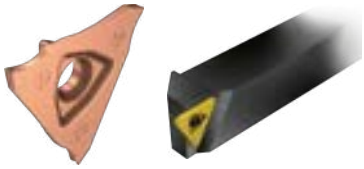
CoroDrill® 862-GM-X2BM
Optimised multi-material drill, internal coolant,
dia. **1.0–3.0 mm**

4 GROOVING

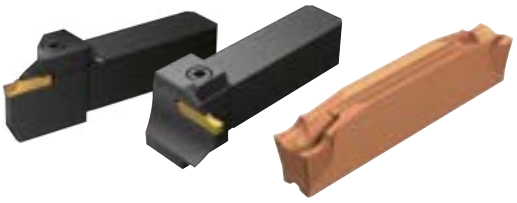
SANDVIK coromant

CoroCut® XS
Max. cutting depth: 1.3–3.7 mm,
cutting width: 0.5–2.5 mm

CoroCut® 3
Max. cutting depth: 3–6 mm,
cutting width: 0.5–3.18 mm



CoroCut® 1–2
Max. cutting depth: 6–16 mm,
cutting width: 1.5–3 mm



CoroCut® QD
Max. cutting depth: >16 mm,
cutting width: 1–3 mm

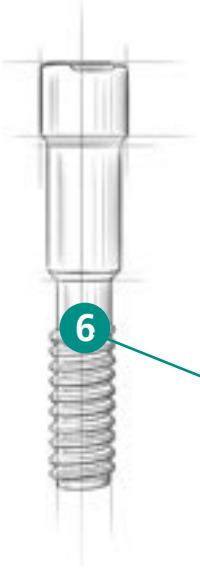
2 THREADING

SANDVIK coromant

CoroMill® Plura R217
Optimised multi-material thread milling cutter,
Starting from size: **M1.6**

DIXI polytool

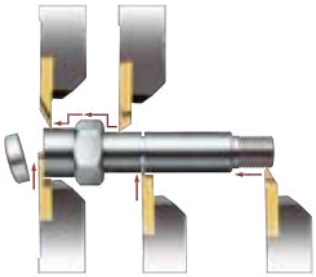
Thread whirler DIXI 1730
M 0.8–M 10.00, Z = 3–6



6 TURNING

SANDVIK coromant

CoroCut® XS



Dental implants

1 MICRO-DRILLING

SANDVIK Coromant

CoroDrill® 862-GM-X2BL
Micro-drill, optimised multi-material drill, external coolant, dia. **0.3–3.0 mm**

CoroDrill® 862-GM-X2BM
Micro-drill, optimised multi-material drill, internal coolant, dia. **1.0–3.0 mm**

