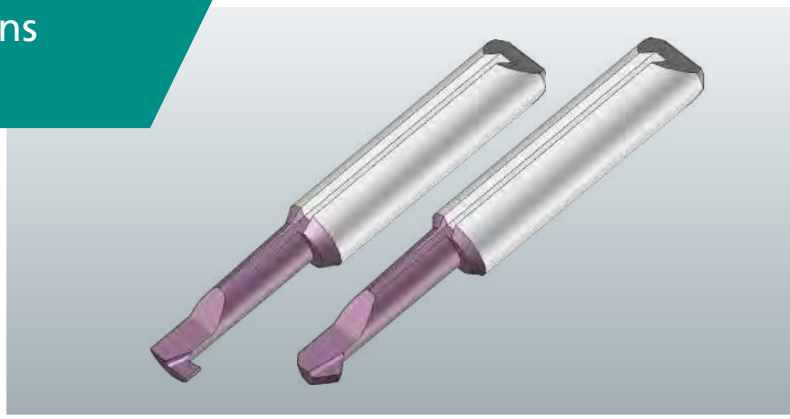
Business

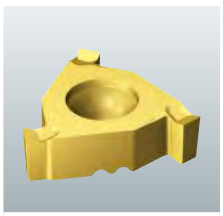
Brütsch·Rüegger Tools

Watchmaking Industry – Solutions for the Haute Horlogerie Sector

Components, materials and applications

Tools. Next Level.





FUTURO performance loves perfection · DC THREADING TECHNOLOGY · IFANGER · DIXI polytool · APPLITEC SWISS TOOLING · magafor · SCHAUBLIN

SANDVIK coromant · Member IMC Group · EMUGE FRANKEN · GOLD SHARK · REGO-FIX · WALTER TITEX · PFERD

ETiC · sylvac · Diamant Weber · GÜHRING · NOVOSTAR · BRM · SWISS TOOLS


12
ARMAND NICOLET
TRAMELAN
AUTOMATIC
SWISS MADE

Contents

Materials and applications

Various **lead-free materials are used in the watchmaking industry**, as it demands a high degree of precision, corrosion resistance and skin tolerability. Here are some of the most important lead-free materials:

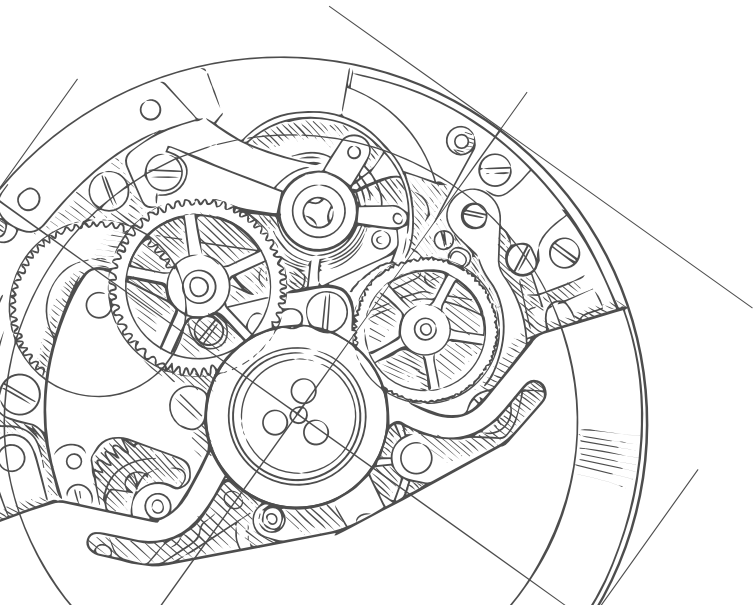
1. Brass alloys (lead-free)
- CuZn21Si3P (EcoBrass) → High degree of corrosion resistance, often used as a substitute for lead-containing brass
- CuZn42 (CW510L) → Used for gears, cases and other precision parts

2. Stainless steel alloys
- 316L (1.4404) → Corrosion resistant, hypoallergenic, used for cases, watch straps and clasps
- 904L (1.4539) → Premium stainless steel with exceptional corrosion resistance

3. Titanium alloys
- Grade 2 & Grade 5 Titanium (Ti6Al4V) → Lightweight, biocompatible, high strength, used for cases, case backs and clasps

4. Ceramics & composite materials
- Zirconium oxide ceramic (ZrO_2) → Extremely scratch-resistant, used for cases and bezels
- Carbon fibre composites → Very light and robust, often used for sporty or limited edition models

5. Aluminium and bronze alloys (lead-free)
- Aluminium 7075 → Occasionally used for cases or light-weight components
- CuSn8 (phosphor bronze) → Used for barrels, gears and bearings



The process of **machining lead-free materials** presents several challenges, especially when compared to lead-containing alloys, which are well known for their excellent machinability. The key challenges are as follows:

1. Increased tool wear
Lead-free materials typically exhibit greater hardness and strength, resulting in accelerated tool wear. Cutting edges can wear out or chip more quickly, particularly during turning and milling processes.

2. Poor chip formation and removal
In contrast to lead-containing alloys, chips frequently fail to break into short segments and instead tend to form long, tangled strands. This can lead to issues with process reliability and surface quality.

3. Increased cutting forces and heat generation
Greater hardness requires increased cutting forces. This generates more heat, which can further reduce the tool life.

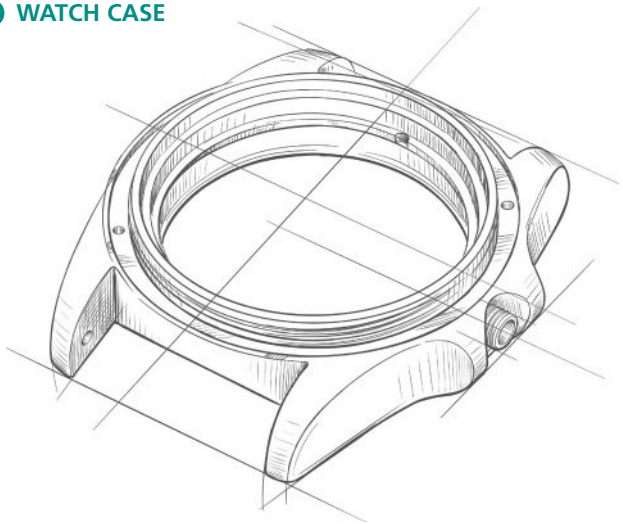
4. Poorer surface quality
Lead-free materials frequently exhibit reduced friction properties, adversely impacting the required surface finish. Maintaining fine structures or tight tolerances can be more challenging.

5. Choosing the appropriate tools and coatings
Tools often need to be specially adapted, e.g., through coatings or modified geometries. Coatings like TiAlN and specialised polishing processes can enhance tool durability.

6. Optimising cutting parameters and coolant / lubrication strategy
Higher cutting speeds and reduced feeds are often necessary to minimise tool wear. Optimal cooling or lubrication (e.g., minimum quantity lubrication (MQL) or high-pressure cooling) can help to control the heat generation.

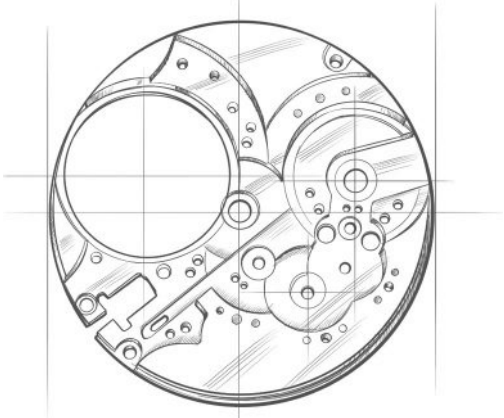
Components for the watchmaking industry

1 WATCH CASE



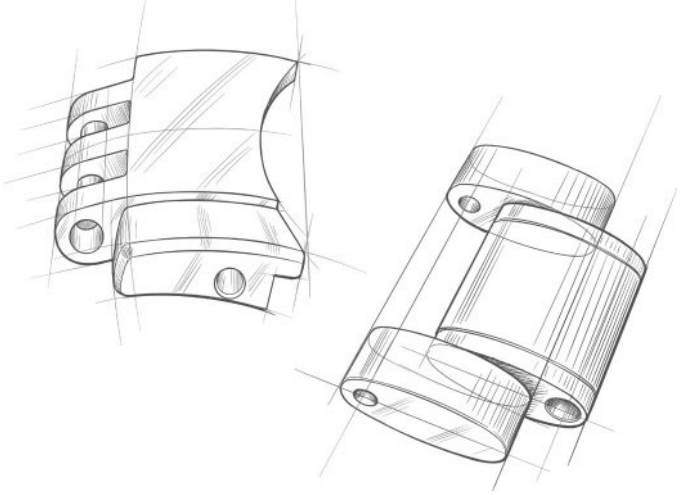
2 CASE BACK

3 MAIN PLATE / BASE PLATE

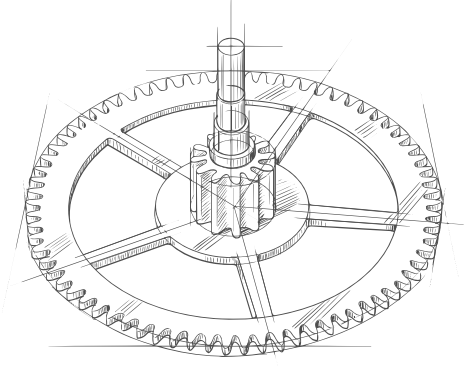


4 PULL-OUT PIECE / WATCH CROWN

5 WATCH STRAP WITH SPRING BAR



6 WATCH GEARS



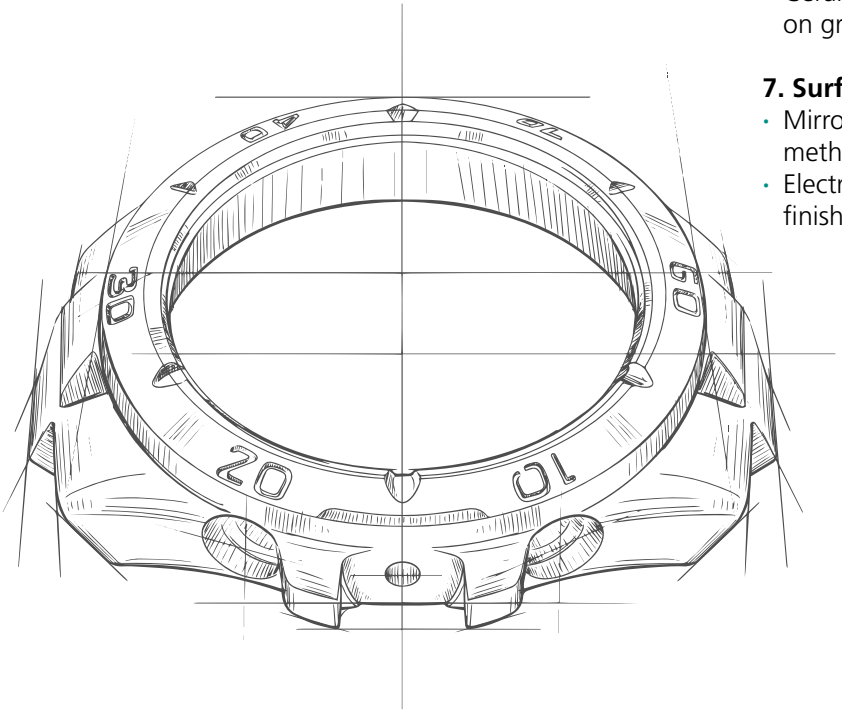
Watch case

The **CNC machining of watch cases** requires stringent precision, careful material choice and optimised machining strategies. The decisive factors are as follows:

1. Choice of materials and their machinability
- Stainless steel (316L, 904L) → High degree of hardness, challenging machinability and increased tool wear
- Titanium (Grade 5, Grade 2) → Lightweight, yet susceptible to strain hardening and poor thermal conductivity
- Ceramics (zirconia, silicon nitride) → Highly brittle, requires grinding and laser processing techniques
- Brass/Bronze (CuZn42, CuSn8) → Comparatively easy to process, though attention must be paid to tarnishing and oxidation
- Platinum → Extremely tough and resistant, challenging to machine, causing significant tool wear
- Gold (yellow, white, or rose gold) → Soft and readily machinable, particularly when using diamond tools

2. Precision and tight tolerances
- Watch cases have extremely tight tolerances (often in the range of ±0.005 mm)
- Crucial for ensuring the accurate fit of crystals, bezels, case backs, and seals

3. Tool selection and tool life
- High-performance carbide tools or PCD/CBN tools for hard materials
- Optimised tool geometries to reduce burring and thermal buildup
- Micro end mills (Ø <0.5 mm) for engravings and fine details



4. Cutting parameters and strategy
- High spindle speeds → Necessary for fine surface finishes and small tools
- Optimal feed rates and depths of cut → Prevents tool breakage, improves surface quality
- Multi-stage machining (roughing – semi-finishing – finishing) → Guarantees precise dimensions

5. Clamping technology and vibrations
- Precision clamping systems (zero-point clamping systems, vacuum clamping)
- Minimised vibration to achieve fine surface quality

6. Cooling and lubrication
- Titanium & Stainless steel → High-pressure cooling or MQL for heat dissipation
- Brass & Bronze → Minimum quantity lubrication or dry machining
- Ceramics → Often machined without coolant, relying on grinding methods with temperature control

7. Surface quality and finishing
- Mirror polishing performed manually or via mechanical methods (e.g. tumbling and diamond finishing)
- Electrochemical plating or PVD coatings for surface finishing

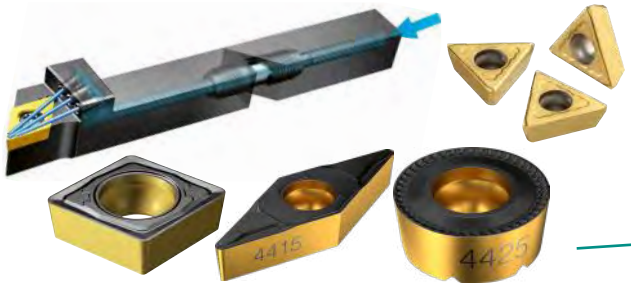
Turning

6 INTERNAL AND EXTERNAL TURNING OF THIN COMPONENTS

SANDVIK coromant

CoroTurn 107

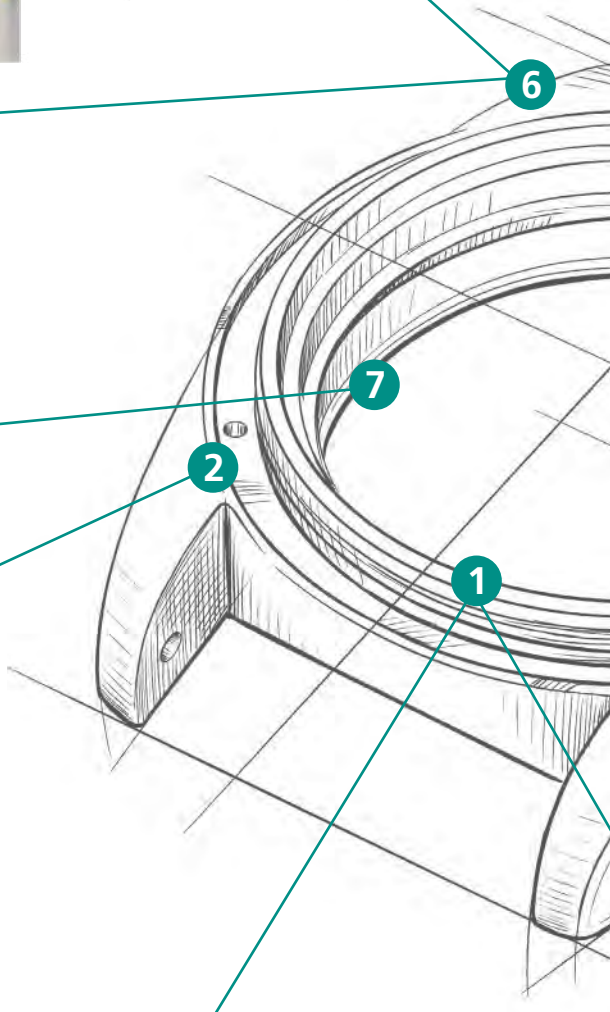
For internal and external turning of thin components



APPLITEC SWISS TOOLING

ISO-Line turning system

Versatile turning programme with ISO indexable inserts for internal and external machining

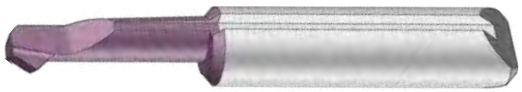


7 FACETING

IFANGER

Micro-turn faceting steel

Faceting steel MTFA available in left- or right-hand versions, with TiAlN coating



2 FACE GROOVING AND THREAD MACHINING

SANDVIK coromant

CoroThread 254

Sharp cutting edges for high-quality grooves

1 SERIES-COMPATIBLE MULTI-OPERATION MACHINING

Member IMC Group

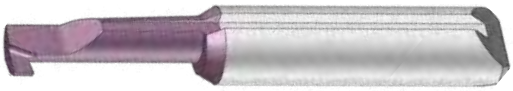
PICCO-MFT

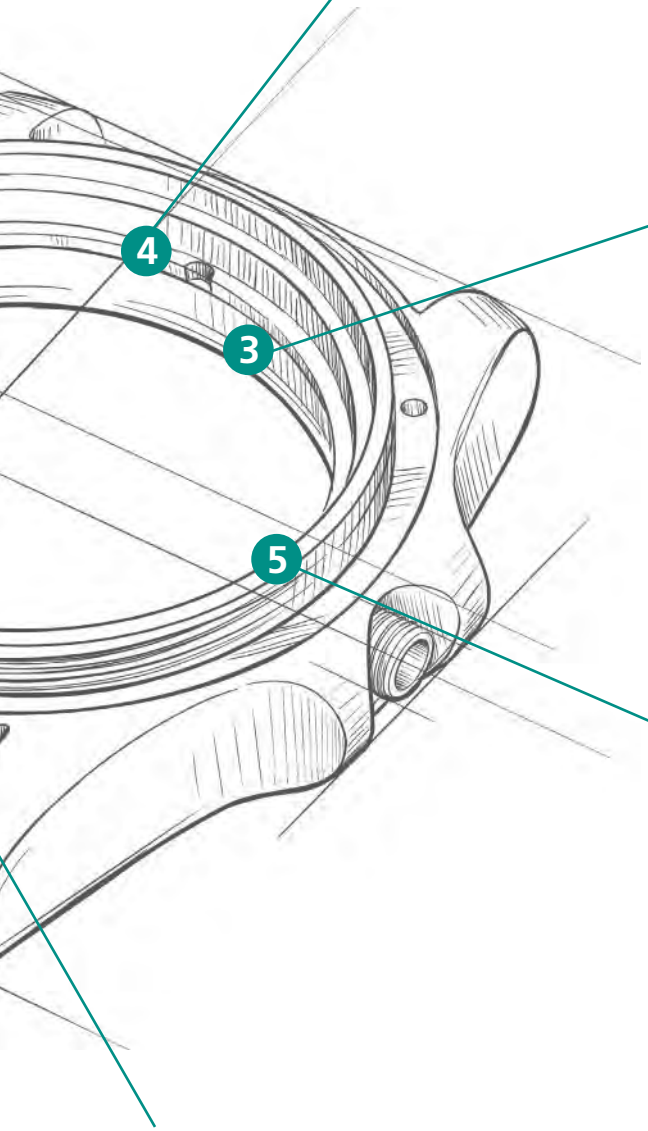
Drilling, internal and external turning, facing, chamfering and 60° thread turning, from Ø 3.9 mm

