DIXI polytool

Dental

Medical Technology

DIXI MEDTECH

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DIXI POLYTOOL S.A.

COMPANY PROFILE

DIXI Polytool S.A. is specialized in the production of tungsten carbide and diamond cutting tools as well as precision reamers.
The company is based in Le Locle since 1946.

With the introduction of the Lean Project, and the heavy investments in the production, our efforts are also focused on supporting our (customers and) 300 co-workers.

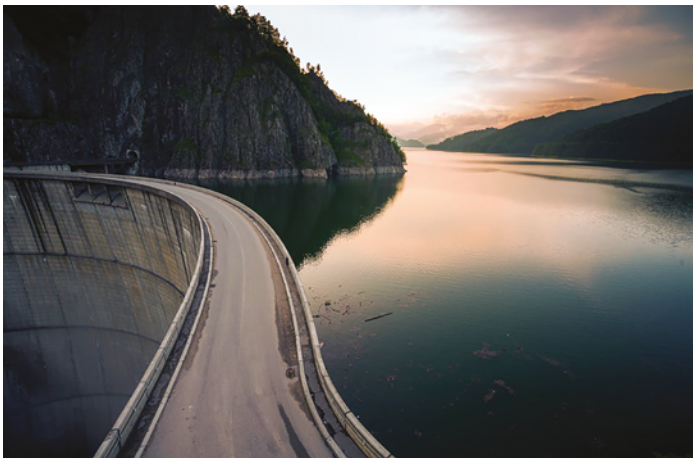
Eager to guarantee the quality of its products while preserving the environment, DIXI Polytool S.A. elaborated a system of certified management according the standards **ISO 9001** and **ISO 14001**.


IQNet
THE INTERNATIONAL CERTIFICATION NETWORK
CERTIFICATE
DIXI POLYTOOL S.A.
Av. du Technicum 37
2400 Le Locle
Switzerland
has implemented and maintains a
Management System
for the following scope(s):
According to appendix SQS registration number H10379
which fulfills the requirements of the following standard(s):
ISO 9001:2015 Quality Management System
ISO 14001:2015 Environmental Management System
Issued on: 2018-09-25
Expires on: 2021-07-14
Registration Number: CH-H10379

Systèmes de Management Certifiés
SQS
ISO 9001 / ISO 14001

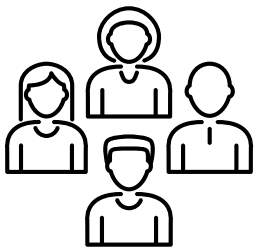
Go Green

DIXI Polytool is powered 100% green electricity produced exlusively from solar panels and hydrpower station.



KEY FIGURES

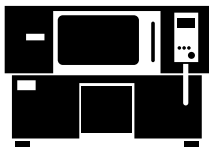
+ 18'000
standard references in stock

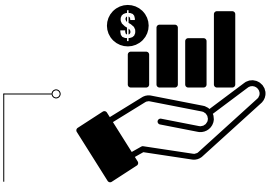


300
employees

9 subsidiaries in
7 countries

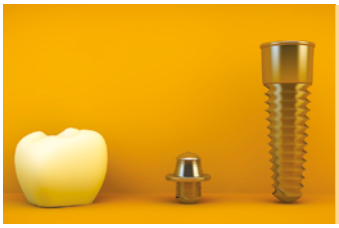
140 machines





60 million in sales
35% of which special tools

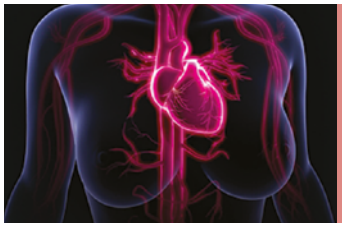
MEDTECH MAIN SECTORS IN MACHINING



DENTAL IMPLANTOLOGY

SPINE

JOINT REMPLACEMENT



INTERVENTIONAL THERAPIES
COMPONENTS

OCULAR

SURGICAL INSTRUMENT

SUMMARY

PRECISION TOOLS FOR MEDICAL TECHNOLOGY

With advances in medical sciences and engineering, the need and complexity of design for different implantable medical devices, associated surgical instruments, electronic medical components, and micromachined medical parts has increased significantly. As a result, the number of medical parts produced by machining is increasing each year.

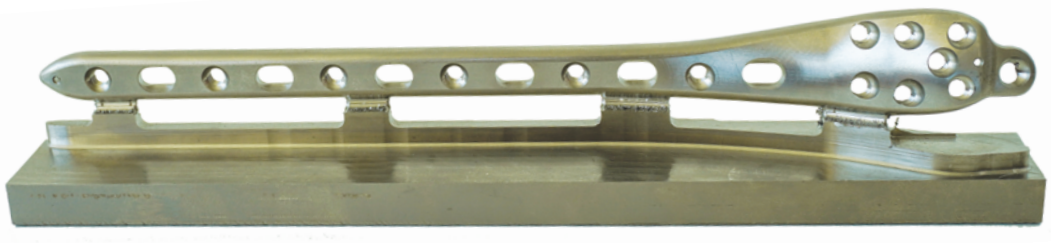
As every patient's anatomy is unique, every orthopedic range implant needs to accommodate a wide variety of anatomies. As a result, product lines require multiple sizes, geometries, and shape options.

Manufacturing medical and dental products require the most advanced technology and processes. These products are often made of difficult-to-work-with materials such as cobalt chrome, stainless steel, nitinol, PEEK reinforced with carbon fibers, and titanium.

DIXI Polytool, due to its location, it benefits from a favourable Medical environment. Most of the big players are in the surrounding area, working together with DIXI Polytool to optimize their manufacturing process. DIXI Polytool has therefore been able to develop over years special solutions dedicated to the machining of medical parts.