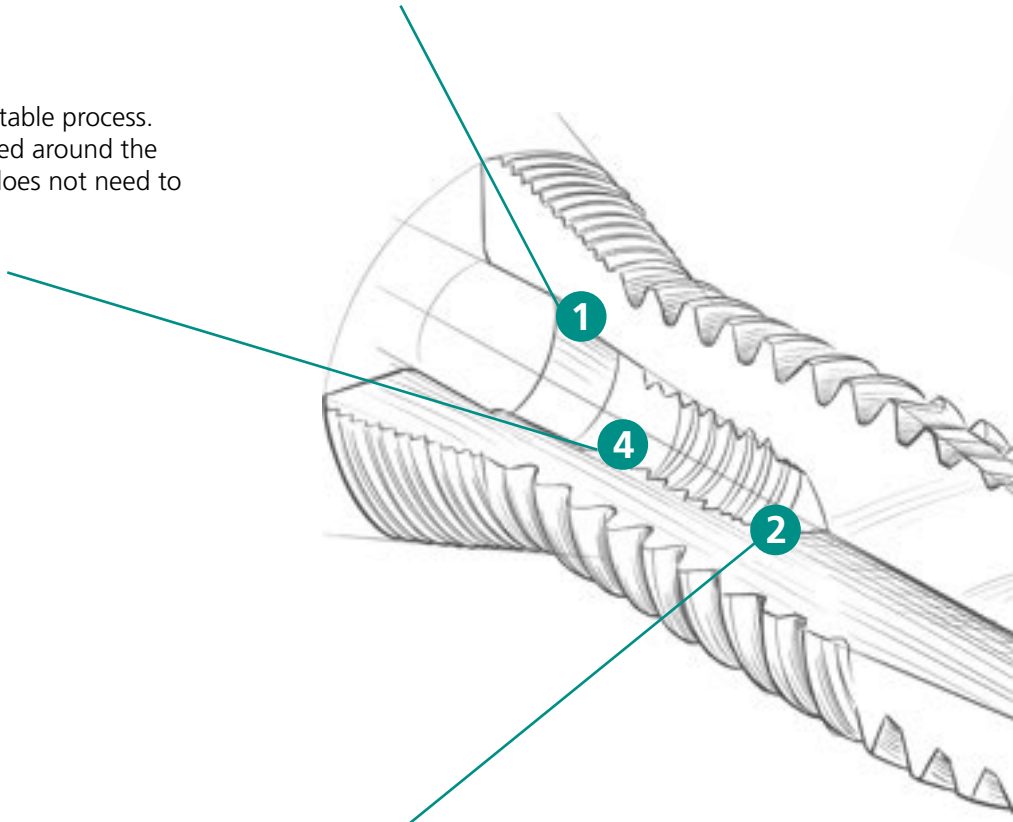
4 INTERNAL TURNING

SANDVIK Coromant

CoroTurn® XS
Internal turning with CoroTurn® XS is a stable process. There are no problems with chips wrapped around the tool. In addition, the machine operator does not need to be present during this work step.