4 FACE GROOVING AND THREAD MACHINING

PiccoCut Grooving steel
Angled parting-off steel

Micro-Turn Grooving steel
Angled parting-off steel MTNU available in left- or right-hand versions, with TiAlN coating





3 INTERNAL AND EXTERNAL THREAD TURNING

SANDVIK coromant
CoroThread 266
High-stability internal and external thread turning

5 PARTING OFF

SANDVIK coromant
CoroCut QD
Dependable and process-safe parting-off operations

SWISS TOOLS
Precision boring head
for perfect roundness and diameter cylindricity, adjustable to 1 µm

Milling and threading

2 FULL-DEPTH THREAD MILLING

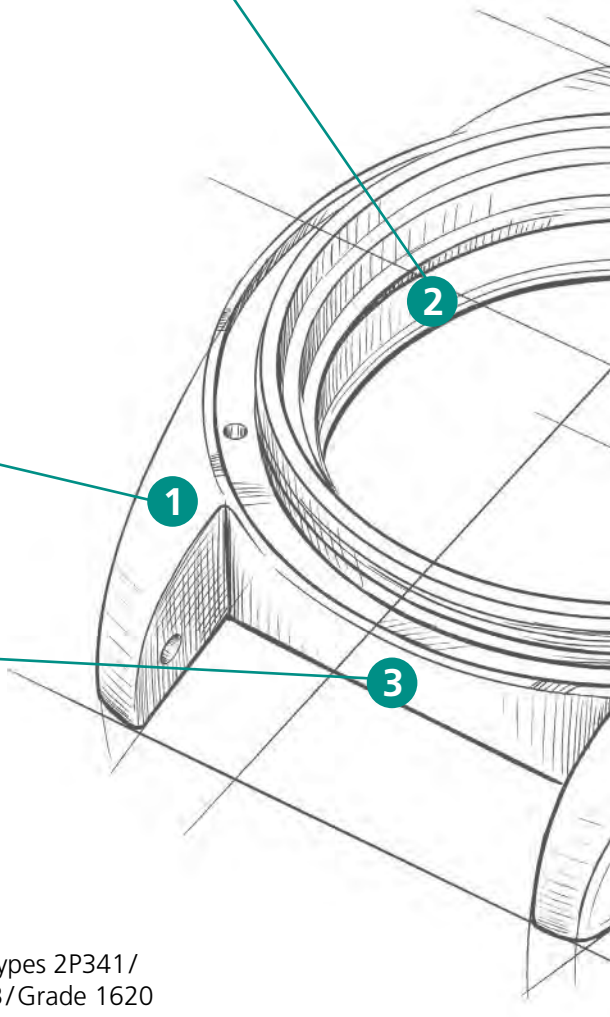
DC THREADING TECHNOLOGY

Thread mill GF6110VS-INT-SP
in accordance with NIHS 60-30

1 FACETING AND ROUNDING

magafor

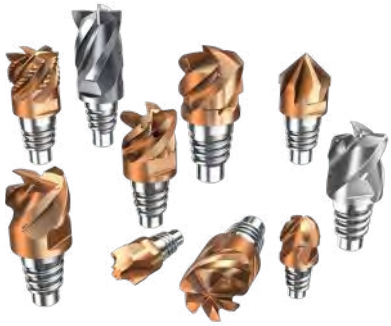
Form cutters and chamfer mills
Specialised micro-tools for edge rounding starting at R 0.2 mm and faceting from Ø 0.2 mm



3 EXTERNAL CONTOUR CORNER AND GROOVE MILLS

SANDVIK coromant

CoroMill 316
Modular system with Coromant EH interface, corner milling, chamfer milling, profile milling and copy milling



SANDVIK coromant

CoroMill Plura
Roughing of stainless steel, types 2P341/ Grade 1640, R216.34–BCxxB/Grade 1620

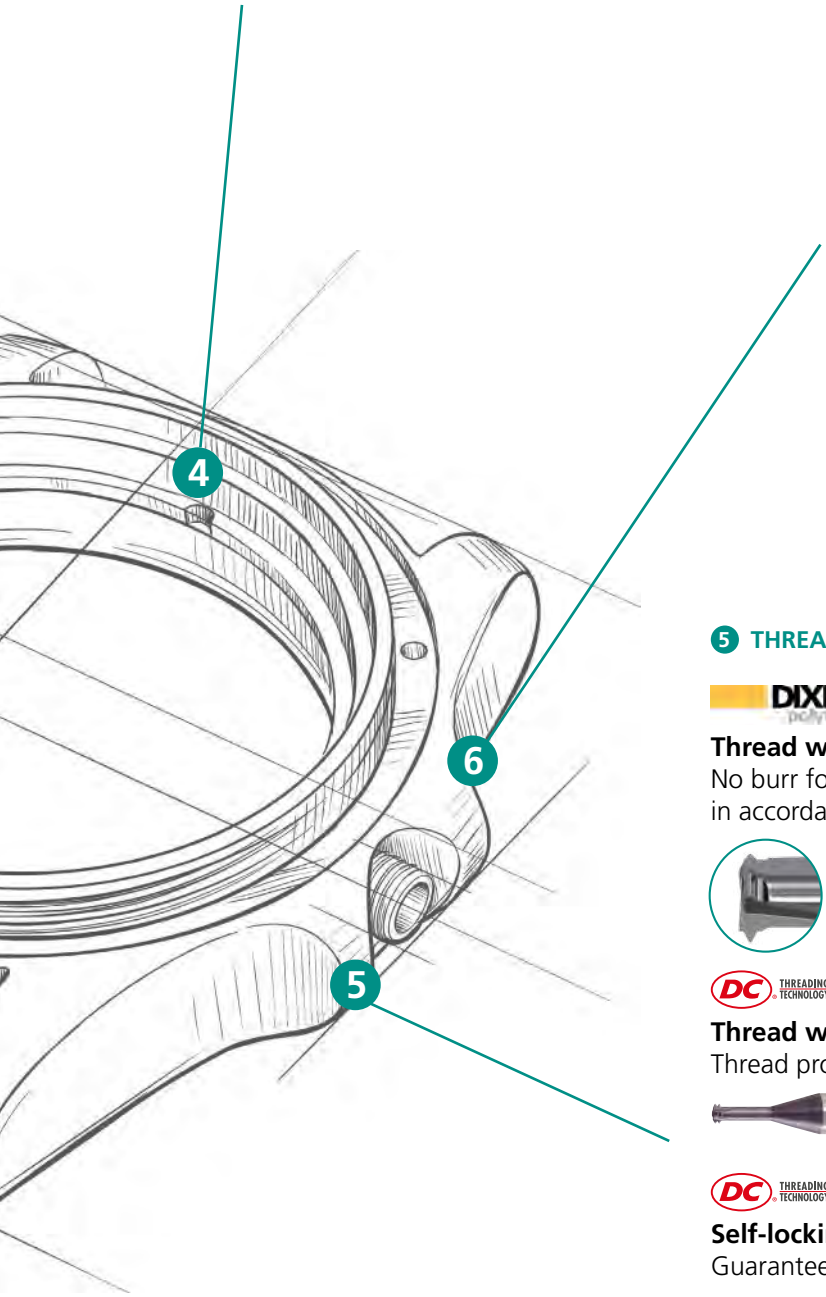
EMUGE FRANKEN

FRANKEN TOP-CUT
with TiAlN coating, from Ø 1.5–20.0 mm, the variable helix angle actively minimises vibrations

4 MICRO CORNER MILLS

DIXI polytool

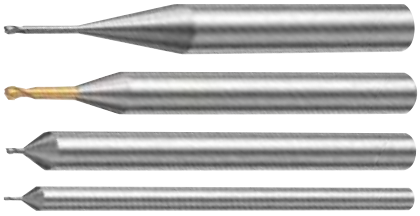
Solid carbide end mill 7583
Micro high-performance end mills with reinforced shank, from Ø 0.3 mm



6 PROFILE MILLS

SANDVIK coromant

CoroMill Plura
Solid carbide Micro Ballnose Milling cutters 2P211-PC/2P212-PC, from Ø 0.5 mm



GÜHRING

G-Mold 55B
Optimised for ISO M/S and ISO H, from Ø 0.5 mm

5 THREADING

DIXI polytool

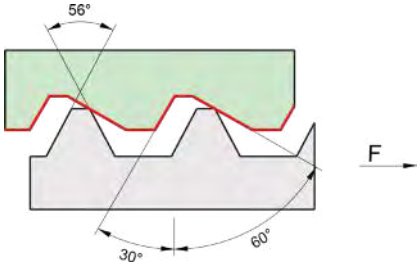
Thread whirler 1737
No burr formation thanks to the full profile in accordance with NIHS 06-10

DC THREADING TECHNOLOGY

Thread whirler GW3015VS
Thread production from M0.8 using a multi-tooth double profile

DC THREADING TECHNOLOGY Micro Safelock

Self-locking threads with Safelock system
Guaranteed resistance to impact and vibration



Drilling and reaming

4 MICRO DRILLING WITH BALL-NOSE ENTRY GEOMETRY

SANDVIK Coromant

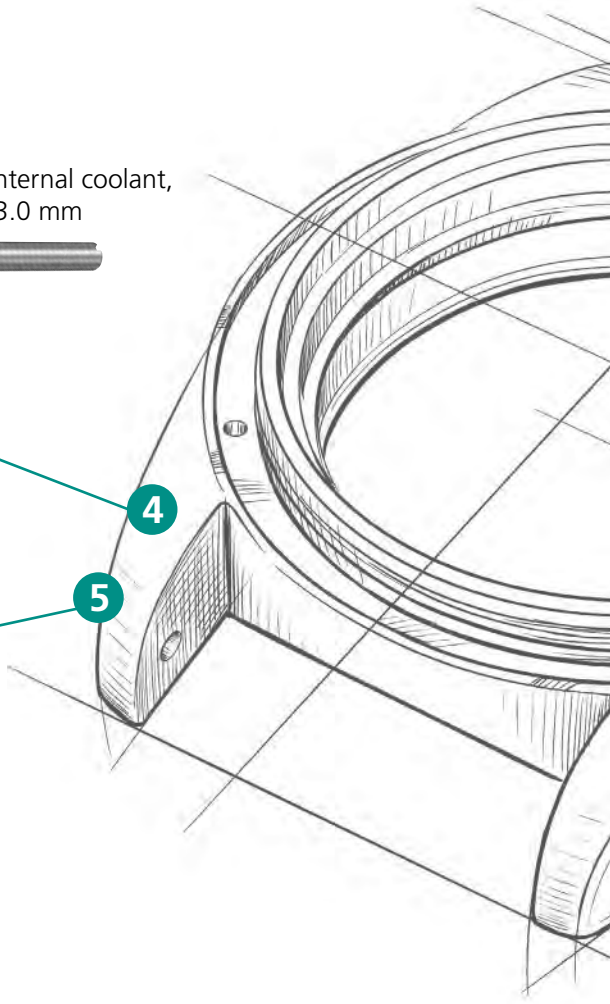
CoroDrill 862-GM-X2BL

Optimised multi-material, external coolant, solid carbide, from Ø 0.3–3.0 mm

SANDVIK Coromant

CoroDrill 862-GM-X2BM

Optimised multi-material, internal coolant, solid carbide, from Ø 1.0–3.0 mm



5 MICRO REAMERS

magafor

Magaforce 8610 Reamer

Step size of 0.005 mm for the most precise holes, from Ø 0.2 mm, with left-hand flutes

DIXI polytool

POLY 4007-TC

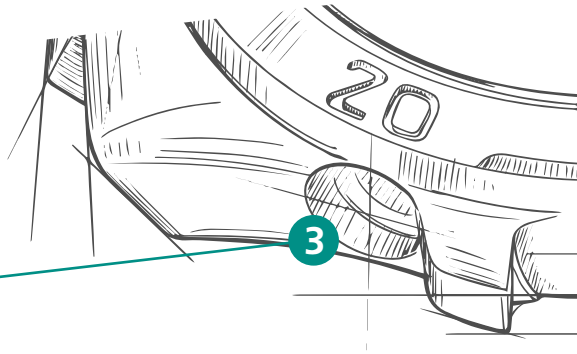
Solid carbide machine reamer with left-hand helix angle, from Ø 0.37 mm, featuring unequal pitch

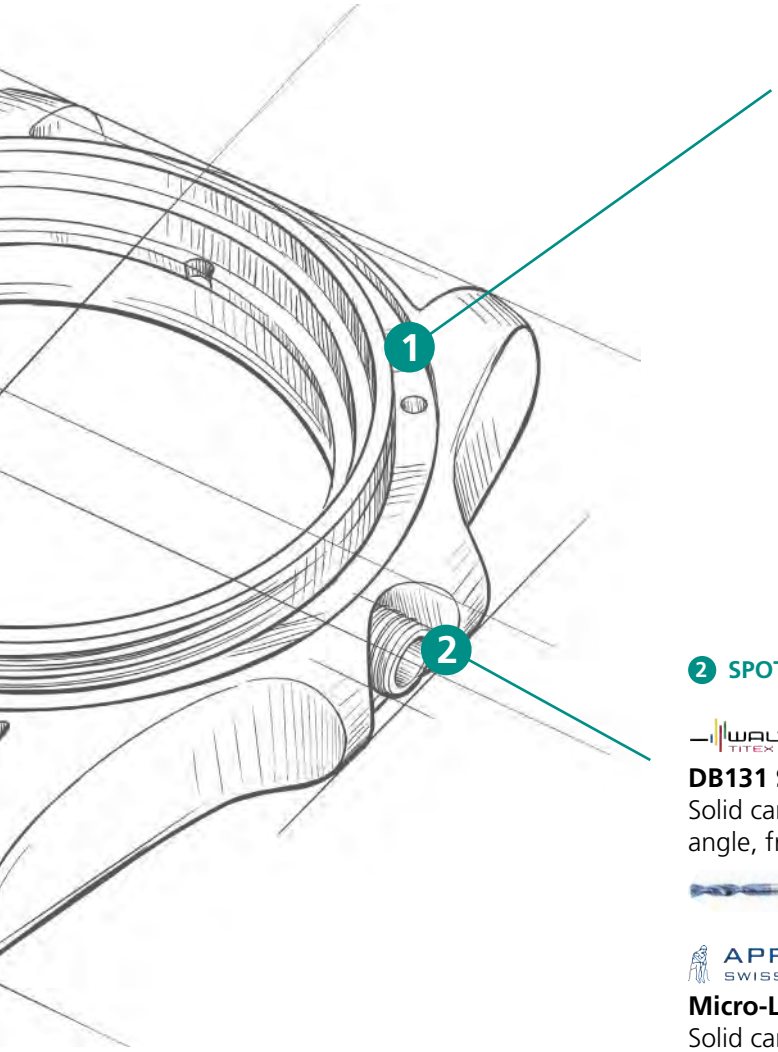
3 MICRO STEP DRILLING

SANDVIK Coromant

CoroDrill Dura 862

Micro step drill for drilling and chamfering in one step, from Ø 0.3 mm





1 MULTI-MATERIAL MICRO DRILLING

magafor

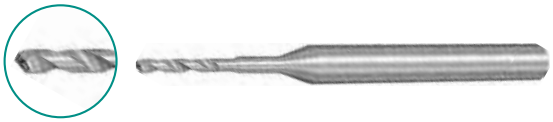
MicroForce
Solid carbide micro drills from Ø 0.1 mm

SANDVIK coromant

CoroDrill 462 XM- H10F
Versatile multi-material drilling with external cooling, from Ø 0.03 – 3.0 mm

SANDVIK coromant

CoroDrill 862 PCD
Offers longer tool life than solid carbide drills, suitable for challenging materials such as platinum and ceramic greenware, from Ø 0.3 – 3.0 mm



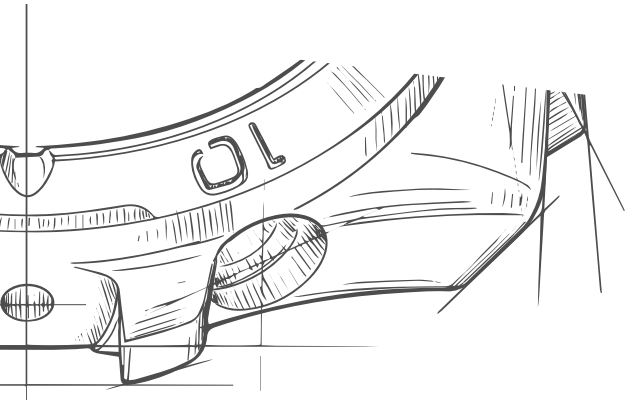
2 SPOT DRILLING

WALTER TITEX

DB131 Supreme
Solid carbide micro pilot drill with 150° point angle, from Ø 0.5 – 1.9 mm

APPLITEC SWISS TOOLING

Micro-Line
Solid carbide micro CNC spot drills 60°/90°, with various special coatings