Common applications in which DIXI Polytool is actively involved in tool development are :

- Trauma plates, cannulated bone screws, bone anchors
- Cardiology and vascular components
- Minimally invasive surgical equipment like laparoscopic devices
- Dental prosthesis such as dental implants
- Wound care (clips, suture needles)
- Orthopedic devices, such as components for joint replacement
- Ocular equipment

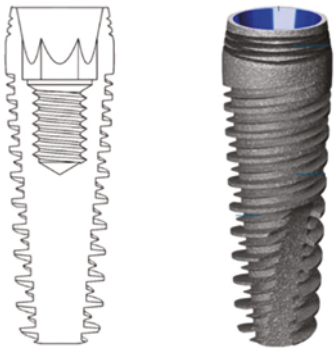


DENTAL TECHNOLOGY

Structure of the dental implant

Common materials for dental implants :
ISO 5832-2 : 3.7065 – Titanium Grade 4 – T60
ISO 5832-3 : 3.7165 – Titanium Grade 5 – TA6V
ISO 5832-3 : 3.7165 – Titanium Grade 23 – TA6V ELI (Extra Low Interstitials % O; N; H; C)
ISO 13356 : Zirconia – Zirconium dioxide – Y-TZP (Yttria stabilized Tetragonal Zirconia Polycristal) 95% Zr02 + 5% Y2O3
ISO 5832-12 : Cobalt-Chrome - CoCr28Mo

DENTAL IMPLANT

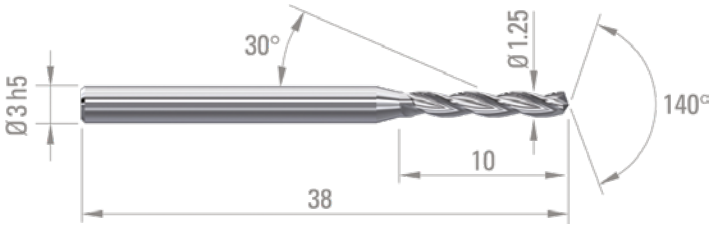


MATERIAL : 3.7165 – Titanium Grade 5 - TiAl6V4

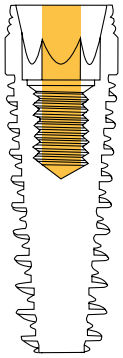
Source picture : A'B superior implant technology catalog 2017

DENTAL IMPLANT INTERNAL CONNECTION TO ABUTMENT

DIXI 1152



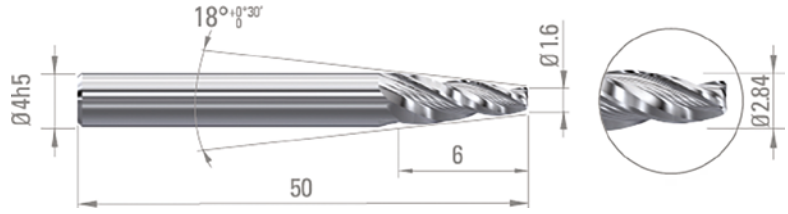
Step 1:
Drilling Ø1.25 x 6.50 with solid carbide drill.
Drilling strategy, one shot on 3xD and then pecking cycles every 0.5 mm.
Ref. 962915
Z = 3
Machine: Tornos deco 20
Coolant: Oil - external
Material: 3.7165 – TiGr5 – Ti6Al4V



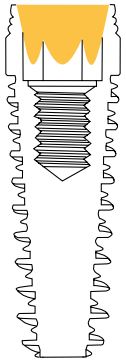
n [rpm]	Vc Cutting speed	f Feed per revolution	Vf Feed speed
7'500 min-1	30 m/min	0.04 mm	300 mm/min

3 fluted twist drills with reinforced shank developed to guarantee excellent precision and straightness of the hole.
Suitable for titanium alloys.
Available on stock from Ø0.15 to 2.90.

DIXI 7645



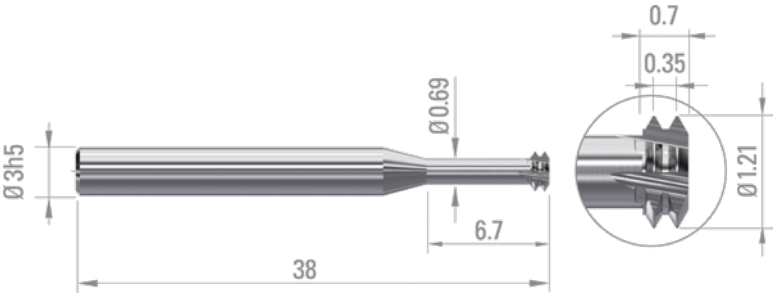
Step 2:
Milling internal conical connexion between implant base and abutment
Ref.430065
Z = 3
Machine: Tornos deco 20
Coolant: Oil - external
Material: 3.7165 – TiGr5 – Ti6Al4V



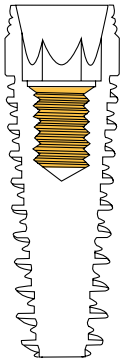
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	Ø Pre-hole
6'000 min-1	54 m/min	0.01 mm	180 mm/min	1.90 mm

Special solid carbide conical end-mill to ensure perfect waterproof connection and prevent any risk of bacterial infection.
Special milling tool with extremly tight tolerance on the conical part.
The operation that was done with a boring bar is replaced by this special conical end-mill.
Repeatability is improved. Tool consumption can be easily quantified according to batch size, and long term dimensional stability can be achieved without program correction.