IFANGER

Shoulder steel optional
MTEE



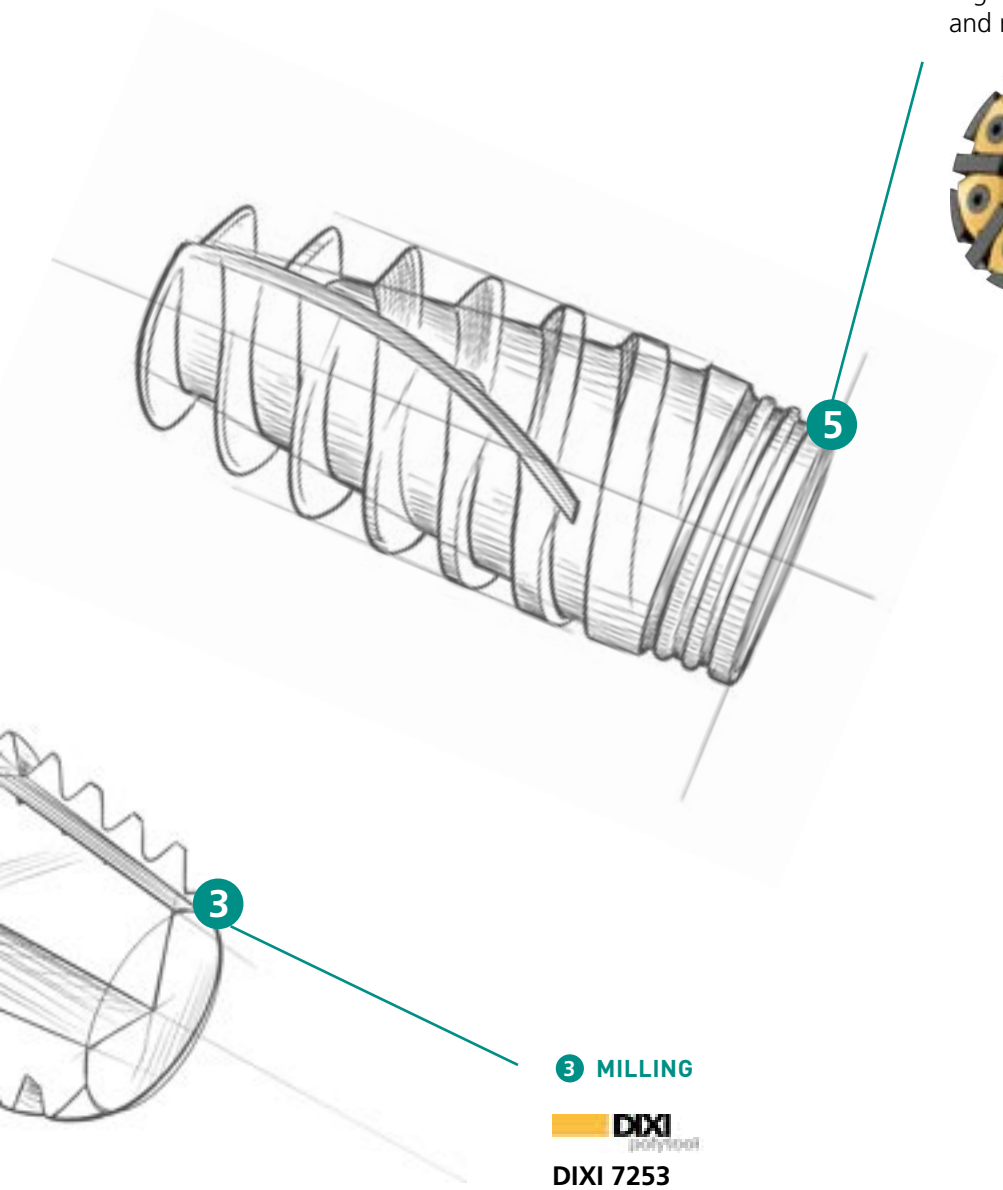
2 THREADING

SANDVIK Coromant

CoroMill® Plura R217
Optimised multi-material thread milling cutter, Starting from size: **M1.6**

DIXI polytool

Thread whirler DIXI 1730
M 0.8–M 10.00, Z = 3–6



5 THREAD WHIRLING

VARDEX Advanced Threading Solutions

V-Whirling VWM
High-precision whirling system for medical and micro-machining

3 MILLING

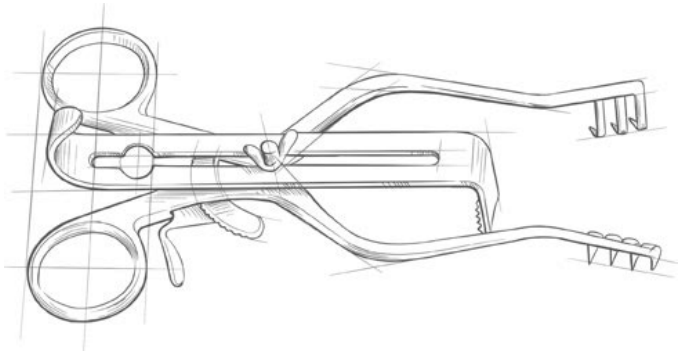
DIXI Polytool

DIXI 7253
Milling cutters with different helix angles

Surgical instruments

The **materials** used to manufacture surgical instruments are standardised both nationally and internationally. As the function of most instruments requires high strength, **hardenable chromium steels with low to medium carbon content** are used.
The chromium content is >12.5%, as only this content can guarantee sufficient corrosion resistance. Since the much more corrosion-resistant chromium-nickel steels are not hardenable, they can only be used to make bowls and special, large-surface instruments

For example: Stainless steel 1.4021 (ISO-OP) , X8CrNiS 18-9 (ISO-Mn)



Tempering
Tempering is the most important production step for the function and reprocessing of most instruments. Tempering ensures that hardenable chrome steel instruments have the required hardness, durability and corrosion resistance.

Instruments made of chromium-nickel steels cannot be hardened; these steels are therefore only suitable for special instruments.

For manufacturers, this means that it is necessary to work in a single clamping operation if possible. On the other hand, this requires high material removal rates for both small and large tool sizes.

In the medical field, the focus is also on ensuring that the edges of the workpieces are **free of burrs.** If a burr were to detach in the patient's body, this piece of metal could cause a lot of damage unnoticed. The higher the surface quality, the more difficult it is for germs to take hold, and the easier it is to sterilise the instrument.