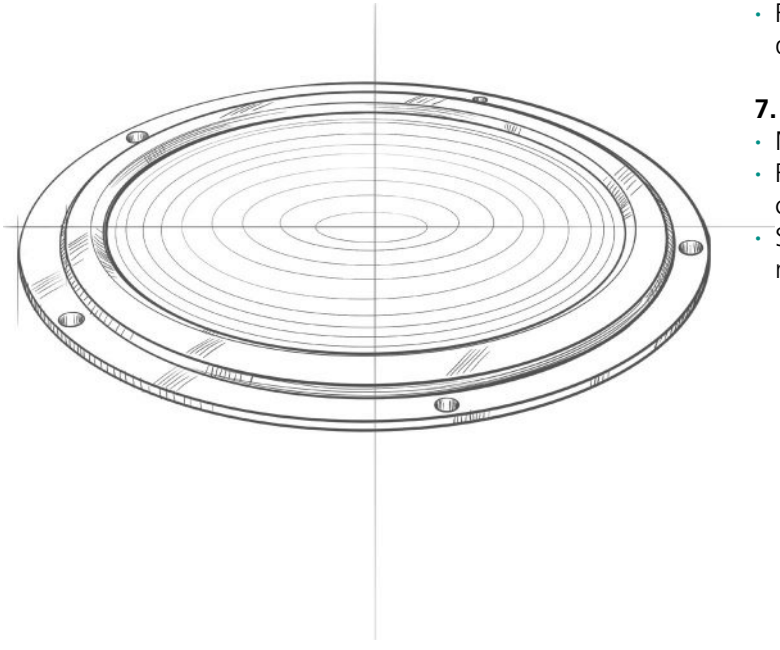
Case back

The **CNC machining of case backs** requires stringent precision, surface finish and process reliability. The decisive factors are as follows:

1. Choice of materials and their machinability
- Typical materials: Stainless steel (e.g., 316L), titanium, brass, bronze or precious metals
- Machinability: Stainless steel is tough and tends to harden – requires sharp tools, proper cooling and stable processes
- Titanium is lightweight but difficult to machine (high tool wear, poor heat dissipation)
- Brass is easy to machine, ideal for high-precision work and fine details

2. Precision and tight tolerances
- Micrometre tolerances are standard (e.g., ±5 µm)
- Temperature compensation and machine accuracy are crucial
- Machines with glass scales and temperature stabilisation are preferred

3. Tool selection and tool life
- Coated carbide tools (TiAlN, AlCrN) for hard materials such as stainless steel or titanium
- Monocrystalline diamond tools or CBN for precious metals or the highest surface finish requirements
- Tool life heavily depends on cooling, cutting parameters and material – short, controlled machining cycles are efficient



4. Cutting parameters and strategy
- Roughing with higher feed and lower depth of cut – with a focus on material removal
- Finishing with small depths of cut and fine feeds (often <0.05 mm/rev)
- Strategies like HSC (High Speed Cutting) and trochoidal machining can reduce wear and heat

5. Clamping technology and vibrations
- Highly precise clamping devices (e.g., zero-point clamping systems, vacuum chucks for flat parts)
- Reduced vibration through short overhangs, rigid construction and optimal number of cutting edges
- Minimal deformations are critical – especially with thin-walled bases

6. Cooling and lubrication
- Minimum quantity lubrication (MQL) for sensitive materials and small components
- Emulsion or oil mist cooling for stainless steel to improve heat dissipation
- For titanium, targeted high-pressure cooling and heat dissipation are particularly important

7. Surface quality and finishing
- Mirror-finish surfaces (Ra <0.2 µm) are often required
- Finishing work by polishing, laser engraving, ultrasonic cleaning or coatings (e.g. PVD)
- Strategies such as “drawing” the finish through targeted milling paths or tangential tool application

Machining

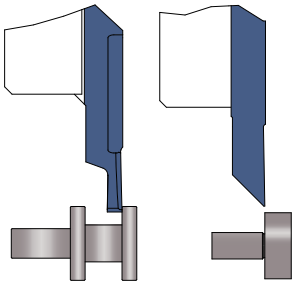
2 SEALING LATCH MACHINING

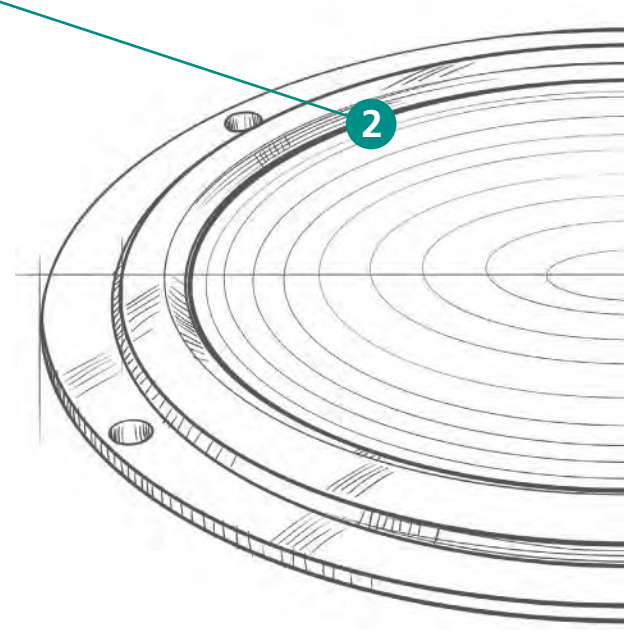
SANDVIK
coromant

CoroCut XS
External machining in small-parts production

APPLITEC
SWISS TOOLING

TOP-Watch 742SF
Various grooving and micro-turning operations





1 HOLE FOR FASTENING SCREW: SPOT DRILLING

magafor

Magaforce 819-D
Solid carbide micro CNC spot drill 90°,
from Ø 0.3–2.5 mm

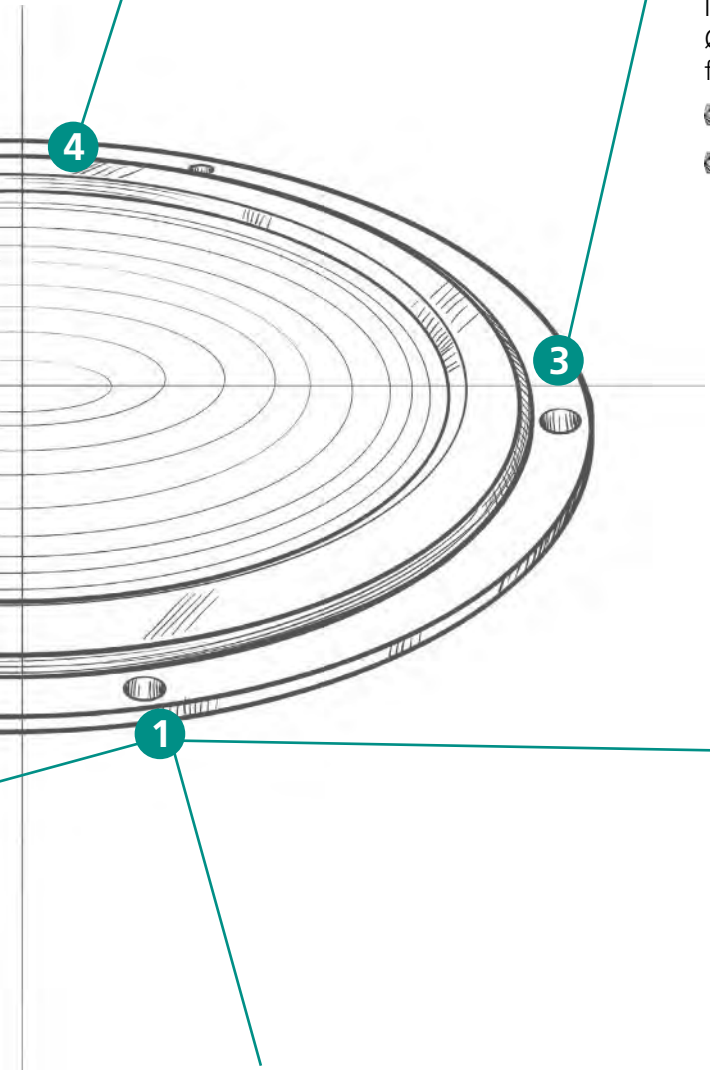
APPLITEC
SWISS TOOLING

Micro-Line
Solid carbide micro CNC spot drill 60°/90°,
with various special coatings

4 FULL-DEPTH THREAD MILLS

DC THREADING TECHNOLOGY

Thread mill GF6110VS-EX-SP
in accordance with NIHS 60-30



3 MICRO DRILLING IN DIFFICULT-TO-MACHINE MATERIALS

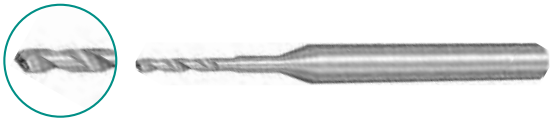
DIXI polytool

Twist drill 1137
Optimised for lead-free brass, polished clamping grooves: Improved chip evacuation, tapered core thickness from Ø 0.5 mm, reduced cutting forces, 140° tip: minimal burr formation at hole exit

1 HOLE FOR FASTENING SCREW: MICRO-DRILLING

SANDVIK coromant

CoroDrill 862 PCD
Offers longer tool life than solid carbide drills, suitable for challenging materials such as platinum and ceramic greenware, from Ø 0.3–3.0 mm



SANDVIK coromant

CoroDrill 462 XM
Versatile multi-material drilling with external cooling, from Ø 0.03–3.0 mm

SANDVIK coromant

CoroDrill 862-GM-X2BL
Optimised multi-material, external coolant, solid carbide, from Ø 0.3–3.0 mm

SANDVIK coromant

CoroDrill 862-GM-X2BM
Optimised multi-material, internal coolant, solid carbide, from Ø 1.0–3.0 mm

1 HOLE FOR FASTENING SCREW: MICRO STEP DRILLING

SANDVIK coromant

CoroDrill Dura 862
Micro step drill for drilling and chamfering in one step, from Ø 0.3 mm

Finishing

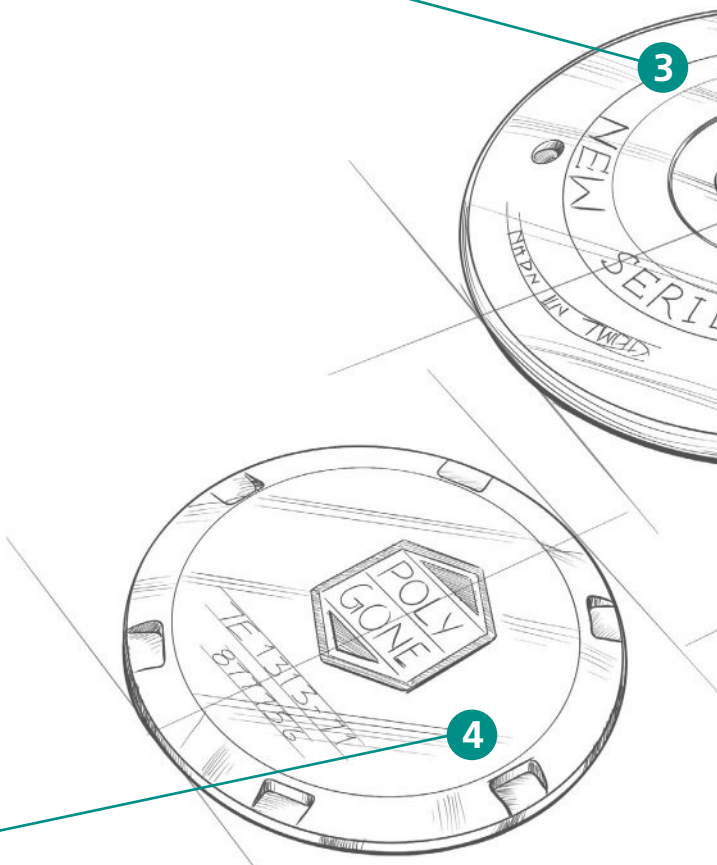
3 HIGH-GLOSS ENGRAVING WITH SOLID CARBIDE

FUTURO

Solid carbide engraver's cutter type RSG / UMG
Reinforced solid carbide engraver's cutter
Ø 0.1 mm / Ø 0.2 mm, coated or uncoated

APPLITEC SWISS TOOLING

Micro-Line
Engraving tools for universal use, available in various designs and coatings



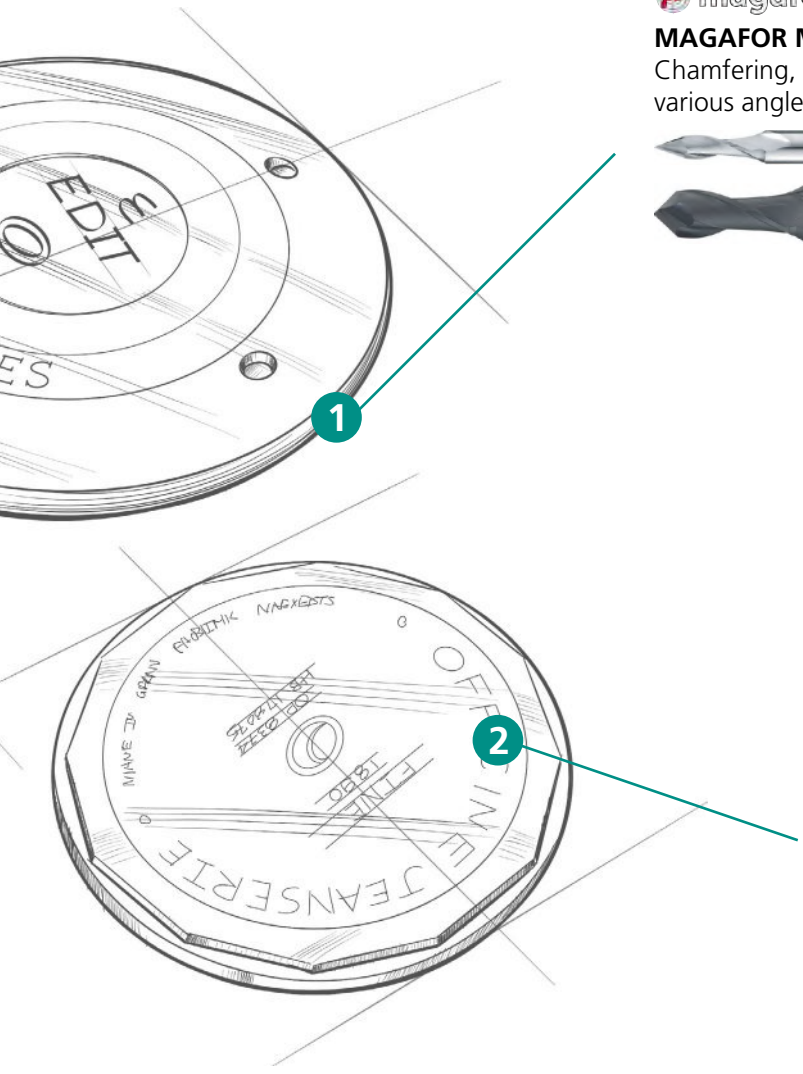
4 MATTE ENGRAVING WITH PCD

DIXI polytool

Engraving burin 70070-PCD
High-end PCD engraving burin, specially designed for matte engraving with ¾ geometry

DIXI polytool

Engraving burin 70170-PCD
PCD engraving burin, specially designed for matte engraving



1 MULTI-OPERATION MACHINING

magafor

MAGAFOR MULTI-V

Chamfering, deburring, drilling, engraving, available in various angles 90°/40°/60°/120°, from Ø 0.1 mm

2 FINE ENGRAVING

APPLITEC SWISS TOOLING

DLC engraving burin

Special thin-film DLC coating for an extra-sharp cutting edge

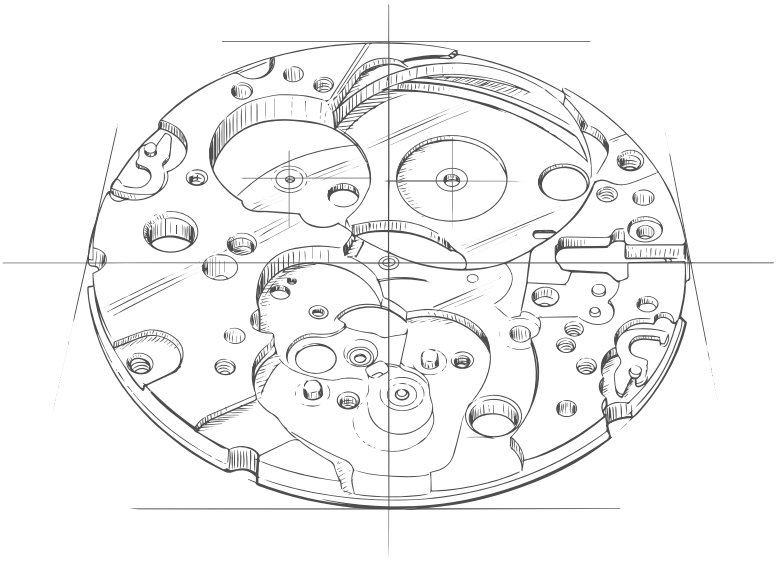
Baseplate/Mainplate

Challenges in machining mainplates
Manufacturing mainplates (baseplates and bridges) is extremely demanding, as they serve as the movement's fundamental structure and require the highest precision. The key challenges are as follows:

1. Choice of materials and their machinability
Mainplates are typically made from the following materials:
- Brass (CuZn39Pb3, CuZn37) → Soft and easy to machine, but tends to scratching
- Nickel silver (CuNi12Zn24/CuNi18Zn20) → Harder than brass, but lead-free, which makes it more difficult to machine
- Titanium → Very light, but tends to work hardening and poor thermal conductivity
- Stainless steel (e.g. 316L) → Corrosion-resistant, but difficult to machine, resulting in high tool wear
- Silicon (used for high-end pallet and balance components) → Requires etching or laser processing

2. High precision and tight tolerances
- Dimensional tolerances in the range of ±2–5 µm → Necessary for precise fitting of gears, jewel bearings and bridges
- Parallelism and flatness → Especially important, as even the smallest deviations can affect the movement's function

3. Tool selection and tool life
- Carbide or diamond tools → Required for hard or brittle materials
- Micro-tools (Ø <0.2 mm) → Required for fine drilling, threads and pockets
- High risk of tool breakage → Due to low cutting forces and vibrations in delicate structures



4. Complex machining strategies
- Multi-stage machining (roughing – semi-finishing – finishing) for dimensional accuracy
- Reduced cutting forces → To prevent deformation in thin areas
- Precise clamping technology (vacuum or zero-point systems) → Necessary for vibration reduction

5. Heat development and burr formation
- Brass and nickel silver tend to form burrs, requiring time-consuming manual rework
- Titanium and stainless steel generate significant heat during milling, which can lead to tool wear and deviations in size
- Minimum quantity lubrication (MQL) or high-pressure cooling → Helps to control heat generation

6. Surface finishing
- Electroplating (e.g. rhodium plating, gold plating) for protection and aesthetics
- Perlage and Geneva stripes → Frequently require highly precise, manual finishing
- Edge chamfering → Very time-consuming and often handcrafted

CONCLUSION

Machining watch mainplates places high demands on CNC strategies, tool selection and clamping technology due to the delicate structures, tight tolerances and challenging materials. Burr formation, tool wear and surface finishing are particularly critical factors for successful manufacturing.