DIXI 1730-3D



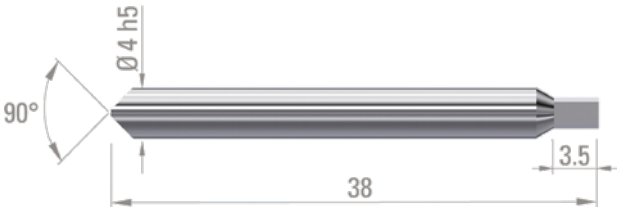
Step 3 :
Threading M1.6 x 0.35 with solid carbide whirlers.
Ref. 429992
Z = 3
Machine : Tornos deco 20
Coolant : Oil - external
Material : 3.7165 – TiGr5 – Ti6Al4V



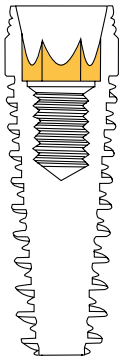
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	Part rotation [rpm]
8'000 min-1	40 m/min	0.002 mm	48 mm/min	9.55 min-1

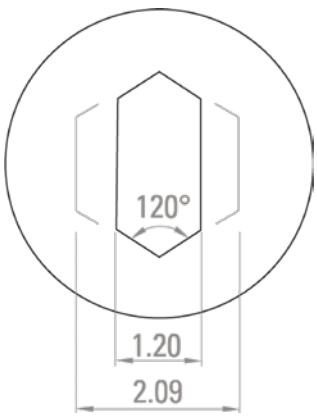
ISO whirling tools, full profile, 5xDnom. necked-down, developed to reduce cutting forces in comparison to thread mills.
No burrs thanks to the full profile.
Thread according to ISO 965 (DIN 13).
Available in stock from M0.80 to M10.00 uncoated or TiAlN coated.

DIXI PUNCH



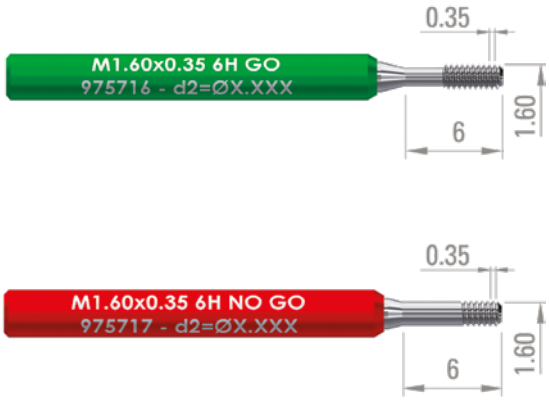
Step 4 :
Broaching the hexagonal socket.
Ref. 376430
Machine : Tornos deco 20
Clamping : Ifanger© tool holder
Coolant : Oil - external
Material : 3.7165 – TiGr5 – Ti6Al4V



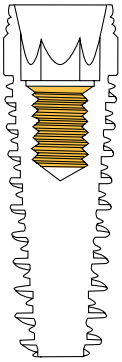


QUALITY INSPECTION ON DENTAL IMPLANTS

DIXI 1718-M - 1719-M



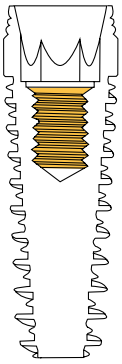
Solid carbide thread gauges dedicated to the pitch diameter inspection of threads according to ISO 965 (DIN 13). Gauges tolerances according to ISO 1502.



PLAIN GAUGES

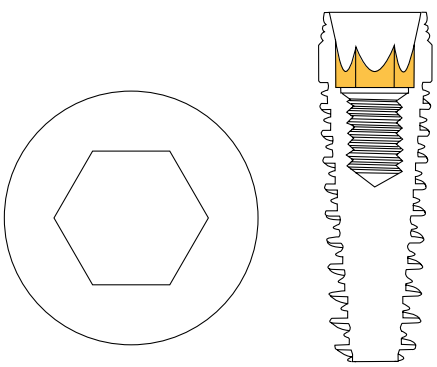
Solid carbide plain gauges « GO » and « NO GO » dedicated to the inspection of the minor diameter of self-locking threads according to ISO 965 (DIN 13).

Gauge tolerances according to ISO 1502.



HEXAGONAL GAUGES

Solid carbide special gauges dedicated to the inspection of screw socket.



SOCKET SCREWS

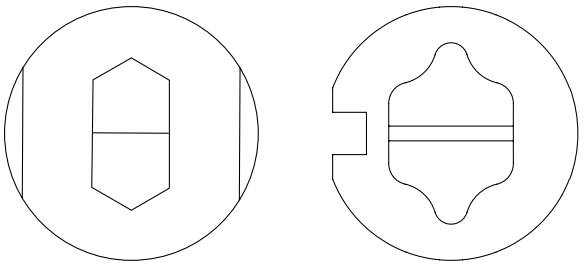
The machining of medical screw sockets is a major challenge in decolletage industry. DIXI, thanks to its wide tool range, is able to offer you different machining solutions. Indeed, Hexagonal sockets require broaching tools when Torx sockets could be machined also with end-mills. Furthermore, the most suitable machining process depends on several customer's factors such as his machine capabilities, programming software and clamping unit.

For example a full broaching profile tool is often driven in rotation by the workpiece, which implies a special feature to clamp the tools and adapt its cutting conditions.

Once the machining has been carried out, it is necessary to check the dimensions.

DIXI is able to manufacture gauges for all kind of screw sockets.

TORX AND HEXAGONAL BROACHINGTOOL

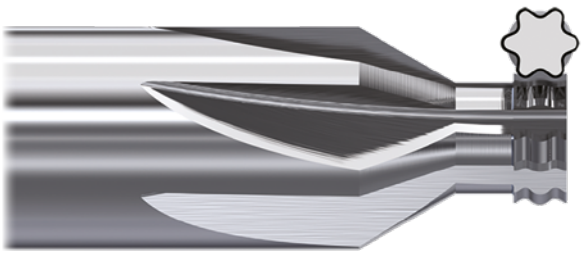


DIXI is providing broaching tool on request.