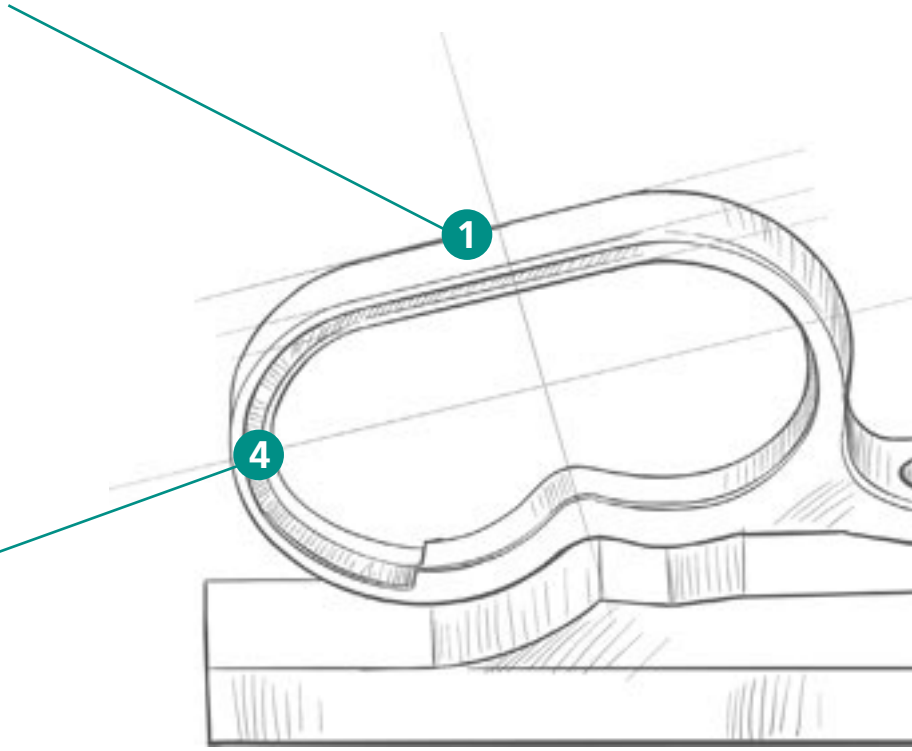
Surgical instruments

1 ROUGHING

SANDVIK coromant

CoroMill® Plura HD – ISO M

Roughing of the external contour, the internal shape of the handle and the pockets, finishing, grade: M2CM

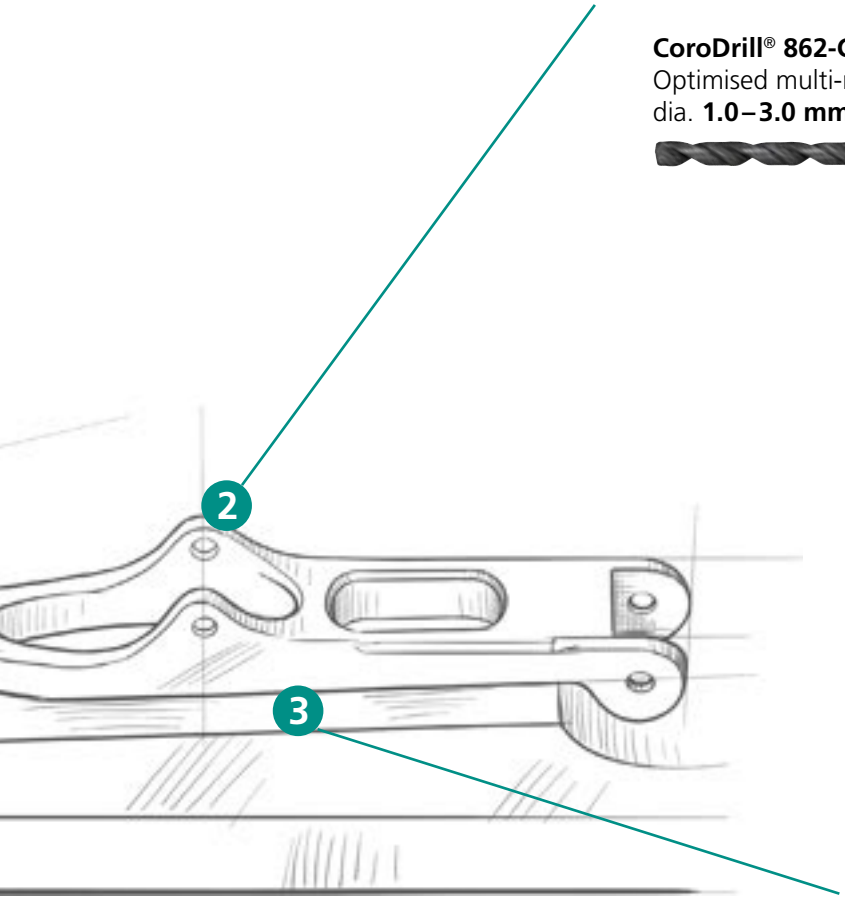


4 CHAMFERING / DEBURRING

SANDVIK coromant

CoroMill® Plura 316

Chamfering/deburring of the complete component, geometry and grade suitable for a wide range of materials 15°, 30°, 45°