Milling

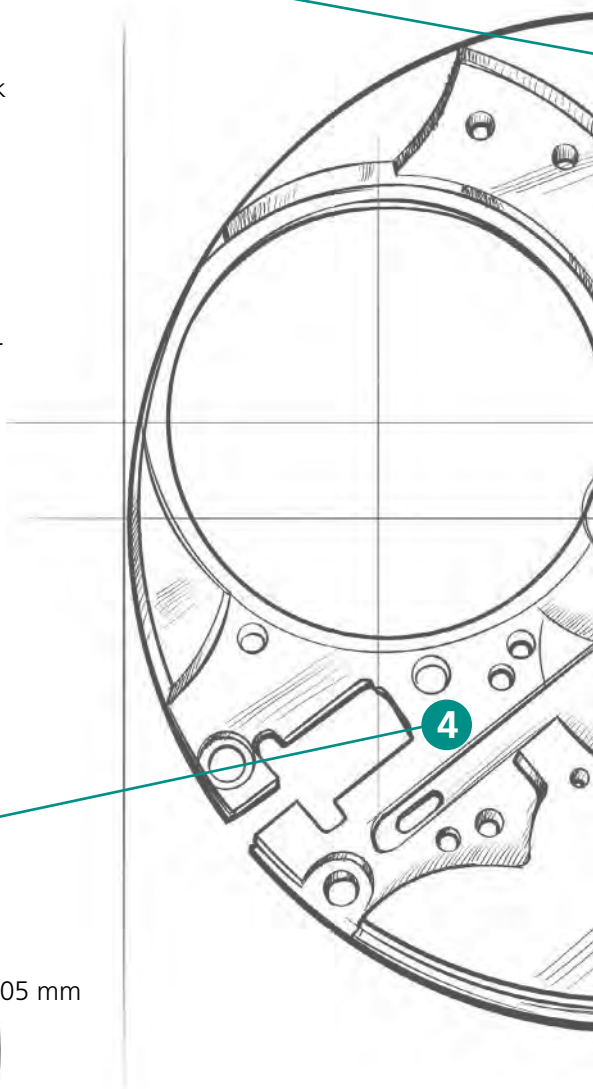
3 FACE MILLING OF VISIBLE SURFACES

WALTER

MP-Series
Straight-fluted PCD finish milling cutters with straight teeth reduce burr formation, while the reinforced shank ensures perfect support of the PCD insert

DIXI polytool

Superfinisher 70630-PCD
PCD Superfinish cutters with single-flute technology for flawless machining of visible surfaces



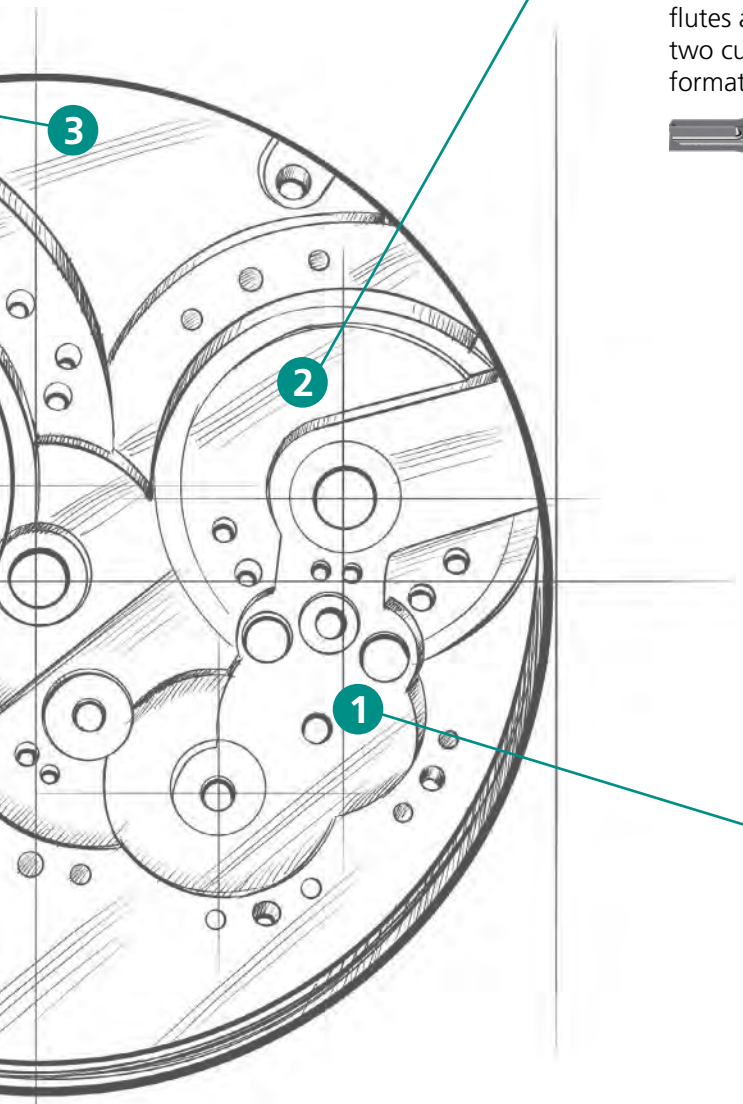
4 MICRO-MILLING

magafor

Magaforce 8500
For ultra-fine milling work from Ø 0.05 mm

SANDVIK coromant

CoroMill Plura
Solid carbide micro shoulder milling cutter,
Types 2P211/2P12/R216.32, Grade 1620, 1700



2 FINISHING MILLING

DIXI polytool

End mill 7233
Straight-fluted end mill for face milling and finishing, a highly tough grade with optimal bending strength, extreme wear resistance, polished flutes and cutting edges for perfect surfaces, two cutting edges for high feed rates, reduced burr formation thanks to straight cutting edges

1 MULTI-OPERATION MACHINING

magafor

MAGAFOR MULTI-V
Chamfering, deburring, drilling, engraving, available in various angles 90°/40°/60°/120°, from Ø 0.1 mm

Drilling

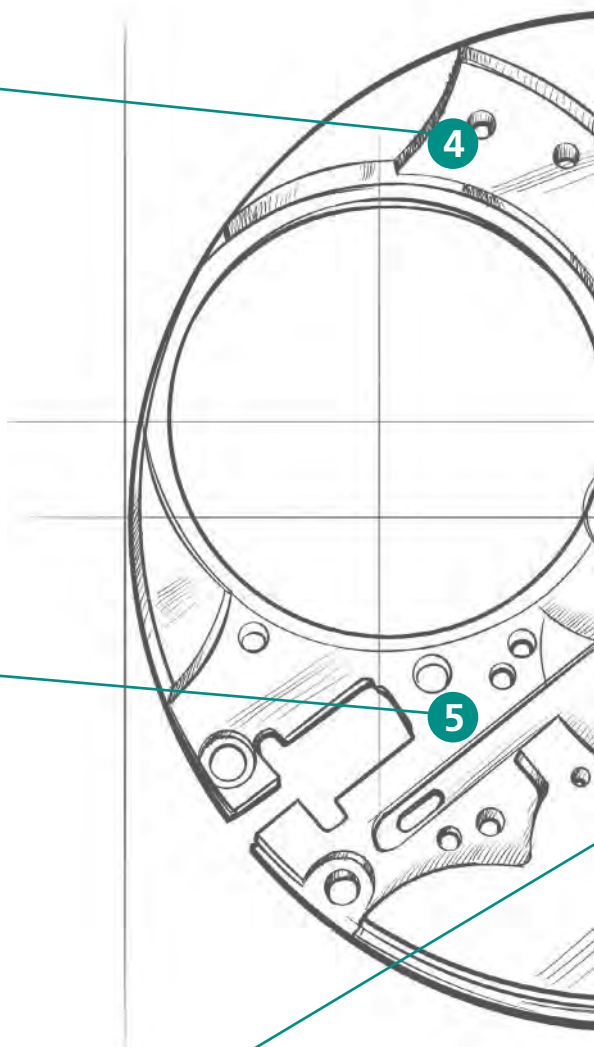
4 SPOT DRILLING

WALTER TITEX

DB131 Supreme
Solid carbide micro pilot drill with 150° point angle, from Ø 0.5 – 1.9 mm

APPLITEC SWISS TOOLING

Micro-Line
Solid carbide micro CNC spot drills 60°/90°, with various special coatings



5 LEAD-FREE BRASS DRILLING

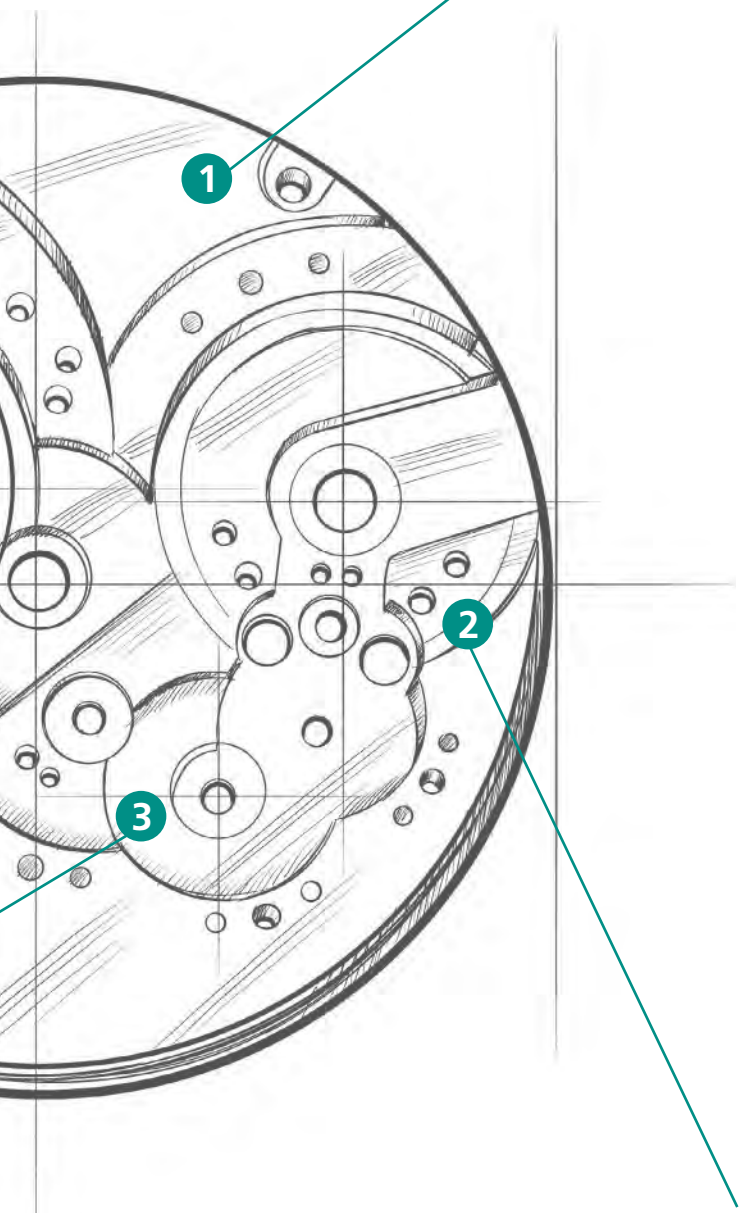
DIXI polytool

Twist drill 1137
Optimised for lead-free brass, polished clamping grooves: Improved chip evacuation, tapered core thickness from Ø 0.5 mm, reduced cutting forces, 140° tip: minimal burr formation at hole exit

3 SPOT DRILLING

WALTER TITEX

DC118 Supreme
Solid carbide spot drill with 180° cutting angle, from Ø 3.0 mm



1 DRILLING AND MICRO-DRILLING

DIXI polytool

Gun drill 1111
Highest precision with cutting edge tolerance of +/- 1 µm, no piloting required thanks to the sharp cutting edge, from Ø 0.1–2.0 mm

DIXI polytool

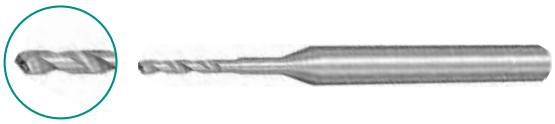
Twist drill 1345
Self-centring high-performance drill with internal cooling for series production, from Ø 3.0 mm

SANDVIK coromant

CoroDrill 462 XM- X0BU
Versatile multi-material drilling with external cooling, from Ø 0.03–3.0 mm

SANDVIK coromant

CoroDrill 862 PCD
Offers longer tool life than solid carbide drills, suitable for challenging materials such as platinum and ceramic greenware, from Ø 0.3–3.0 mm



APPLITEC SWISS TOOLING

Micro-drill 2020
Solid carbide drill with 130° point angle, from Ø 0.1–2.0 mm

2 MICRO REAMERS

magafor

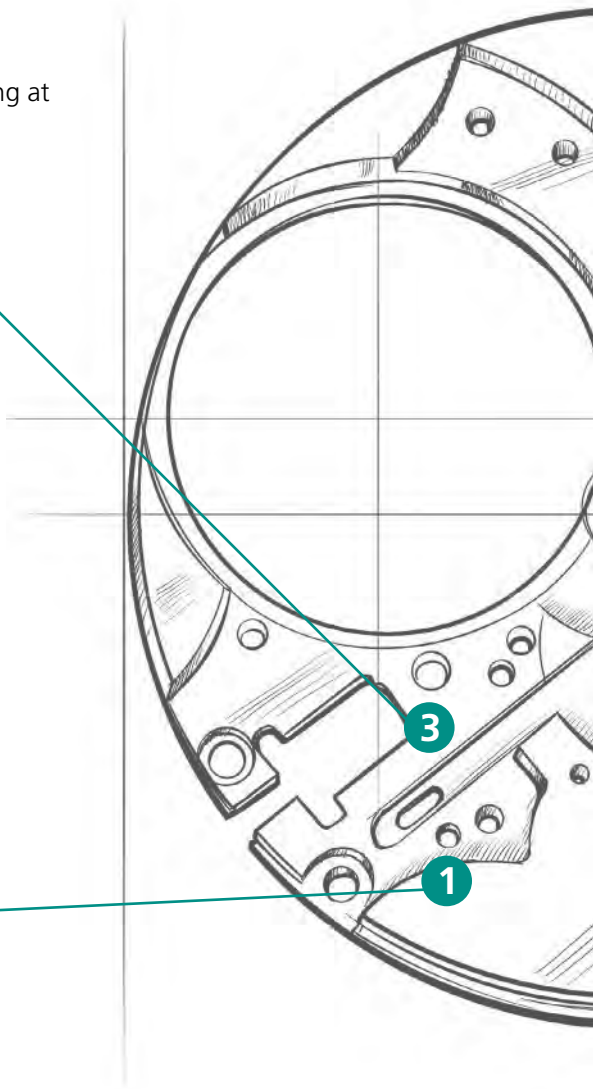
Magaforce 8610
Reamers for cylindrical holes, from Ø 0.2 mm, with left-hand flutes

Finishing

3 FACETING AND ROUNDING

magafor

Form cutters and chamfer mills
Specialised micro-tools for edge rounding starting at R 0.2 mm and faceting from Ø 0.2 mm



1 THREADING

DIXI polytool

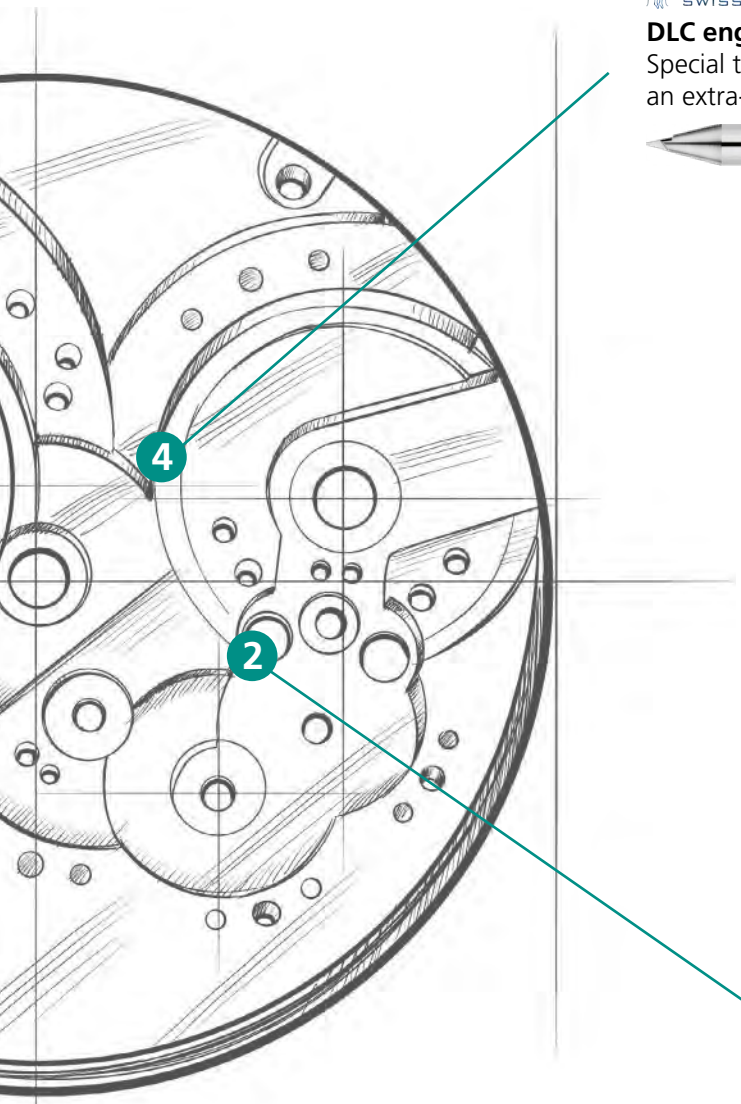
Polytool 1739 (Z1)
Thread whirler with partial profile, designed to reduce cutting forces for all materials, from Ø 0.21 – 1.1 mm

DC THREADING TECHNOLOGY

Thread whirler GW1116VS
High-performance thread whirler for mainplate machining, from Ø 0.3 – 2.6 mm, suitable for NIHS threads

DC THREADING TECHNOLOGY

Thread tap CMS50
High-performance thread tap for mainplate machining, from Ø 0.3 – 2.6 mm



4 ENGRAVING

APPLITEC SWISS TOOLING

DLC engraving tool
Special thin-film DLC coating for an extra-sharp cutting edge

2 REAMING

magafor

Magaforce 8610 Reamer
Step size of 0.005 mm for the most precise holes, from Ø 0.2 mm, with left-hand flutes

Pull-out piece/ Watch crown

Pull-out piece
Material: Ø 1.0 / 20AP steel

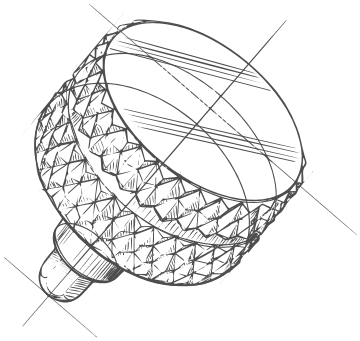
Challenges in machining pull-out pieces and watch crowns
Pull-out pieces and watch crowns are the key control elements of a watch. They must be manufactured with precision to ensure reliable function and high aesthetic quality. This involves several challenges in the machining process.