We have selected a specific carbide grade to obtain the best results when machining screw heads. We adapt to all broaching tool holders, including Hobe© and Ifanger©, delivering our tools with suitable clamping and indexing interfaces. All you have to do is mention your clamping system when making your request.

To improve tool life we also offer you to grind coolant slot on any type of shank.

SCREWDRIVER END MILL

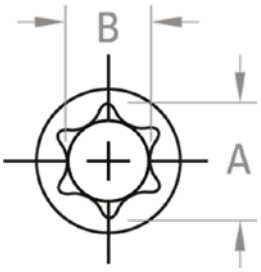


Special end mill for screwdriver.

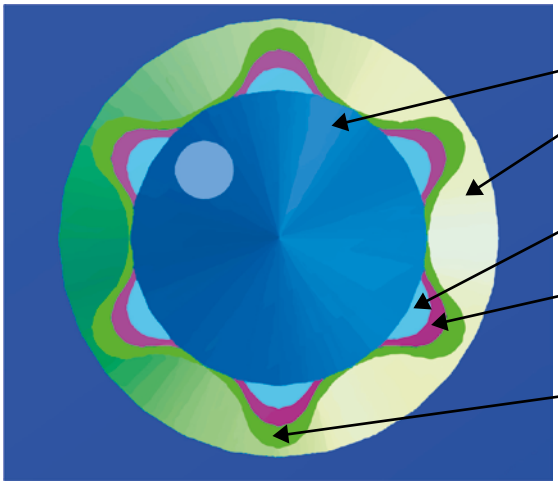
Screw sockets are often brand-specific, which requires a special shaped screwdriver. DIXI, thanks to its wide range of grinding machines, could easily design and manufacture a special end-mill to meet this need.

You have the advantage of a single supplier and the security of sourcing a repeatable screw + screwdriver pair.

TORX SCREW HEAD T10 MACHINING



N° Torx	A mm	B mm
T1	0.90	0.65
T2	1.01	0.73
T3	1.21	0.88
T4	1.37	0.99
T5	1.49	1.09
T6	1.77	1.29
T7	1.09	1.52
T8	2.41	1.75
T9	2.59	1.87
T10	2.81	2.05
T15	3.35	2.43
T20	3.93	2.85
T25	4.53	3.27
T27	5.09	3.67
T30	5.62	4.06
T40	6.78	4.89
T45	7.95	5.68
T50	8.96	6.50



1/ Drilling + Chamfering step 1 : 374220

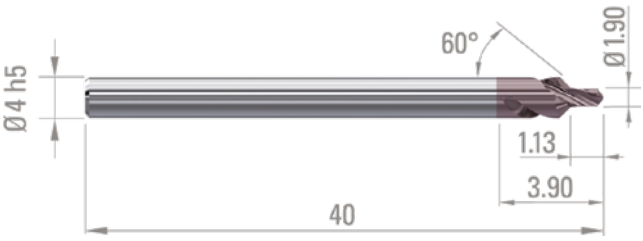
2/ Milling step 2 : 412126

3/ Milling step 3 : 412126

4/ Finishing step 4 : 412126

TORX SCREW HEAD T10 MACHINING

DIXI 1501

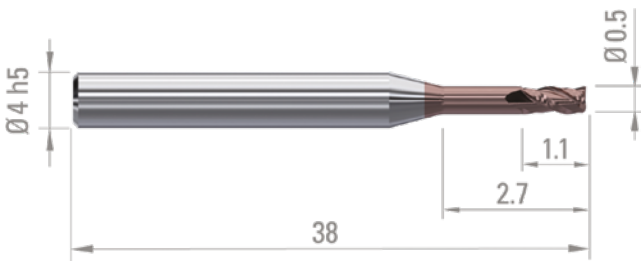


Step 1 :
Drilling and chamfering with DIXI 1501.
Ref. 433525
Z=2
Machine : Tornos deco 20
Coolant : Oil - external
Material : 3.7165 – TiGr5 – Ti6Al4V

n [rpm]	Vc Cutting speed	f Feed per revolution	Vf Feed speed
5'000 min-1	30 m/min	0.06 mm	300 mm/min

Solid carbide step-drill designed for the machining of Torx socket screw.
Available in stock for every Torx standard size from T4 to T30.

DIXI 7343-5D

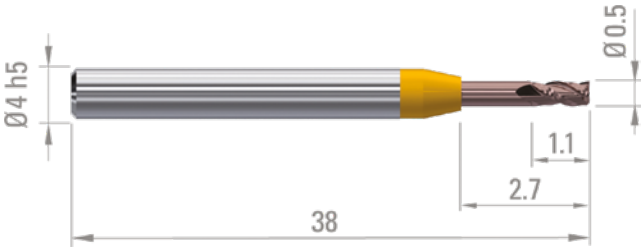


Step 2, 3, 4 :
Climb-milling the Torx contour with DIXI 7343-5D
Ref. 412126
z=3
Machine : Tornos deco 20
Coolant : Oil - external
Material : 3.7165 – TiGr5 – Ti6Al4V

	n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae
Milling Step 2+3	18'000 min-1	30 m/min	0.005 mm	270 mm/min	0.50 mm	0.15 mm
Finishing Step 4	18'000 min-1	30 m/min	0.002 mm	120 mm/min	1.00 mm	0.05 mm

High performance end mills with reinforced shank with variable helix and 5xD_1 necked down, tools developed for the machining of tough materials.
The extra smooth C-TOP coating improves tool life, even at high temperatures, in difficult to machine materials.
Available in stock from Ø0.30 to 12.00.