2 DRILLING

SANDVIK coromant

CoroDrill® 862-GM-X2BL
Optimised multi-material drill, external coolant, dia. **0.3–3.0 mm**

CoroDrill® 862-GM-X2BM
Optimised multi-material drill, internal coolant, dia. **1.0–3.0 mm**

3 MILLING

SANDVIK coromant

CoroMill® Plura
Shoulder milling cutter for various materials with hardness ≤63 HRc

FRANKEN TiNox-Cut
High-performance roughing end mill for titanium, nickel and cobalt alloys, as well as corrosion-resistant steels.

Titanium lamina hooks

Dia. 24 × 20 mm

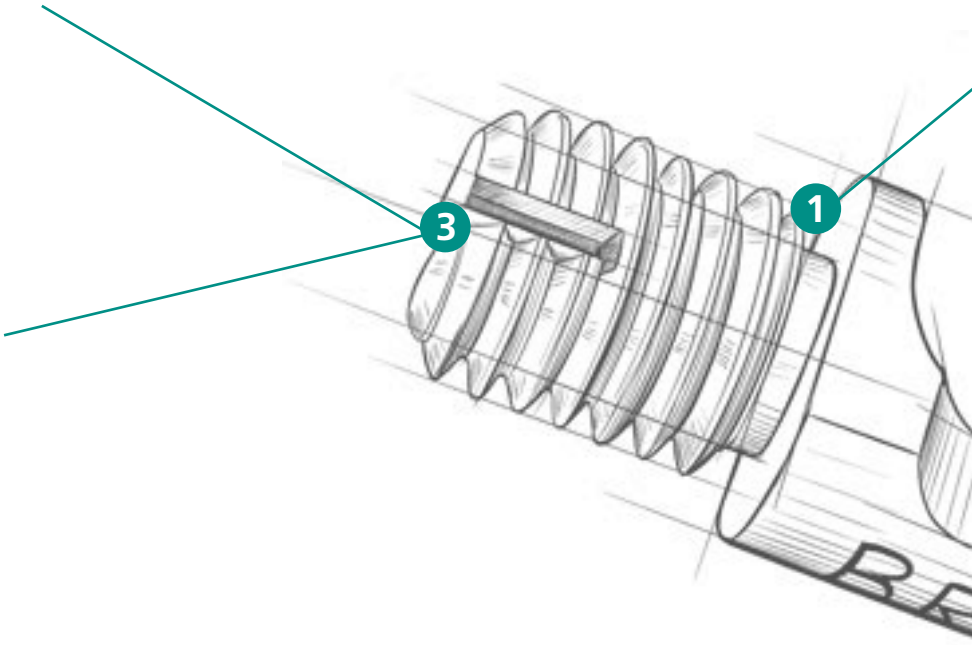
3 CIRCULAR SAWS

APPLITEC SWISS TOOLING

APPLITEC Circular saw blades Type 1101

DIXI polytool

DIXI VHM Circular saw blade Type A
Fine toothing, DIN 1837A



4 ENGRAVING

APPLITEC SWISS TOOLING

APPLITEC MICRO-Line
Wide range of different versions and coatings

DIXI polytool

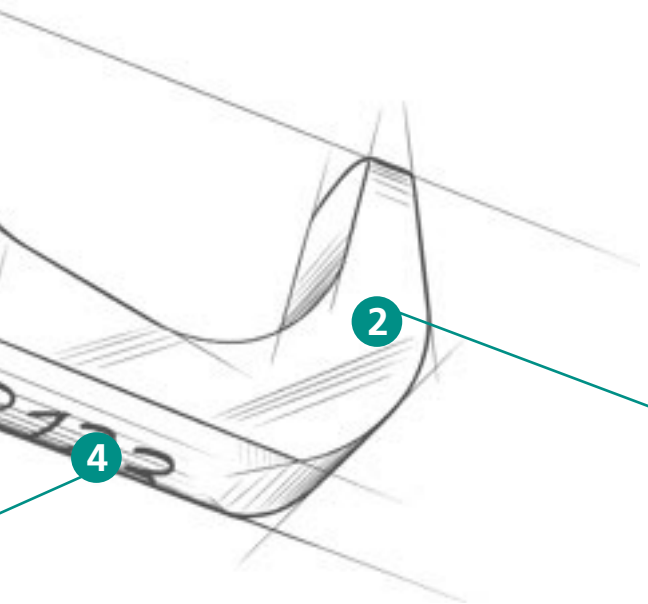
3 / 4 ENGRAVING CUTTER DIXI 7007 DINAC
DINAC-coating improves tool life in iron and non-ferrous materials

1 MICROMACHINING

SANDVIK coromant

CoroMill® Plura

Shoulder and ball nose end mills for various materials with hardness ≤63 HRc



2 MILLING

SANDVIK coromant

CoroMill® Plura HFS Titanium

Solution optimised for machining of titanium alloys

Finishing

1 BRUSHING

Tungsten carbide/ceramic/diamond brushes

2 CLEANING

FUTURO

Automated workpiece cleaning

3 DEBURRING

FUTURO

Solid carbide tools for ISO-M and ISO-S materials


SZ5 LT

Metrology solutions for the medical components

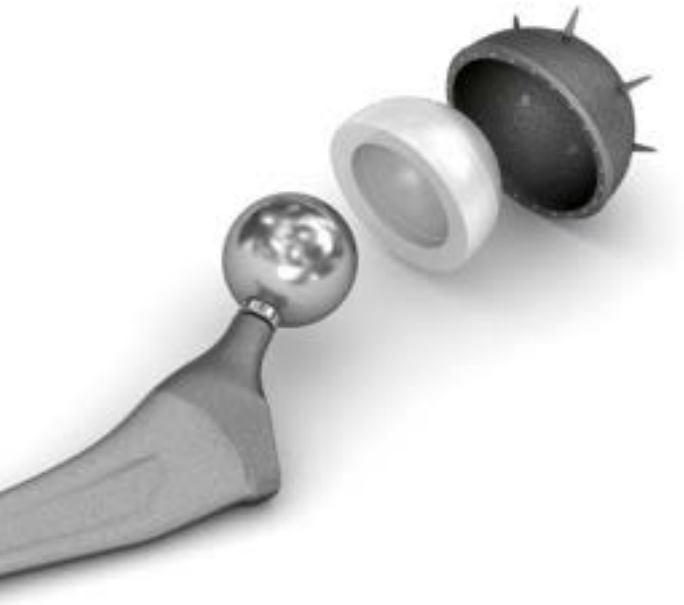