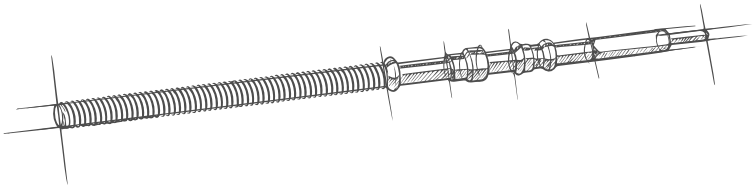
1. Choice of materials and their machinability
Pull-out pieces and crowns frequently consist of the following materials:

- Stainless steel (316L, 904L, 17-4PH) → High degree of corrosion resistance, but difficult to machine (increased tool wear)
- Titanium (Grade 2, Grade 5) → Lightweight, yet susceptible to strain hardening, requiring special cutting strategies
- Gold (18k yellow, white, or rose gold) → Soft and readily machinable, but prone to scratching
- Platinum → Extremely tough, high tool wear, difficult to polish
- Ceramics → Extremely hard, requires grinding or injection-moulding processes

2. High precision and tight tolerances

- Dimensional tolerances in the range of ±2–5 µm → Especially important for threads and sealing surfaces
- Run-out accuracy of the crown → Must be perfectly matched to the case
- Perfect fit of the pull-out piece → Essential for the winding and hand-setting mechanism to function properly





3. Machining techniques and challenges
a) Turning and milling (CNC)

- Fine threads (e.g., M1.2 or smaller) are difficult to manufacture
- Risk of burr formation, especially with stainless steel and titanium
- High demands on clamping technology to prevent deformation and vibrations

b) Micro machining (laser, EDM, polishing)

- Laser engraving for logos or textures → Requires utmost precision
- EDM (electrical discharge machining) for complex structures → Slow but highly precise
- Polishing gold or platinum → Very time-consuming, frequently manual

c) Surface finishing

- Electroplating (rhodium plating, gold plating) for corrosion protection and appearance
- Satin finishing or matting for premium surface aesthetics
- PVD coating for coloured crowns (e.g., black, blue)

4. Sealing and functionality

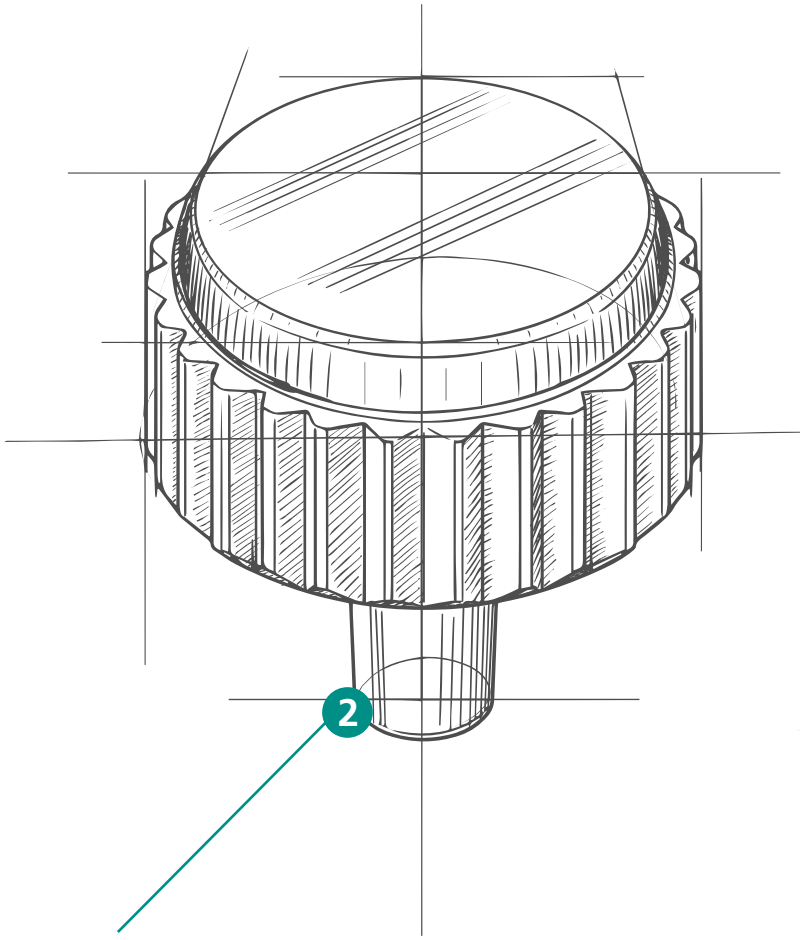
- Water resistance → Requires precise sealing surfaces and high-quality seals
- Perfect thread fit between crown and case → Avoidance of play or stiffness
- Compression and tensile stress on the pull-out piece → It must withstand stresses without bending

CONCLUSION

Machining pull-out pieces and watch crowns is challenging because it requires the utmost precision, fine threads, flawless surfaces and durable seals. Burr formation, tool wear and demanding finishing are particularly problematic.

Watch crown
Material: Ø 6.50 / Inox 1.4427

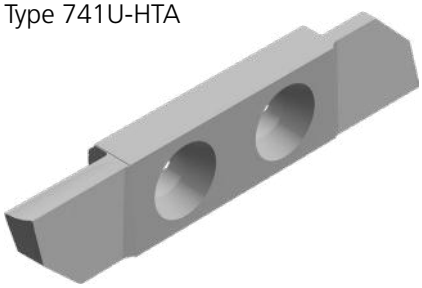
Precision-turned watch crown



2 PARTING OFF

APPLITEC SWISS TOOLING

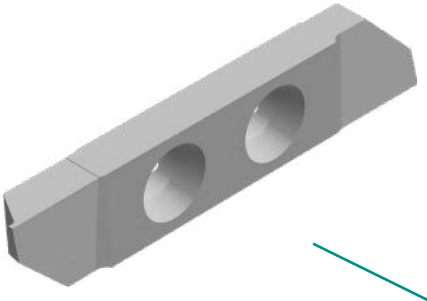
TOP-Line 741
Indexable inserts for parting-off with chip breaker, Type 741U-HTA



5 RADIAL GROOVING

APPLITEC SWISS TOOLING

TOP-Line 745
Indexable insert for grooving narrow widths, type 745-0202-HTA



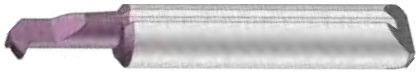
6 INTERNAL THREAD TURNING

IFANGER

Thread steel MTGE
with 60° profile angle, TiAlN-coated

IFANGER

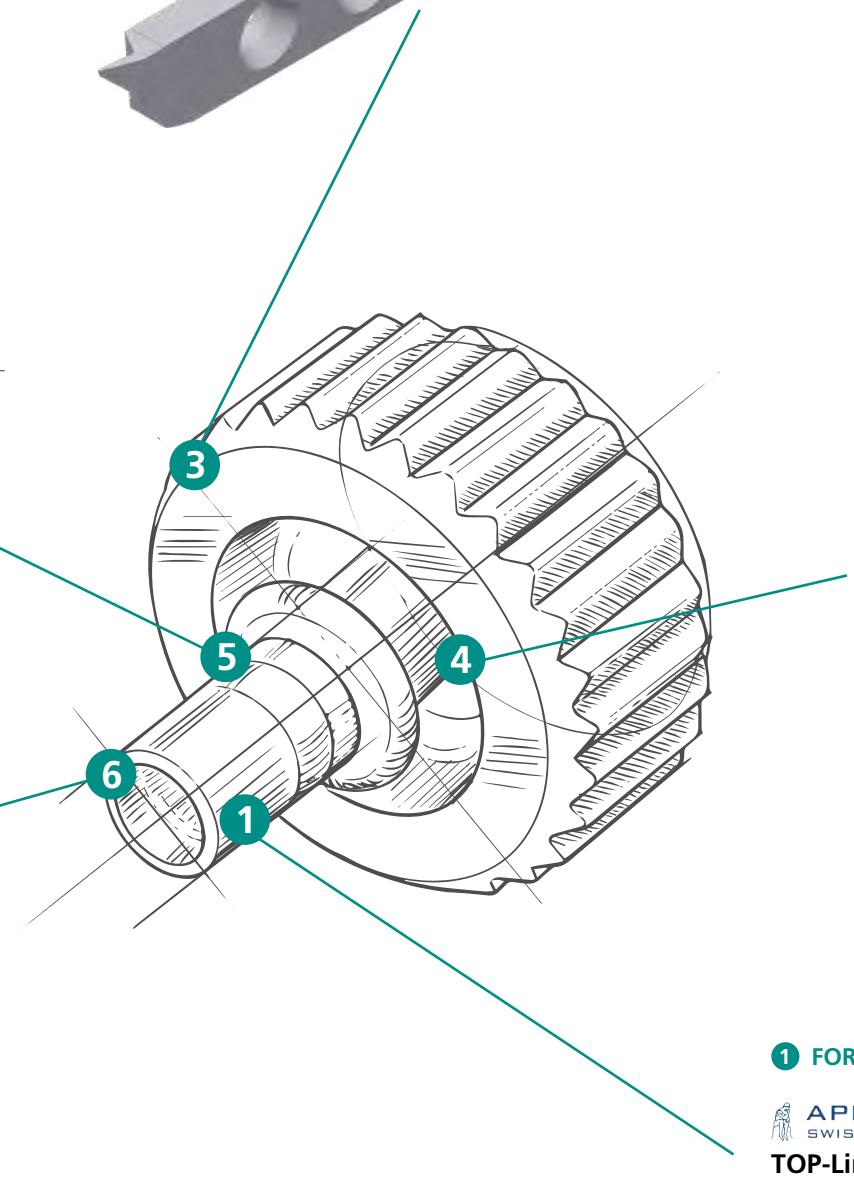
Thread steel MTGW
with 55° profile angle, TiAlN-coated



3 REVERSE PRECISION TURNING

APPLITEC SWISS TOOLING

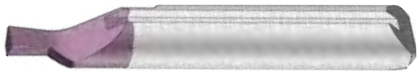
TOP-Watch 743SF
Indexable insert for reverse precision turning,
Type 743SF-10/3-HTAF



4 AXIAL GROOVING

IFANGER

Micro-Turn Grooving steel
Axial grooving steel MTNY available in left- or right-hand versions, with TiAlN coating



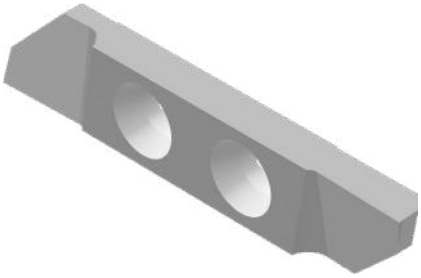
APPLITEC SWISS TOOLING

IN-Line BBR6
Axial grooving steel, Type BBR6R-50150-FEG150X

1 FORWARD TURNING

APPLITEC SWISS TOOLING

TOP-Line 732
Indexable insert for forward turning,
Type 732-2° TiAlX

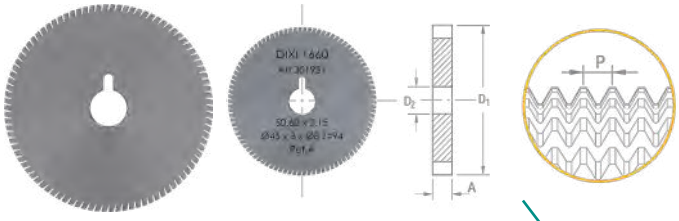


Precision-turned pull-out piece

1 MICRO-THREAD TURNING / MILLING

DIXI

Hobbing cutter 1660
Hobbing cutter for miniature threads, short cycle times, perfect thread quality even under the highest demands, also available with NIHS threads



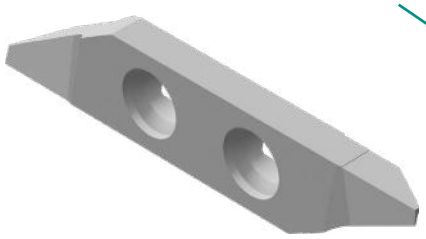
APPLITEC SWISS TOOLING

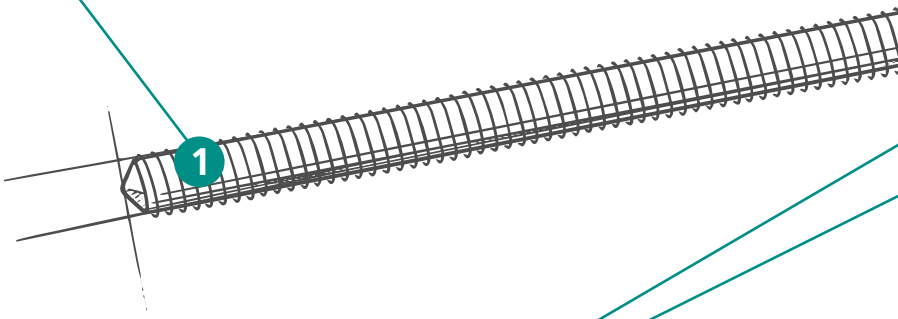
TOP-Watch SFX
Indexable insert for micro-thread turning, Type 746SFX/736SFX

2 FORWARD TURNING

APPLITEC SWISS TOOLING

TOP-Line 712
Indexable insert for forward turning, Type 712-30-TIALN





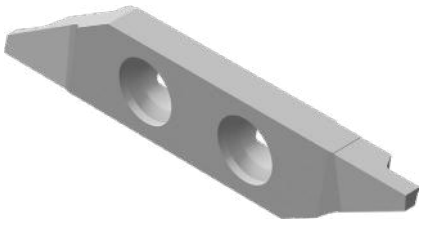
6 GROOVING

APPLITEC SWISS TOOLING

TOP-Watch 748SF
Indexable inserts for micro-grooves, Type 748SF-E03-A45°

APPLITEC SWISS TOOLING

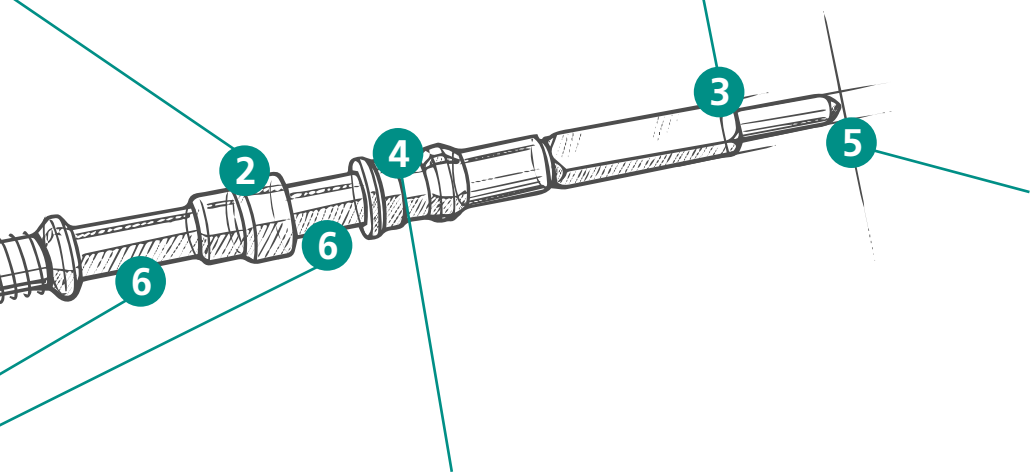
TOP-Line 714
Indexable insert for precision turning, Type 714-0.5 TiaIN



3 REVERSE FINE CONTOUR TURNING

APPLITEC SWISS TOOLING

TOP-Watch 743SF
Indexable insert for reverse precision turning,
Type 743SF-10/3-HTAF



5 PARTING OFF

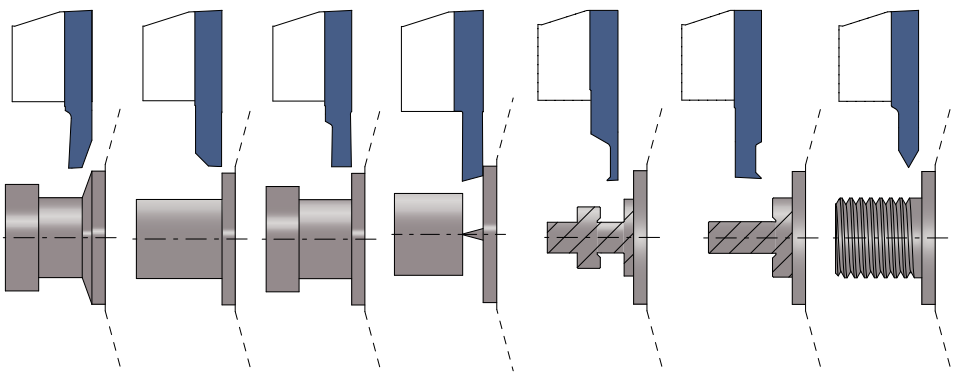
APPLITEC SWISS TOOLING

TOP-Line 711
Indexable insert for parting off,
Type 711-0.5-TIALN

4 FORWARD FINE CONTOUR TURNING

APPLITEC SWISS TOOLING

TOP-Watch SF
Indexable inserts for precision turning in the watchmaking industry, various geometries

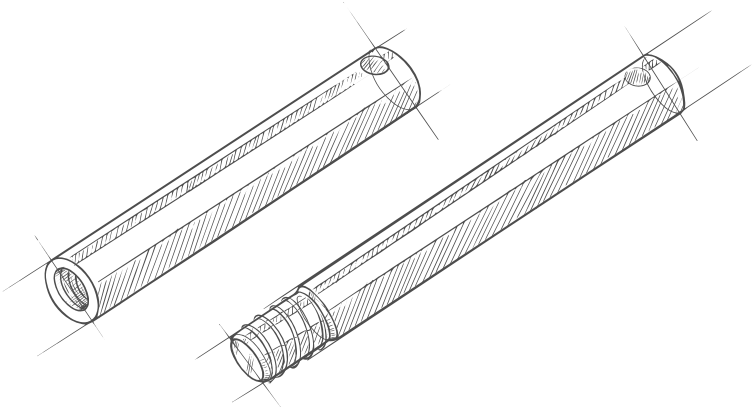


Watch strap with spring bar

Challenges in machining watch straps in the watch-making industry
Watch straps for high-quality watches are made from metal, leather, rubber or ceramic. Metal watch straps in particular pose significant manufacturing challenges, as they require both high mechanical precision and flawless surface quality.