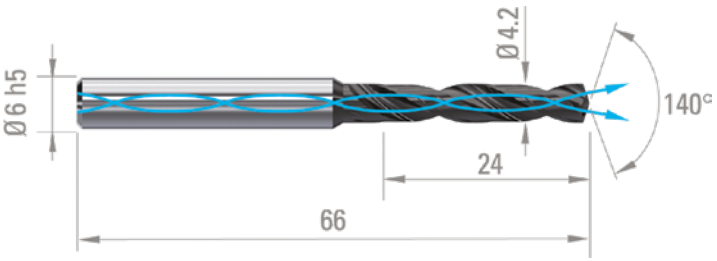
DIXI 7443-5D COOL+®



Same geometry as DIXI 7343 but with internal coolant
DIXI 7443-3D COOL+ or 7443-5D COOL+.
Ref. 412152
Z=3

TRAUMA PLATES

DIXI 1345-3D-HH

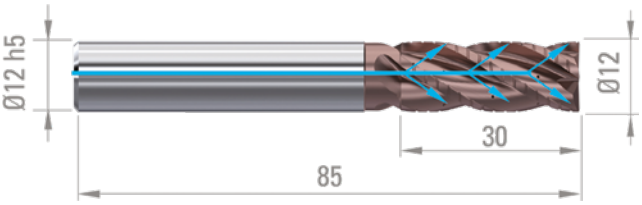


Drilling operation :
Drilling trauma plates with solid carbide drill 3xD coated and internal coolant, DIXI 1345-3D-HH.
Ref. 387122
Z = 2
Machine : GF Mikron MILL 600U
Coolant : Oil - internal
Material : 3.7165 – TiGr5 – Ti6Al4V

n [rpm]	Vc Cutting speed	f Feed per revolution	Vf Feed speed
3'030 min-1	40 m/min	0.080 mm	242 mm/min

High perfomance coated drill with reinforced shank and internal coolant.
DIXI 1345 is available on stock in 3xD, 5xD, 8xD, from Ø3.00 to 16.00.

DIXI 7220



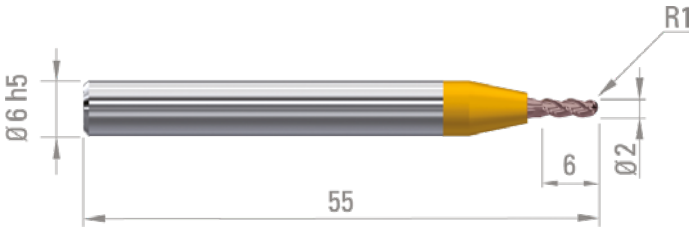
Roughing operation :
Milling the outside contour from bone plate 220×60×20 mm
Rough end Mill DIXI 7220 C-TOP coated
Ref. 421846
Z = 4
Machine : HERMLE C250
Coolant : Emulsion - Internal 80 Bar
Material : Ti-6Al-7Nb ISO5832-11

n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae
2'388 min-1	90 m/min	0.2 mm	1'910 mm/min	20 mm	1.00 mm

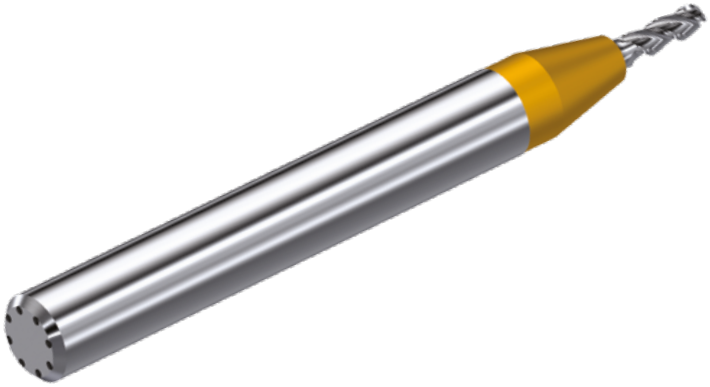
Roughing end mills developed for the machining of difficult materials. Produce a better surface finish than a conventional roughing end mill. This end mill is optimized with 3 coolant holes per flute.
Available with or without neck, from Ø3.00 to 16.00.

TRAUMA PLATES CONTOUR MILLING

DIXI 7033 COOL+®



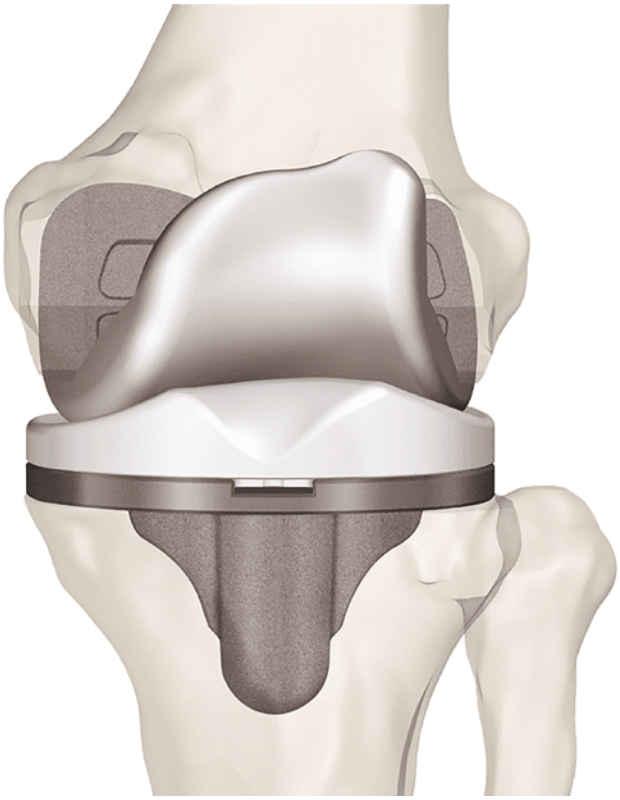
Finishing operation :
Milling the bone plate contour.
Ball nose end Mill DIXI 7033 COOL+ C-TOP Coated
Ref. 429213
Z = 3
Machine : GF Mikron MILL 600U
Coolant : Oil - internal
Material : 3.7165 – TiGr5 – Ti6Al4V



n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae	Tool life
18'000 min-1	110 m/min	0.024 mm	1'300 mm/min	0.10 mm	0.10 mm	2'100 min
23'900 min-1	150 m/min	0.024 mm	1'720 mm/min	0.10 mm	0.10 mm	2'100 min
30'000 min-1	190 m/min	0.024 mm	2'160 mm/min	0.10 mm	0.10 mm	2'100 min