Prosthetics profiling

sylvac

SYLVAC MEASURING BENCH PS16 V2 LV SMART
Superior performance: These benches provide accurate measurement of small and complicated components that are otherwise difficult to handle, ensuring consistent and reliable results. With a proven track record of success in demanding applications in the medical industry. You can rely on this bench to provide accurate measurements each and every time.

sylvac

MEASURING BENCH PS15 BV / BV+
Vertical measuring bench: The small and versatile vertical measuring bench inspects small parts up to 10 mm with a linear ball bearing spindle guide. Perfect for measuring shoulder heights.
Precise and customisable: display of measurement values with a choice of a digital dial or a Sylvac measuring probe for a resolution of up to 0.0001 mm. The bench is equipped with a wide range of accessories for a variety of applications.



sylvac

GAUGE S CAL EVO BASIC

High productivity with a fast maximum adjustment speed of 2.5 m/sec., while the intelligent sleep mode saves power after 10 minutes of inactivity, optimising battery life.

FUTURO

Digital sliding Gauge FUTURO, IP67

sylvac

MEASURING PROBE P25D

- **Precision at your fingertips**: This probe offers highly accurate measurements with a measuring range of 25 mm and a resolution of 0.01 µm. Its patented dual inductive system ensures accuracy and repeatability.
- **Convenient and customisable**: the device comes with a 2-metre straight cable and offers both USB and M8 ports.