1. Choice of materials and their machinability
Watch straps are made from various materials, each presenting specific challenges:
- Stainless steel (316L, 904L, 17-4PH) → Difficult to machine, high tool wear, challenging to polish
- Titanium (Grade 2, Grade 5) → Lightweight, yet susceptible to strain hardening and difficult to polish
- Gold (18k yellow, white, or rose gold) → Soft and readily machinable, but tends to scratching
- Platinum → Extremely tough, high tool wear, complex surface finishing
- Ceramics (ZrO_2, Si_3N_4) → Extremely hard, requires grinding or injection-moulding processes
- Rubber/silicone → Requires precise moulding, sensitive to abrasion
- Leather → Manual processing, sensitive to moisture and aging

2. Precision and tolerances
- Tight tolerances for links and hinges → Requires a perfect fit to ensure a smooth strap feel
- Consistent width and thickness → Especially important for metal and ceramic watch straps
- Perfect hinges and clasps → Must operate smoothly yet close securely



3. Machining techniques and challenges
a) CNC milling and turning
- Highly precise milling and turning operations necessary for links and connectors
- Challenging machining of hard materials such as titanium or ceramics
- Heavy burr formation with stainless steel and titanium → Requires extensive rework

b) Grinding, polishing and satin finishing
- Polishing effort for stainless steel, gold, and platinum → Time-consuming, often manual
- Satin-finished or brushed surfaces → Must be perfectly uniform
- Ceramics require diamond tools for a perfect finish

c) Joining techniques and assembly
- Invisible screws or snap-fit connections require the highest precision
- Hinges must be durable and free of play
- Water-resistant or flexible joints in certain models

4. Ergonomics and wearing comfort
- Watch strap flexibility → Must fit the wrist comfortably
- Balanced weight → Especially important for solid gold or platinum watch straps
- Skin compatibility of materials → No allergenic potential, no sharp edges

5. Surface finishing
- Electroplating (gold-plating, rhodium plating, PVD-plating) for protection and appearance
- A combination of polished and satin-finished surfaces → Very time-consuming and often manual
- Ceramic watch straps require rework to prevent sharp edges

CONCLUSION

Machining watch straps is extremely demanding, as it requires both mechanical precision and high-quality surface finishing. Particularly challenging are high tool wear, burr formation, assembly precision and labour-intensive polishing.

Watch strap machining

3 SLOTTING

DIXI polytool

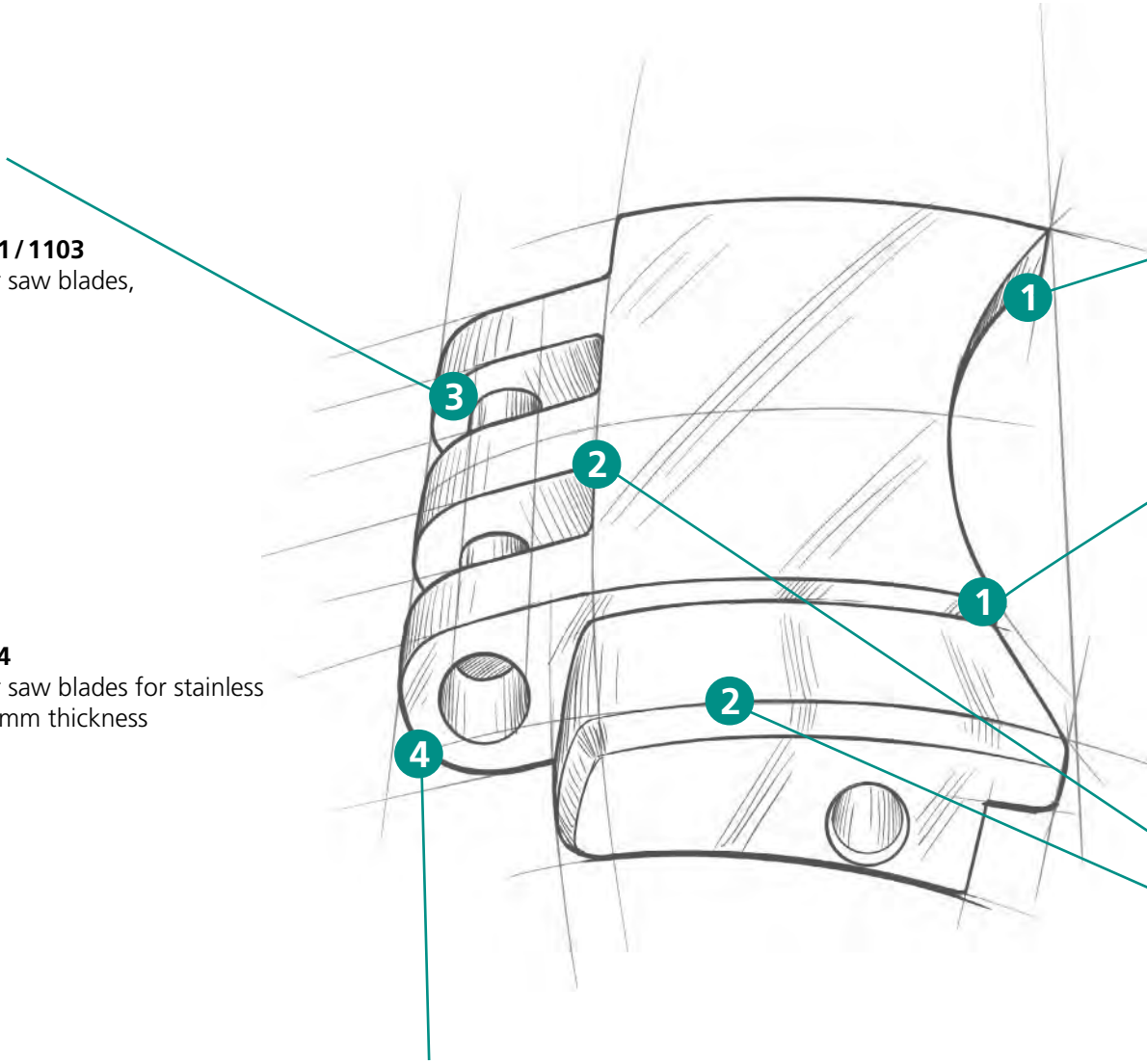
Circular saw blade 1533
Solid carbide slitting saw, Type A, fine-toothed, in accordance with DIN 1837A, from 0.2 mm thickness

APPLITEC SWISS TOOLING

Circular saw blade 1101 / 1103
Ultrafine-toothed circular saw blades, from 0.1 mm thickness

APPLITEC SWISS TOOLING

Circular saw blade 1104
Ultrafine-toothed circular saw blades for stainless steel materials, from 0.8 mm thickness



4 SLOT-MILLING

GÜHRING

G-Mold 55B
Optimised for ISO M/S and ISO H from Ø 0.5 – 12.0 mm

1 EXTERNAL CONTOUR MILLING

DIXI polytool

Multi-tooth milling cutter 7520
Ideal for finishing at elevated temperatures in demanding materials, available from Ø 0.35 mm

DIXI polytool

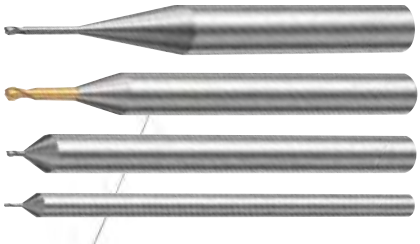
Multi-tooth milling cutter 7560
Designed for finishing stainless steels and superalloys, from Ø 0.4 mm

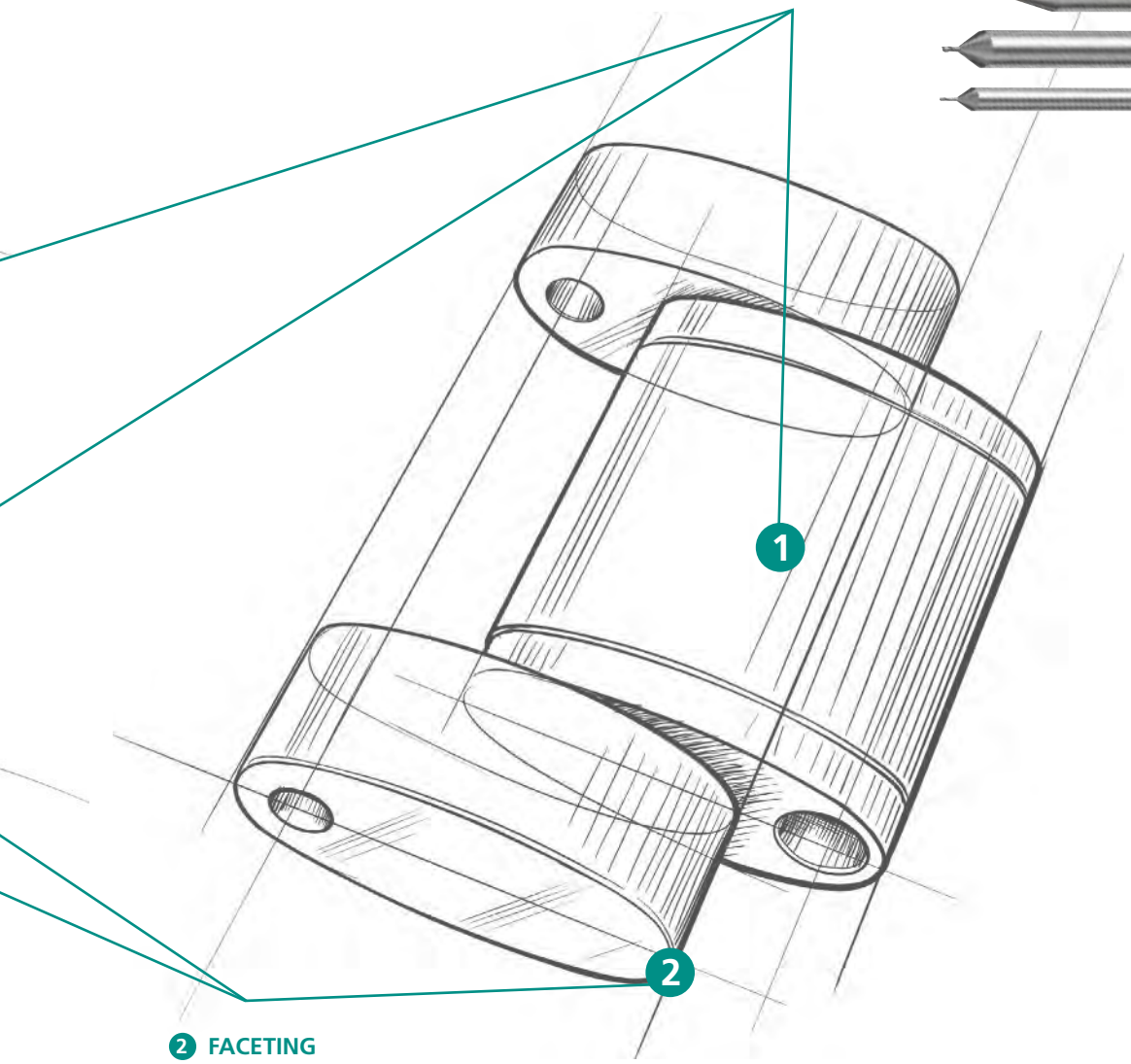
SANDVIK coromant

CoroMill Plura HFS
Optimised for ISO M and ISO S/Type 2P341/Grade 1640, from Ø 2.0–25.0 mm

SANDVIK coromant

CoroMill Plura
Solid carbide micro copy mills 2P211-PC/2P212-PC, from Ø 0.5 mm

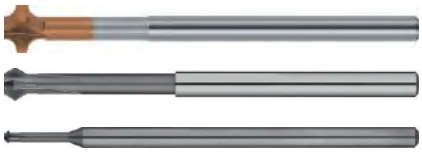




2 FACETING

magafor

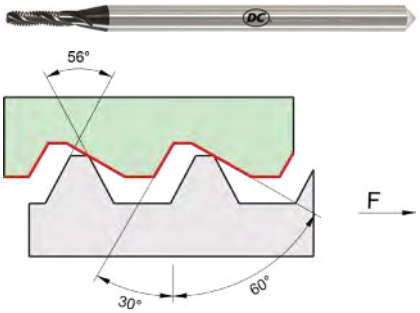
Bi-FACE 845/846 M
Bi-FACE chamfer cutter for faceting from Ø 0.2 mm, ideal for stainless steel and superalloys



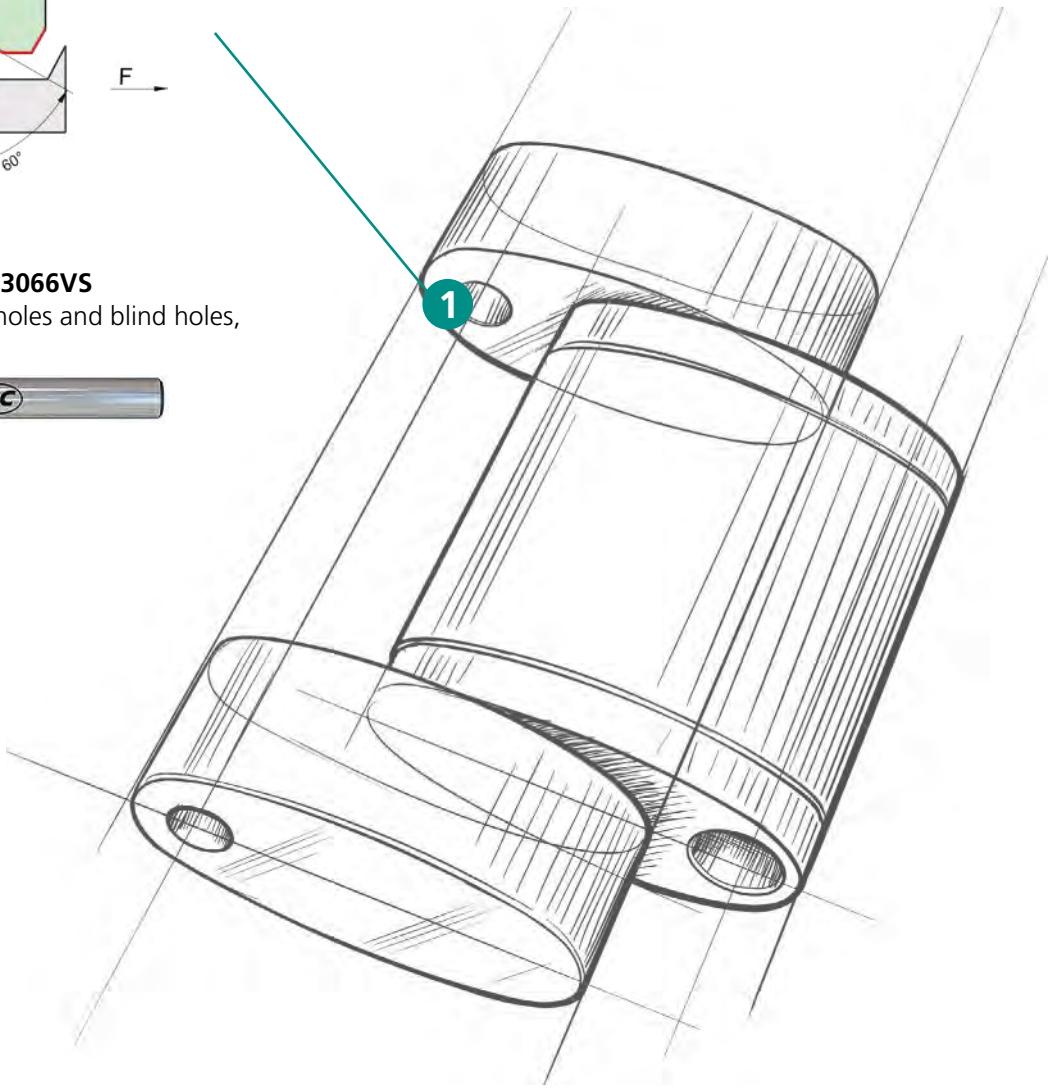
Watch strap machining

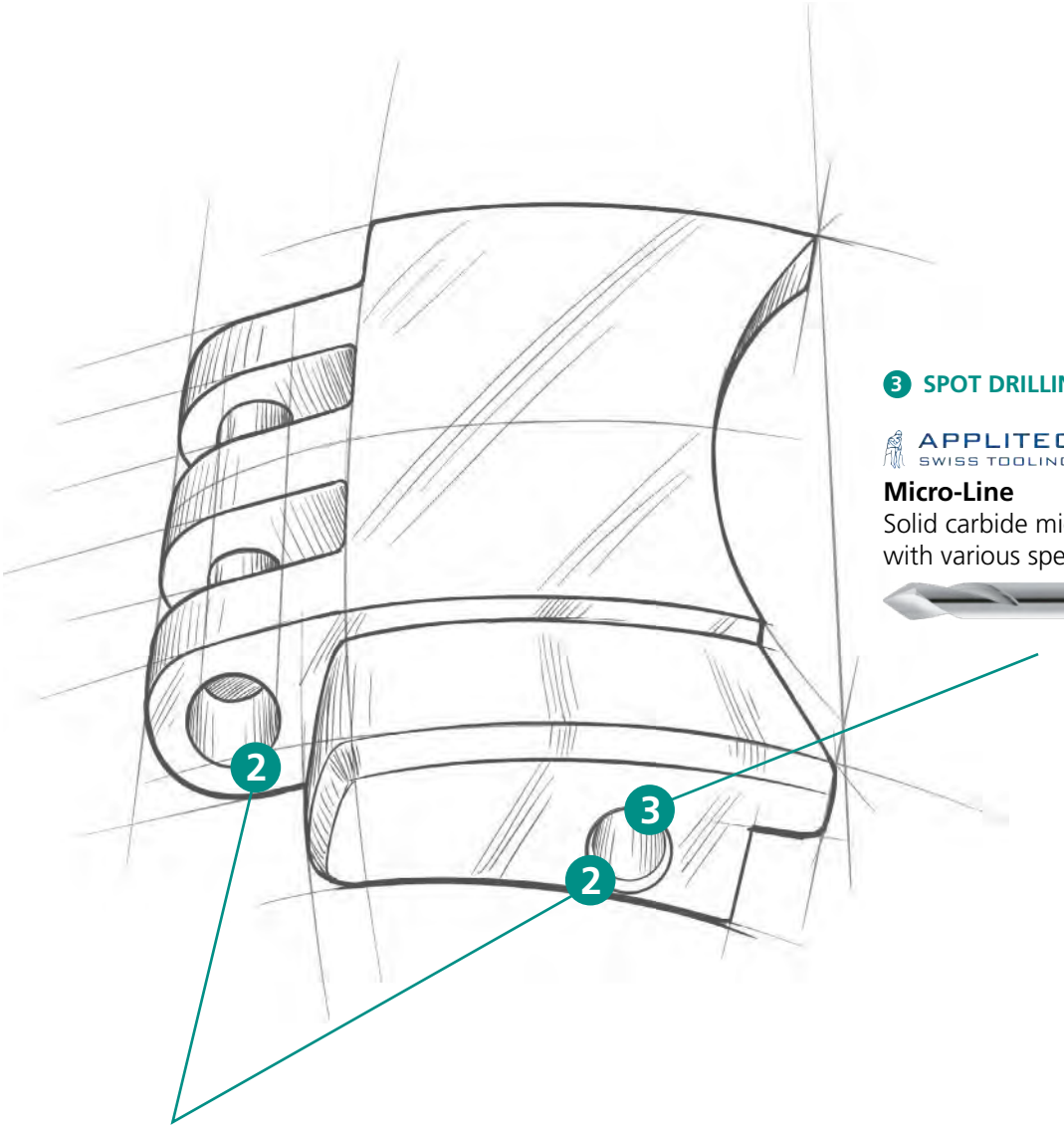
1 THREADING

Self-locking threads with Safelock system
Guaranteed resistance to impact and vibration