Thanks to our new ball nose end mill geometry in addition to the COOL+ device we are able to provide one of the best milling solution for contour finishing on bone plates. Our new geometry has consistant performance regardless of the spindle speed capabilities. In the near future, this new line will be available from Ø0.80 to 3.00.

KNEE PROSTHESIS



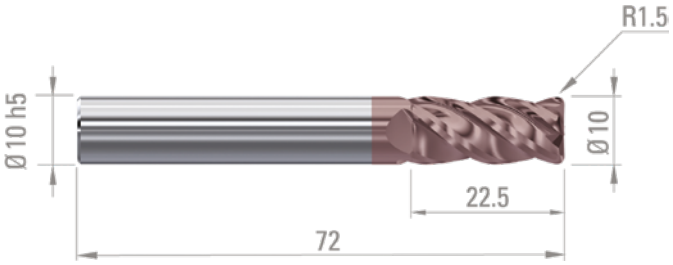
The polyethylene tibial insert (PE) replaces the cartilage by allowing the metal prosthetic components to articulate with each other.

The femoral component Cobalt-Chrome (CoCr) and the tibial component (metal) replace the articular surfaces of the femur and tibia worn down by osteoarthritis.

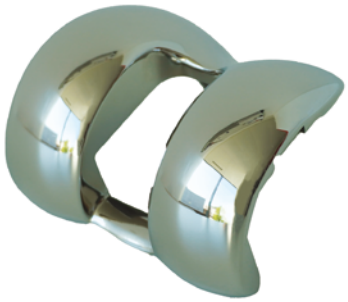
Pictures source : https ://symbios.ch/patients/prothese-de-genou/

FEMORAL COMPONENT MILLING

DIXI 7265



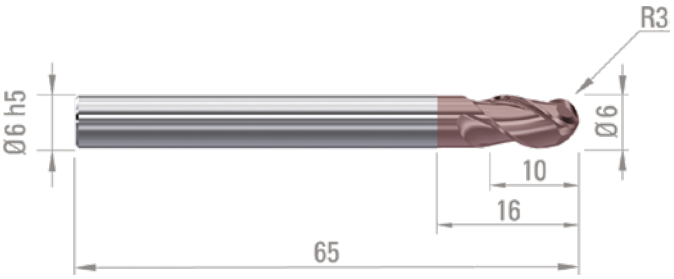
Roughing operation :
Trochoidal milling of the femoral part.
Corner radius end mill with variable helix C-TOP coated.
Ref. 359014
Z = 4
Machine : Hermle C22U
Coolant : Emulsion - external
Material : CoCr28Mo - ISO 5832-12



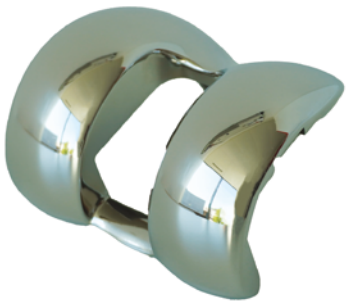
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae	Tool life
1'900 min-1	60 m/min	0.15 mm	1'140 mm/min	0.70 – 18 mm	0.75 mm	150 min (~4 prosthesis)

Special carbide grade dedicated to rough milling on Cobalt Chrome workpiece.
DIXI 7265 is available in stock from Ø2.00 to 12.00, with CUTINOX coating.

DIXI 7033



Finishing operation :
Milling the femoral part contour
Ball nose end mill C-TOP Coated.
Ref. 341402
Z = 3
Machine : Hermle C22U
Coolant : Emulsion - external
Material : CoCr28Mo - ISO 5832-12



n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae	Tool life
2'600 min-1	49 m/min	0.10 mm	780 mm/min	0.30 mm	0.30 mm	175 min (~5 prosthesis)

Special carbide grade dedicated to finish milling on Cobalt Chrome workpiece.
DIXI 7033 is available in stock from Ø1.00 to 10.00, uncoated or with TiAlN coating.

TIBIAL INSERT MILLING

DIXI 70320 DIA

Finishing operation:
Monocrystalline Diamond Ball-nose end mill.
Milling strategy 4 axis with DIXI 70320 DIA.
Ref. 341447
Z=1
Machine: Willemin 408 S2
Coolant: Air - external
Material: High-modulus-Polyethylene (HMPE)
Roughness on workpiece: Ra 0.4

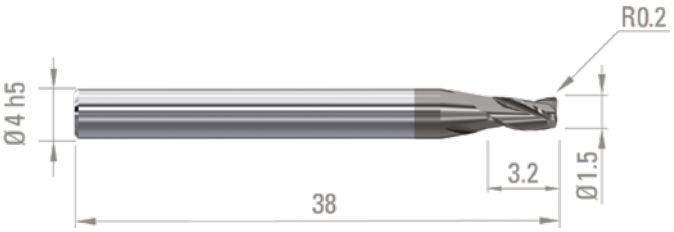
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae
30'000 min-1	377 m/min	0.20 mm	6'000 mm/min	0.05 mm	0.05 mm

Ball-nose monocrystalline diamond end mill developed for the machining of non-ferrous materials and precious metals.
Monocrystalline diamond guarantees surface quality and tool life unmatched by tungsten carbide.