Measurement of the properties / diameter of bone screws

sylvac

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sylvac

SYLVAC MEASURING BENCH PS16 V2 LV SMART

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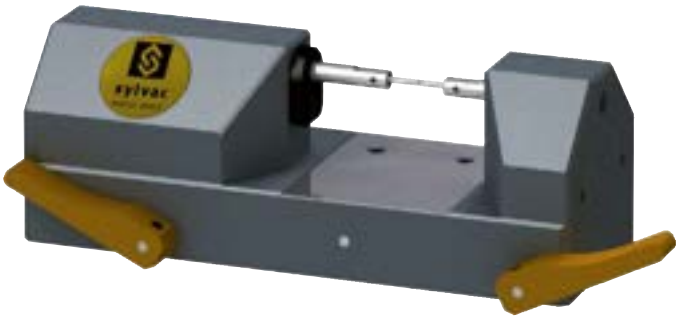

sylvac

MEASURING BENCH PS15 BH
Pinpoint precision: Equipped with a measuring spindle guided by linear ball bearings, this measuring bench can be equipped with a digital dial or a measuring probe for a resolution of up to 0.1 µm. The combination of Sylvac display units and measuring probes achieves an overall accuracy of 0.6 µm and a repeatability of 0.2 µm.

sylvac

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Thread measurement for dental implants

sylvac

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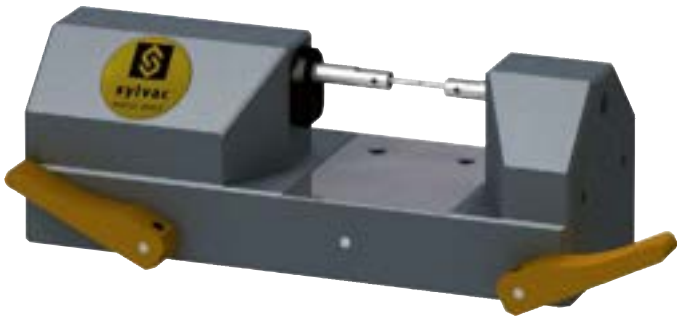