Thread whirler GWI3066VS
Suitable for through-holes and blind holes, from M 0.8 to M 8





3 SPOT DRILLING

APPLITEC SWISS TOOLING

Micro-Line
Solid carbide micro CNC spot drills 60°/90°, with various special coatings

2 HOLE FOR WATCH STRAP LINK

magafor

Magaforce 82X
Micro-drills 3xD/5xD/8xD, from Ø 0.1 mm in 0.01 mm increments

SANDVIK coromant

CoroDrill 462 XM- X0BU
Versatile multi-material drilling with external cooling, from Ø 0.03–3.0 mm

APPLITEC SWISS TOOLING

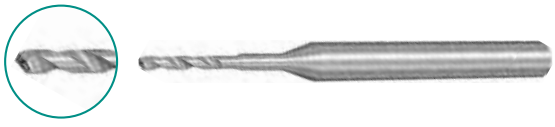
Micro drill 2020
Solid carbide drill with 130° point angle, from Ø 0.1–2.0 mm

DIXI polytool

Twist Drill- Solid Carbide Drill 1345
Self-centring high-performance drill with internal cooling for series production, from Ø 3.0 mm

SANDVIK coromant

CoroDrill 862 PCD
Offers longer tool life than solid carbide drills, suitable for challenging materials such as platinum and ceramic greenware, from Ø 0.3–3.0 mm



Spring bar machining

1 HIGH-PRECISION MACHINING

APPLITEC SWISS TOOLING

TOP-Line 711
Indexable insert for parting off,
Type 711-0.5-TIALN

APPLITEC SWISS TOOLING

TOP-Line 712
Indexable insert for forward turning,
Type 712-30-TIALN

APPLITEC SWISS TOOLING

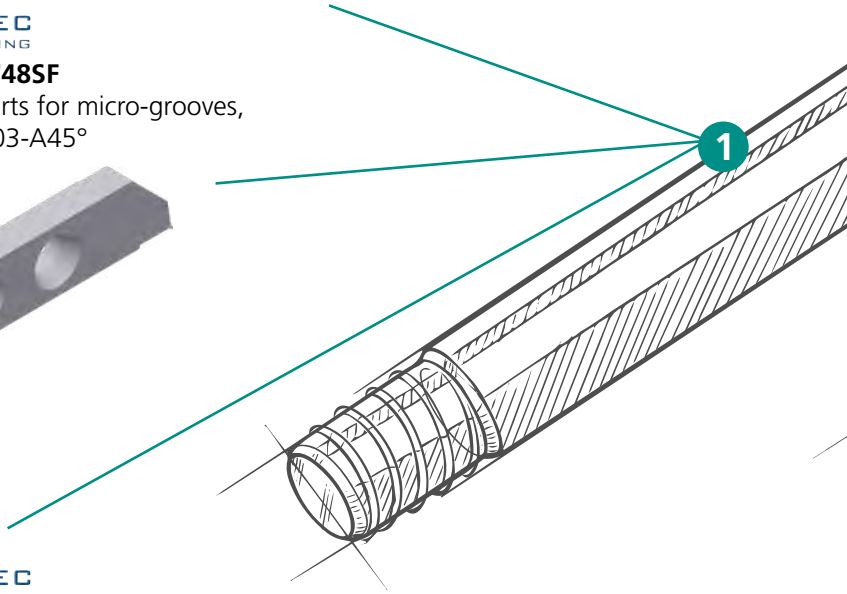
TOP-Line 714
Indexable insert for precision turning,
Type 714-0.5 TiaIN

APPLITEC SWISS TOOLING

TOP-Watch 743SF
Indexable insert for reverse precision turning, Type 743SF-10/3-HTAF

APPLITEC SWISS TOOLING

TOP-Watch 748SF
Indexable inserts for micro-grooves,
Type 748SF-E03-A45°

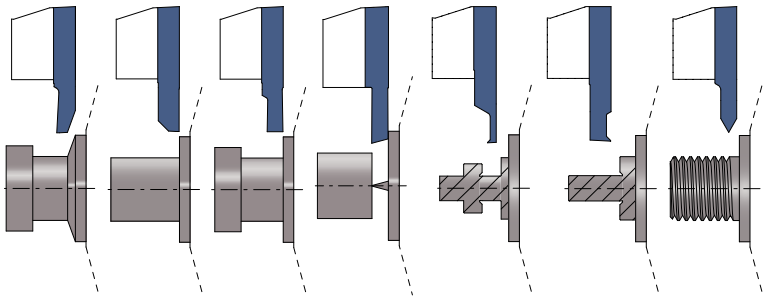


APPLITEC SWISS TOOLING

TOP-Watch SFX
Indexable insert for micro-thread turning, Type 746SFX/736SFX

APPLITEC SWISS TOOLING

TOP-Watch SF
Indexable inserts for precision turning in the watchmaking industry, various geometries



2 DRILLING ON CONVEX SURFACES

SANDVIK coromant

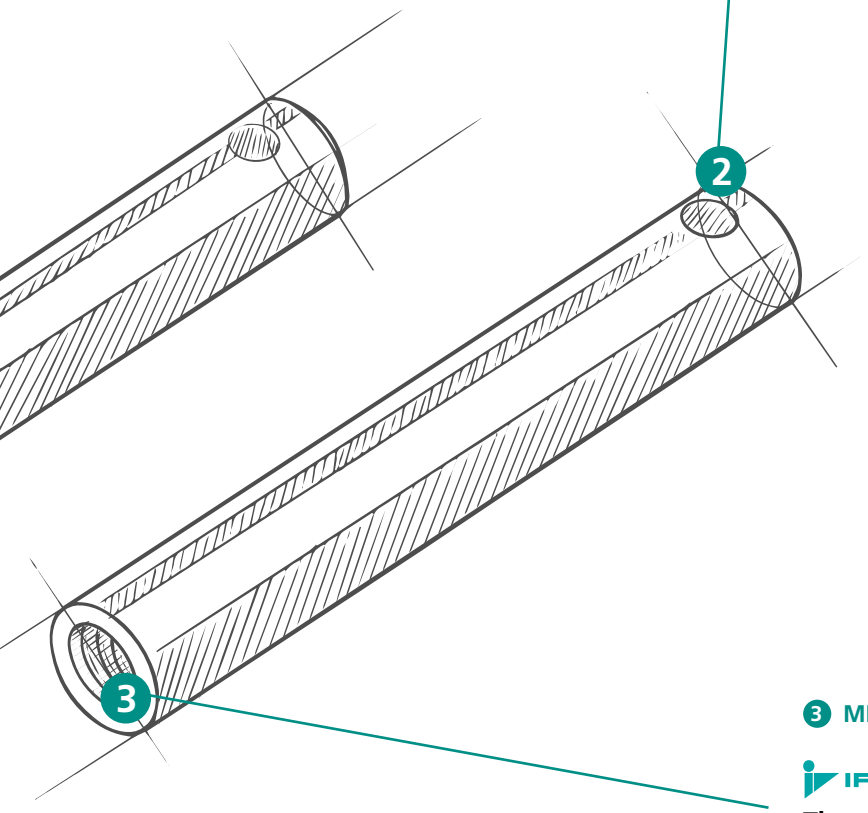
CoroDrill 462 XM- X0BU

Versatile multi-material drilling with external cooling, from Ø 0.03–3.0 mm

SANDVIK coromant

CoroDrill 862 PCD

Offers longer tool life than solid carbide drills, suitable for challenging materials such as platinum and ceramic greenware, from Ø 0.3–3.0 mm

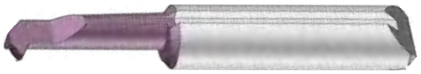


3 MICRO THREAD TURNING

IFANGER

Thread steel MTGE

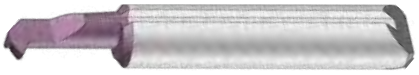
with 60° profile angle, TiAlN-coated

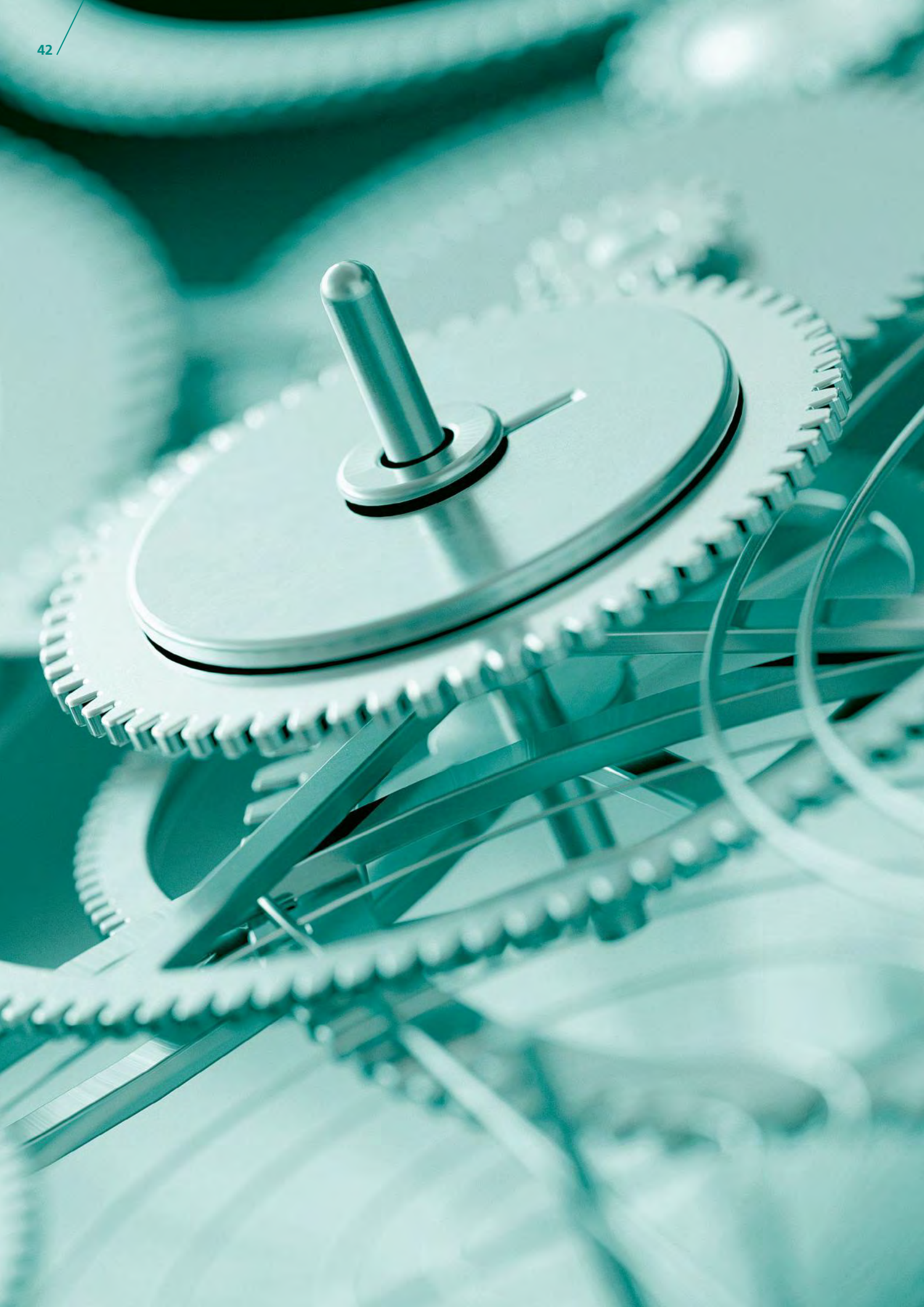


IFANGER

Thread steel MTGW

with 55° profile angle, TiAlN-coated





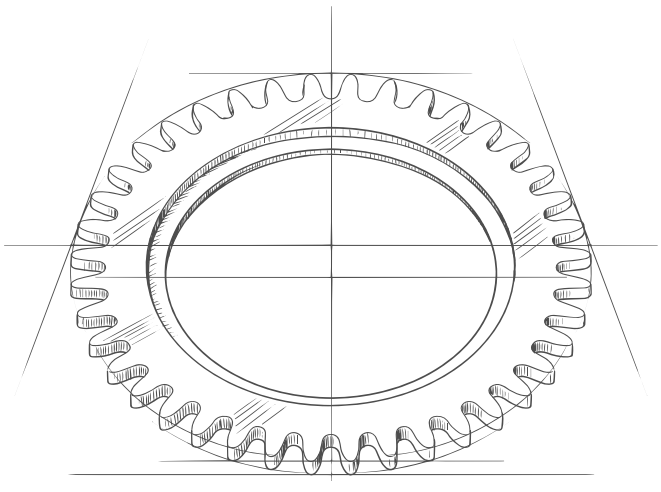
Watch gears

Challenges in machining gears in the watchmaking industry
Watch gears are crucial for the precision and function of a movement. Their machining poses special challenges due to their extremely small dimensions, tight tolerances and unique material properties.

1. Choice of materials and their machinability
Watch gears are made from various materials, each presenting their own specific challenges:
- Brass (CuZn37, CuZn39Pb3) → Good machinability but soft material → high tool wear on fine structures
- Nickel silver (CuNi12Zn24/CuNi18Zn20) → Harder than brass, but poorer machinability
- Stainless steel (316L, 17-4 PH) → Corrosion-resistant, but difficult to mill and turn
- Titanium (Ti6Al4V) → Light and robust, but tends to work hardening
- Silicon → Used for ultra-precise gears in high-frequency applications (via etching or laser processes)

2. High precision and tight tolerances
- Tolerances in the range of ±2–5 µm → Even the slightest deviations affect accuracy
- Perfect tooth geometry → Essential for smooth transmission and minimal energy loss
- Coaxiality and run-out accuracy → Essential for ensuring uniform meshing with other gears

3. Machining methods and challenges
a) Milling/Hobbing/Shaping
- Rapid tool wear when machining hard materials
- Precise positioning is essential to ensure minimal deviations in tooth geometry
- High demands on clamping systems to prevent vibrations



b) Wire or sinker EDM (for high-precision gears)
- Slow process, but extremely precise → ideal for prototypes and small-scale production
- Risk of heat impact on thin teeth → can lead to dimensional deviations

c) Laser cutting/etching (for silicon gears)
- Etching is particularly suitable for fine structures (e.g., anchor escapement)
- Requires special rework to remove burrs and residual stresses

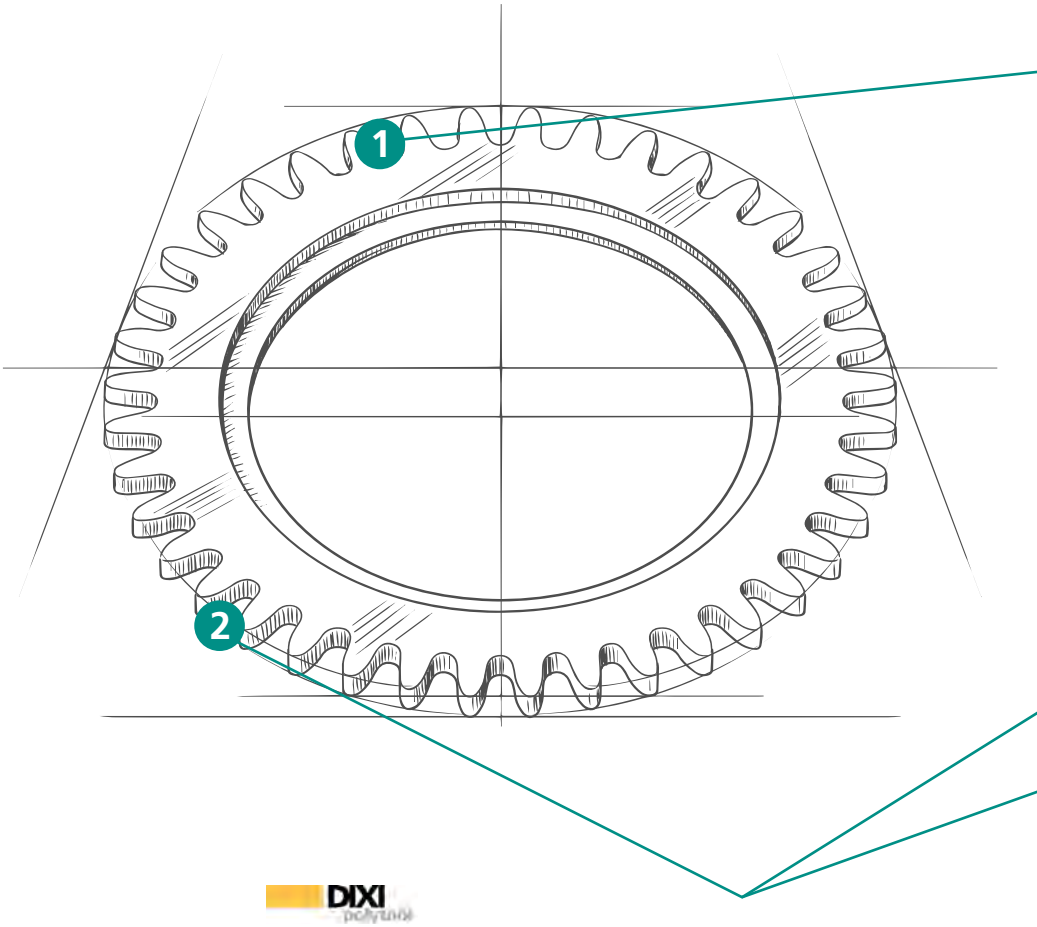
4. Tool life and wear
- Carbide or PCBN/CBN tools required for hard materials such as stainless steel or titanium
- High wear due to extremely small tools (cutters Ø <0.1 mm for micro gears)
- Cooling is crucial → often minimum quantity lubrication (MQL) or dry machining

5. Surface quality and rework
- Minimal roughness required → Less friction, higher efficiency
- Honing or vibratory finishing to improve tooth flank quality
- Electroplating (gold-plating, rhodium plating, nickel-plating) for protection and reduced friction

CONCLUSION

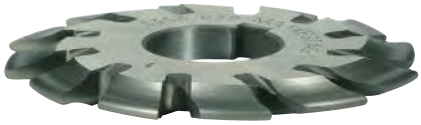
Machining gears in the watch-making industry demands utmost precision, specially adapted manufacturing processes and high-quality materials. The challenges lie in burr formation, tool life, perfect tooth geometry and rework.