DIXI 70320 is available in 2 versions:
- 70320 DIA for monocrystalline diamond in stock from Ø2.00 to 10.00.
- 70320 PCD for polycristalline diamond, in stock from Ø2.00 to 20.00.

CARDIAC COMPONENTS

DIXI 7353

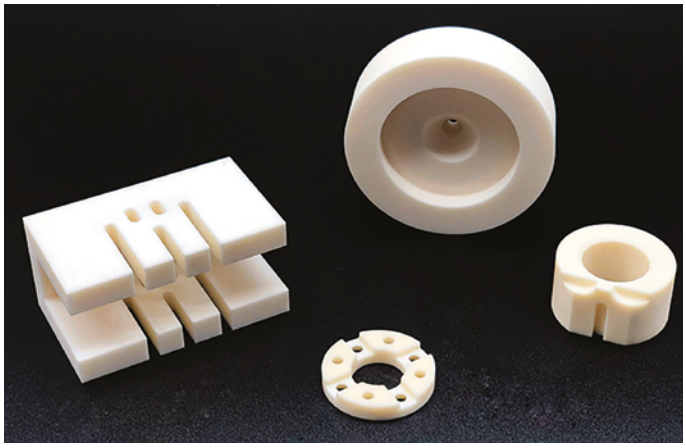


Roughing operation :
Climb-miling with torus end mill, variable helix,
DIXI 7353 Diamond coated.
Ref. 421614
Z = 3
Machine : Kummer K5
Coolant : Oil - external
Material : Platinium-Palladium (PtPd)

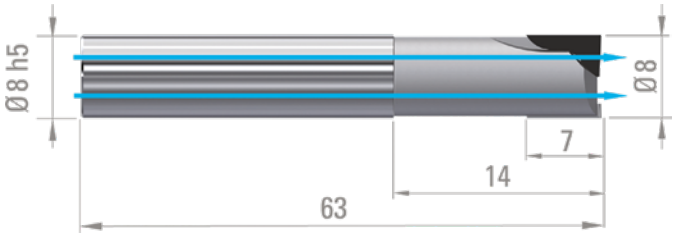
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap	ae	Tool life
20'000 min-1	95 m/min	0.022 mm	1'320 mm/min	2.50 mm	0.10 mm	1'900 min

End mills with reinforced shank, with corner radius and symmetrical front grinding. Tools developed for the machining of tough materials.
For this case, the end mill has been coated with a special Diamond coating.
DIXI 7353 is available in stock from Ø0.40 to 12.00 with different corner radius sizes; uncotaed or C-TOP coated.

CERAMICS HOUSING PART



DIXI 72420 -SH PCD

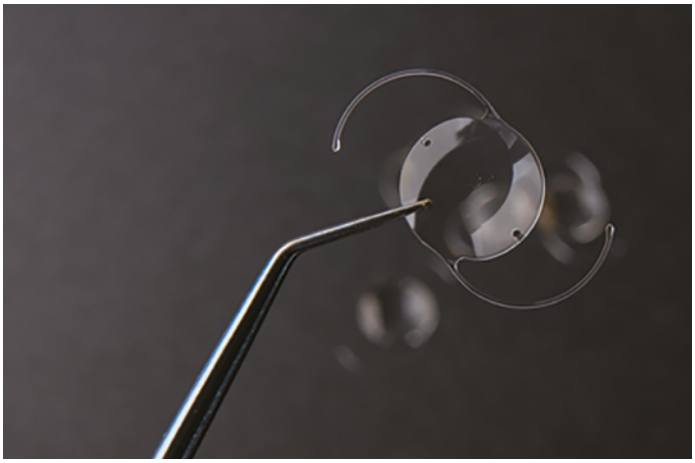


Milling surface:
Face milling with a polycristalline diamond end mill, internal coolant, DIXI 72420-SH PCD.
Ref. 976395
Z = 2
Machine: Bumotec S191
Coolant: Air - internal
Material: Alumina Al_2O_3 99,7%

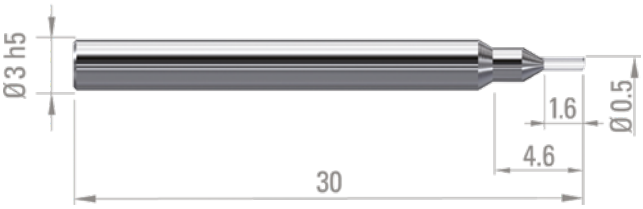
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap
12'000 min-1	300 m/min	0.02 mm	480 mm/min	0.05 mm

PCD end mills with centre cut and through coolant developed for the general machining of non-ferrous materials, precious metals and composites.
Available in stock in short and long version, from Ø1.00 to 20.00.

OCULAR PROSTHESIS



DIXI 72310 DIA

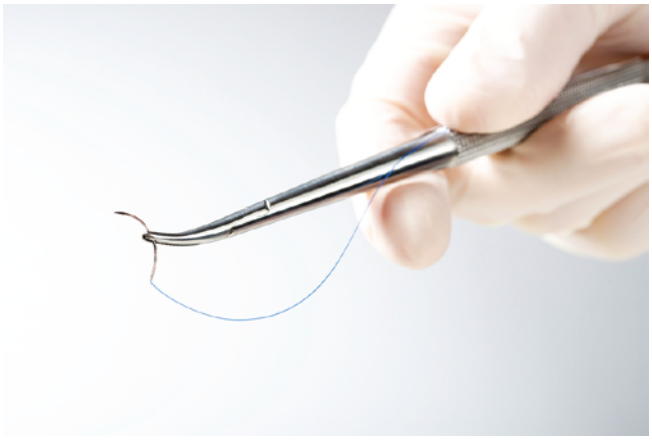


Routing machining:
Routing ocular prosthesis with a monocrystalline diamond end mill DIXI 72310 DIA.
Ref. 953425
Z=1
Machine: DATRON
Coolant: Air - external
Material: PMMA