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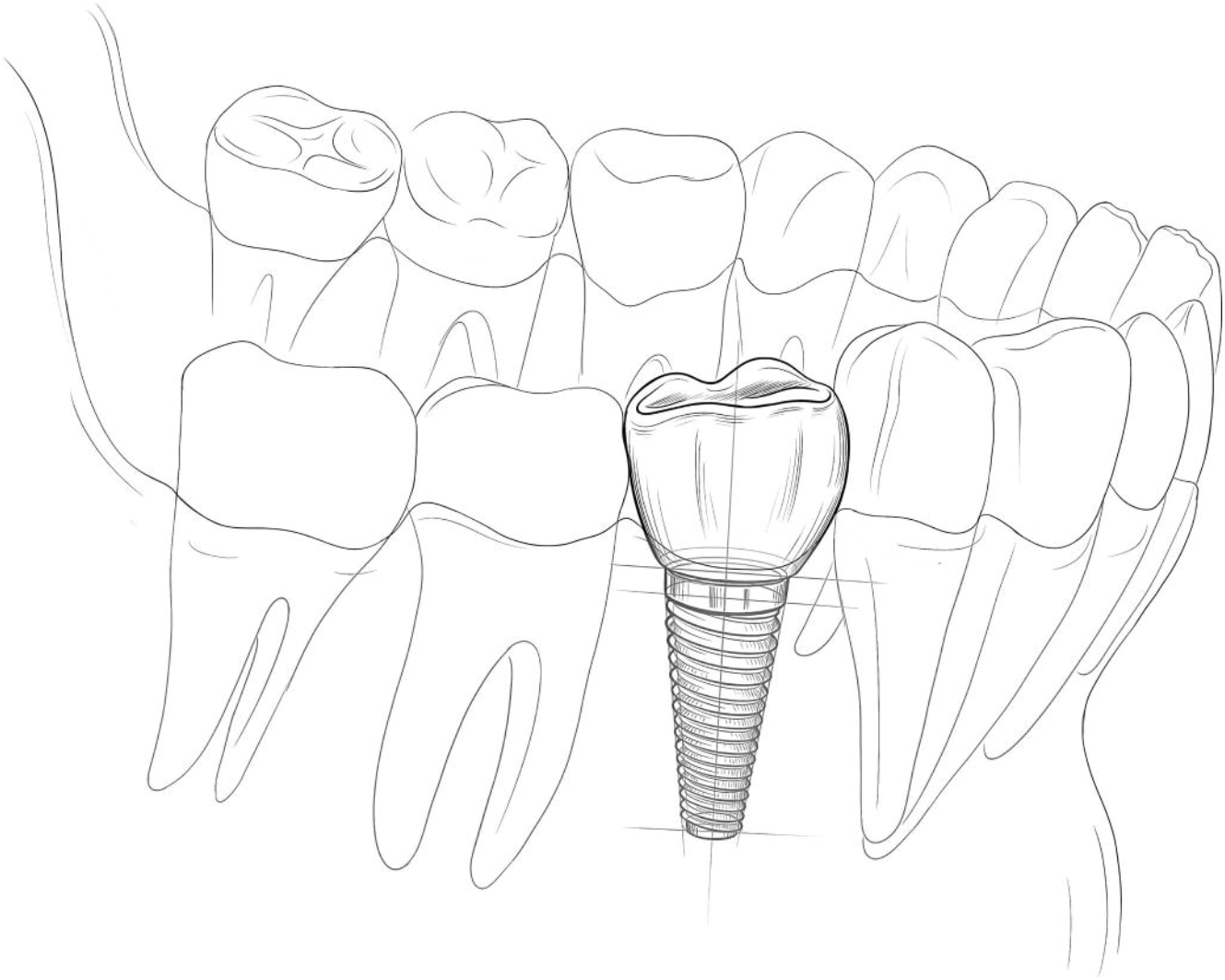

Optical measurement of external contours

sylvac

SYLVAC SCAN S25T
This high-resolution and highly accurate machine is ideal for **measurements on small cylindrical parts up to Ø 26 mm and 200 mm in length, where measurement time and accuracy are of the essence.**

With a complete 2D part scan that takes less than three seconds, **inspection times are reduced**, scrap is minimised and **overall productivity is increased**.

The all-new user touchpad enables intuitive operation right on the shop floor, with automatic one-click measurement and part recognition.

Precision and efficiency: exceptional precision with our machine's bi-telecentric optical system and the high-resolution CMOS camera

Seamless integration: This offer includes the Reflex SCAN+ software and a PC that makes it easy to intuitively measure a wide range of elements.


sylvac
SCAN S25T
SWISS MADE

Hive
Digital Suite

Brütsch·Rüegger
Tools

Utilise the potential of your production data

Hive Digital Suite, networked applications for industry.

HIVE INVENTORY

AUTOMATE YOUR
TOOL AND MATERIAL MANAGEMENT

HIVE SHOPFLOOR

EVALUATE MANUFACTURING PROCESSES
AND CREATE NEW PRODUCTION CAPACITIES

HIVE QUALITY CONTROL

SIMPLE QUALITY CONTROL AND LOGGING
OF MEASUREMENT DATA AT ALL PRODUCTION LEVELS

HIVE CONNECT

DIGITAL NETWORKING OF YOUR MEASURING EQUIPMENT

Our digital 4.0-Business Apps

HIVE INVENTORY

- "ToolBox" output system
- Traceability of withdrawals and returns
- Monitoring of tool consumption
- Automated warehouse management

HIVE CONNECT

- Networking of your measuring equipment
- Display values in real time
- Defining tolerances per measuring instrument
- Reset function (Offset)

HIVE QUALITY CONTROL

- SPC Software
- Management of measurement data during the production process
- Customisable workflows for internal processes
- Progress and control reports

HIVE SHOPFLOOR

- Real-time machine dashboard
- Measuring and increasing overall equipment efficiency (OEE)
- Analysis of your machine downtimes
- Influence on your planning

Hive Digital Suite

Do you need more information about our applications?

www.hive-digital-suite.com

Brütsch·Rüegger
Tools

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