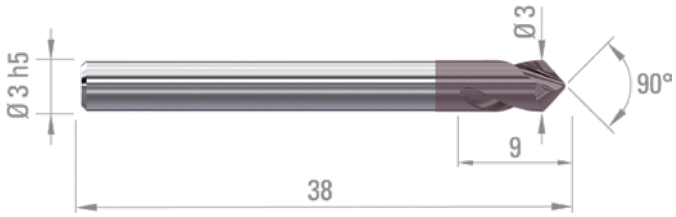
n [rpm]	Vc Cutting speed	Fz Feed per teeth	Vf Feed speed	ap
42'500 min-1	67 m/min	0.001 mm	42 mm/min	0.10 mm

Monocrystalline diamond micro end mill with centre cut.
Available in stock from Ø0.40 to 2.00, every 0.10mm.

SURGICAL NEEDLE DRILLING



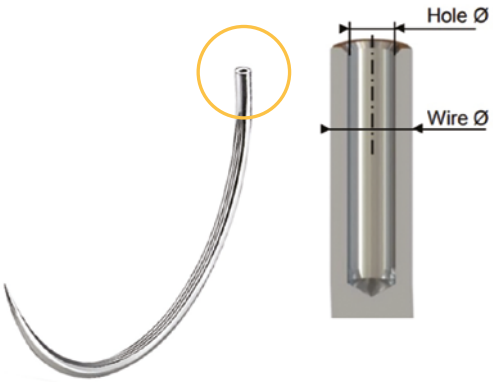
DIXI 1106



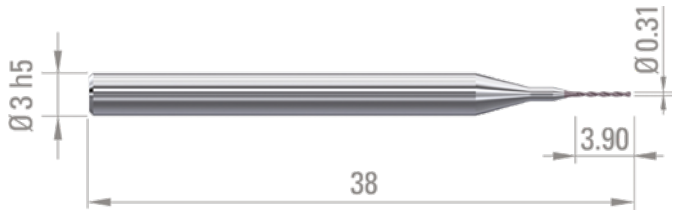
Spotting operation:
Solid carbide spotting drill DIXI 1106, TiAlN coated.
Ref. 34090
Z = 2
Coolant: Oil - external
Material: Martensitic stainless steel
XM16 – X2CrNiCuTiNb 12.9 – 1.4543 – MX455

n [rpm]	Vc cutting speed	f Feed per revolution	Vf Feed speed
2'100 min-1	19 m/min	0.05 mm	105 mm/min

DIXI 1106 is a 90° spotting drill developed for general machining.
Available in stock from Ø1.00 to 20.00mm, uncoated or TiAlN coated.



DIXI 1138



Drilling the main hole:
Drilling on approx. 12xD depth with a special solid carbide drill, POLYCUT coated and similar to DIXI 1138 geometry specifications.
Ref. 373076
Z = 2
Coolant: Oil - external
Material: Martensitic stainless steel
XM16 – X2CrNiCuTiNb 12.9 – 1.4543 – MX455

n [rpm]	Vc cutting speed	f Feed per revolution	Vf Feed speed
9'250 min-1	9 m/min	0.002 mm	18.5 mm/min

DIXI 1138 is a high perfomance solid carbide drill with optimized gash geometry.
Available in stock from Ø0.05 to 2.80mm uncoated or TiAlN coated.

DIXI STANDARD TOOLS FOR MEDTECH INDUSTRY

Application \ Geometry end mill	Standard end mills	Torus end mills	Ball nose end mills	Drilling tools
Ocular- eye lens PMMA High index, Trivex, Poly, CR-39	7305/7240/7242 Uncoated	7250 Uncoated 7554 Uncoated	Uncoated 7032/7042/7046/7047	1131 DLC
Orthopedics PE	7583 DLC	7250 Uncoated 7554 Uncoated	Uncoated 7032/7042/7046/7047	1137 DRYCUT
Orthopedics CoCr	7220 C-TOP (new roughing) 7343 C-TOP 7264 CUTINOX	7265 CUTINOX	7032/7033 C-TOP	1147 TiAlN 1145 TiAlN 1345 TiAlN
Orthopedics Ti6Al4V grade 5 and 23 Stainless steel 1.4435 and 1.4472	7220 C-TOP (new roughing) 7343 C-TOP 7443 C-TOP COOL+	7353 C-TOP 7453 C-TOP COOL+	7033 C-TOP	1145 TiAlN 1147 TiAlN
Orthopedics PEEK (Polyetheretherketone) natural PEEK carbon fibre reinforced (30%)	7583 Uncoated 72420 PCD	7553 Uncoated 70520 PCD	7033 Uncoated 70320 PCD	1145 TiAlN 1345 TiAlN
Dental Ti6Al4V grade 5 and 23 Stainless steel 1.4435 and 1.4472	7442 C-TOP COOL+ 7443 C-TOP COOL+	7353 Uncoated or C-TOP 7453 C-TOP COOL+	7032/7033 C-TOP 7046 DICUT	1145 TiAlN 1147 TiAlN
Dental Zr02	72420 PCD	70520 PCD	70320 PCD	1137 DRYCUT
Dental CoCr	7220 C-TOP (new roughing) 7343 C-TOP 7264 CUTINOX	7265 CUTINOX	7532 XIDUR	1147 TiAlN 1145 TiAlN 1345 TiAlN

Scan to see the General Catalog

DIXI COOL+®, MANY POSSIBLE VARIANTS

PATENTED COOL+

Whirling mills

Ball-nose mills

Thread mills

Reamers

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