Machining



2 GEAR-MODULE MILLING

Gear cutter Type 3355
Module sizes from 0.5 – 3.0 mm



DIXI polytool

Monoblock hobbing cutter 1672
For cycloidal tooth profiles, used for generating small gears by hobbing (NIHS, EVJ, CETEHOR standards, etc.), including a regrindable logarithmic profile

DIXI polytool

Hobbing cutter 1675
Hobbing cutters for cycloidal tooth profiles, designed for hobbing through the generation of pinions and gears (NIHS, EVJ, CETEHOR standards)

DIXI polytool

Special adjustable hobbing cutter
Used for hobbing to create asymmetric pinions and gears, including colour wheel and wolf-tooth profile

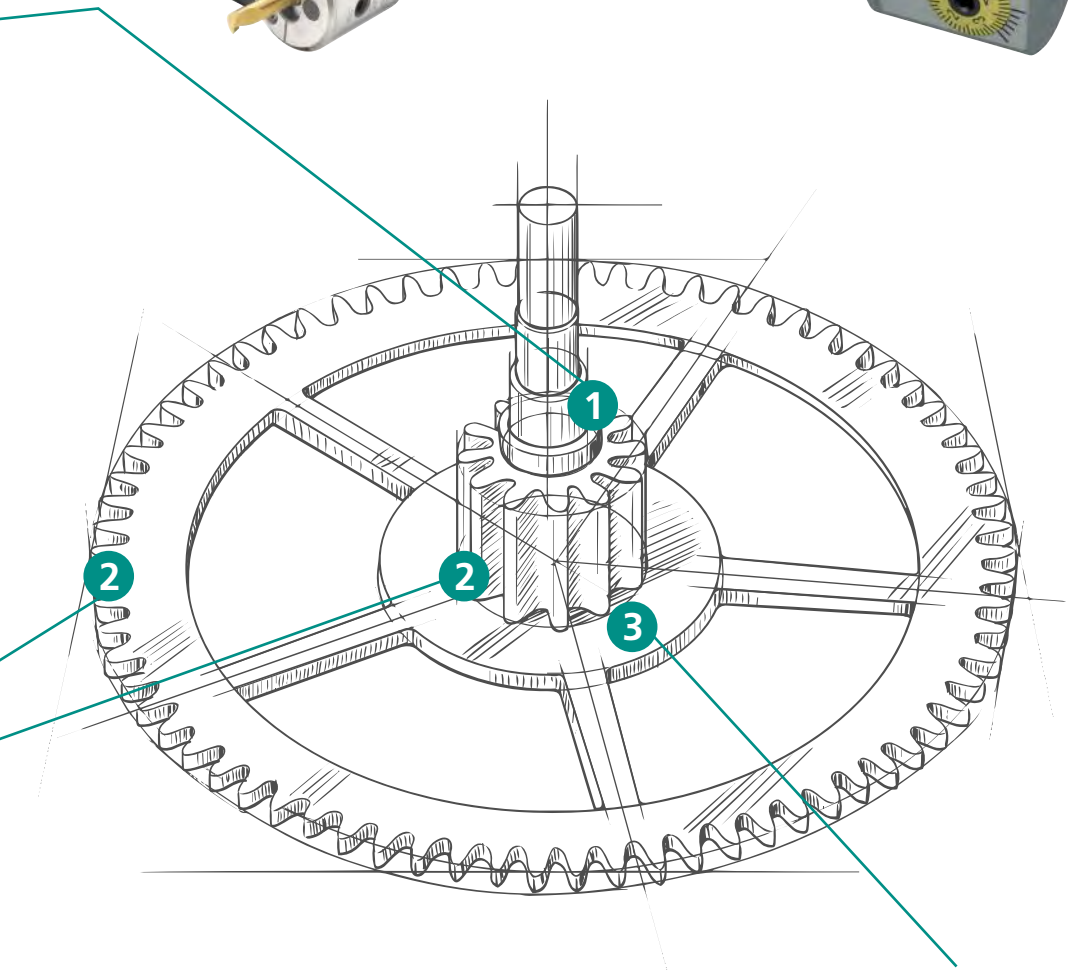
1 MICRO BORING

FUTURO

Micro boring head with cylinder shank
Precision boring head for perfect roundness and diameter cylindricity, adjustable to 1 µm

SWISS TOOLS

Micro boring head with HSK-EZ15 / ATC15
Precision boring head for perfect roundness and diameter cylindricity, adjustable to 1 µm



3 MICRO-REAMING OF INTERNAL ADJUSTMENT IN TOOTHED PULLEYS

magafor

Magaforce 8610 Reamer
Step size of 0.005 mm for the most precise holes, from Ø 0.2 mm, with left-hand flutes

DIXI polytool

POLY 4007-TC
Solid carbide machine reamer with left-hand helix angle, from Ø 0.37 mm, featuring unequal pitch

Finishing

1 BRUSHING

NAMPOWER grinder head brushes

2 CLEANING

FUTURO

Automated workpiece cleaning

3 DEBURRING

FUTURO

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

Decorations

1 CÔTES DE GENÈVE

Geneva stripes are a finish widely used in haute horlogerie, also known as straight ribs or Geneva waves. It is a decorative finish on the movement of a mechanical watch, featuring wave-like lines or stripes.

DIXI polytool

Straight-toothed T-slot cutter

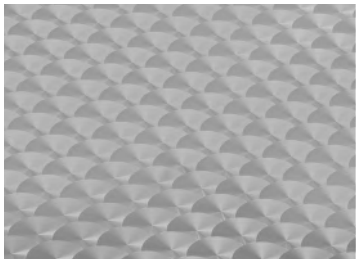
2 CENTRE RULES

Centred stripes are another finish also used in haute horlogerie. This is a decorative finish, primarily applied to the base plate, created with a single-point boring tool to produce a concentric, visually appealing surface.

SWISS TOOLS

Boring head with single-point cutting tool

3 PERLAGE



A type of decoration that consists of creating circles with very fine concentric lines that intersect each other. It is also referred to as engine turning or pearling.

DIXI polytool

DIXI PKD-Corner and slot cutter 70600-PCD

PFERD

Cylindrical Pferd grinding points (CY)

4 LE SOLEILLAGE AND COLIMAÇONNAGE

... is a type of decoration consisting of radial lines extending from the centre of the surface to its edges. It is referred to as a snail or spiral pattern when the lines are no longer straight but curved.

DIXI polytool

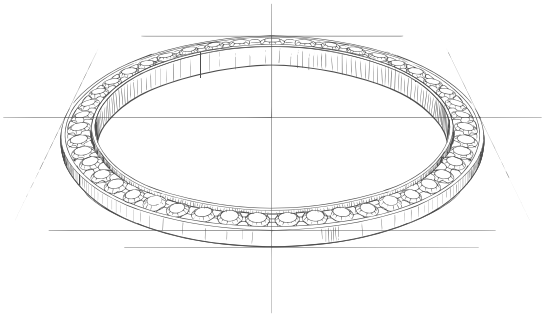
Special, multi-toothed decoration cutter

5 CRIMPING

... refers to the setting of gemstones and jewels into the bezel. A suitable recess matching the stone's cut is created using an engraving burin.

APPLITEC SWISS TOOLING

DLC-coated engraving burin



6 FLAT POLISHING

Flat polishing creates a mirror-smooth surface by gently rubbing the workpiece with diamond grinding paste in figure-eight motions.

Diamant Weber

Diamond grinding paste

Tool holders for micro-machining machines

New collet system HSK-EZ
The new collet system was developed in accordance with the HSK-E15 standards of DIN-SPEC 28999 and replaces the existing ATC-E15 products. The innovative tool holders by REGO-FIX and SCHAUBLIN enable the miniaturisation of spindles and micro-machines to meet the specific demands of the micro-industry regarding performance, reliability, precision and minimal interference contours.

Swiss precision at its finest
All variants of the HSK-EZ tool holders are manufactured with the highest Swiss precision and can operate at speeds of up to 80,000 revolutions per minute.
High-speed machining of workpieces is essential, especially in micro and ultra-fine part manufacturing. The large and well-matched variety of clamping diameters, meaning the extensive range of suitable mounting diameters from 0.2 mm to 7.0 mm, makes these tools indispensable for your micro-machining applications, especially when combined with their minimal interference contours.

Design for micromachining
For the watchmaking and chip industries, this new HSK-EZ collet system offers a compact solution without having to forgo the proven hollow shank taper interface. With a run-out accuracy of less than 4 µm and a surface finish of up to Ra 0.25, these tools meet the highest demands of micro-machining. Additionally, this system offers high repeatability, silent operation and excellent rigidity for disturbance-free performance. The slim body and specially designed collet nuts or shrink-fit holders ensure the smallest possible installation space, especially when used with tool changers. Naturally, the new HSK-EZ clamping tools also reduce the risk of interference contours and their design improves chip evacuation in tight geometries.

Tool holders for HSK-EZ15 micromachines

REGO-FIX

Collet chuck
Clamping system: ER/SR
Clamping range: from Ø 0.2–7.0 mm

SCHAUBLIN

HydroNut System
Compatible with ER/D collets

SCHAUBLIN

Shrink-fit chuck
Clamping range: from Ø 3.0–6.0 mm

REGO-FIX

Collet chuck
With HSK-AZ geometry (HSK-A), featuring a special orientation notch

SWISS TOOLS

Monoblock boring head with HSK-EZ15 interface, adjustable to 1 µm

SCHAUBLIN

Collet chuck
Clamping system: ER/D
Clamping range: Ø 1.0–7.0 mm

Accessories for HSK-EZ15 micromachines

SCHAUBLIN

Run-out test mandrel
For testing the machine spindle, finely balanced

REGO-FIX

Spindle cone cleaner
For thorough cleaning of the HSK-EZ15 cone

REGO-FIX

MasterBar
High-precision run-out test mandrel for inspecting and aligning the machine spindle, cylindricity = 2 µm, run-out = 3 µm

SCHAUBLIN

Balancing mandrel
For warm-up and running warm-up programmes

HSK-E20 tool holders

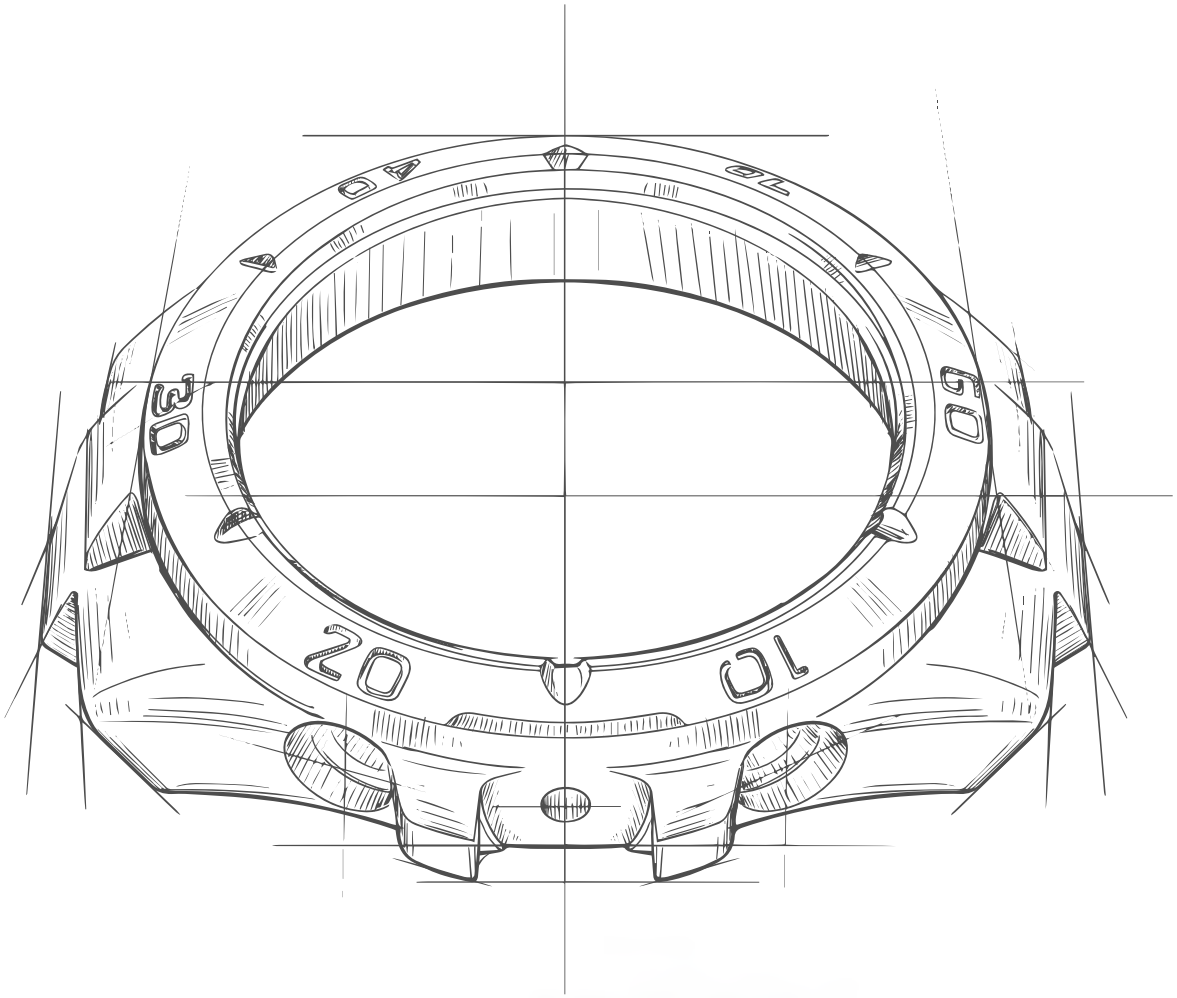
SCHAUBLIN

Run-out test mandrel
For testing the machine spindle, finely balanced

SCHAUBLIN

Collet chuck
Clamping system: D
Clamping range: Ø 1.0–7.0 mm

Metrology

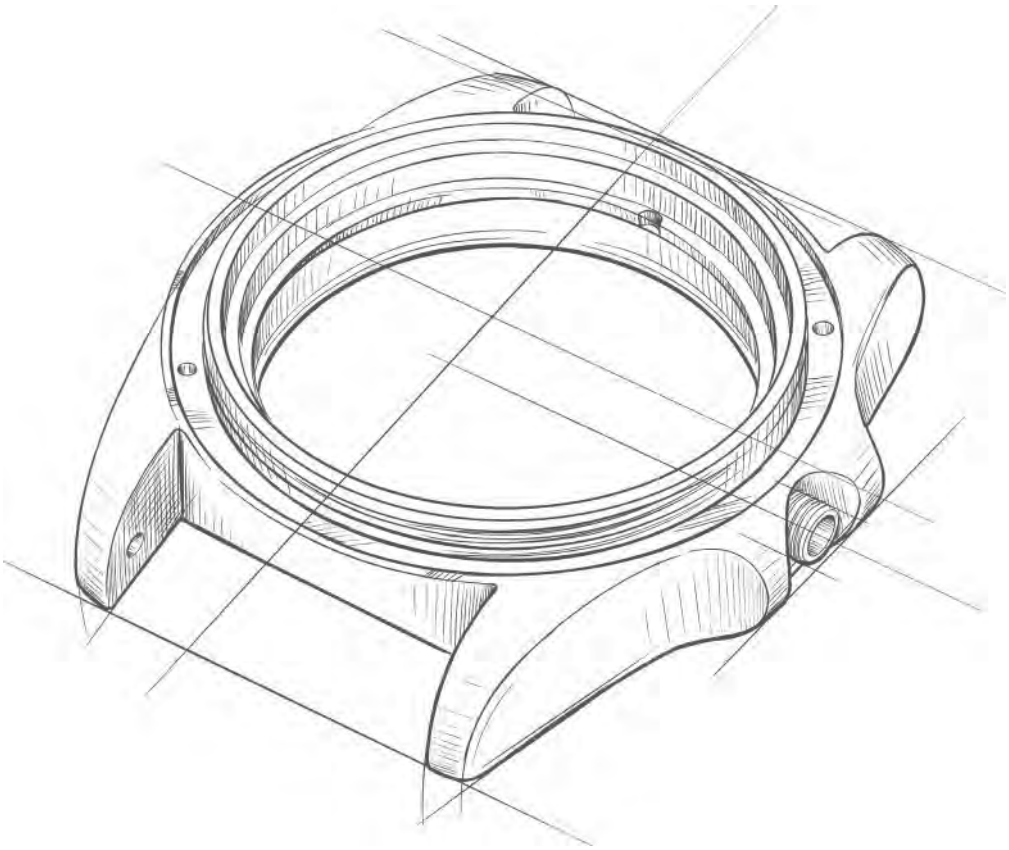


Internal measurement of the watchcase

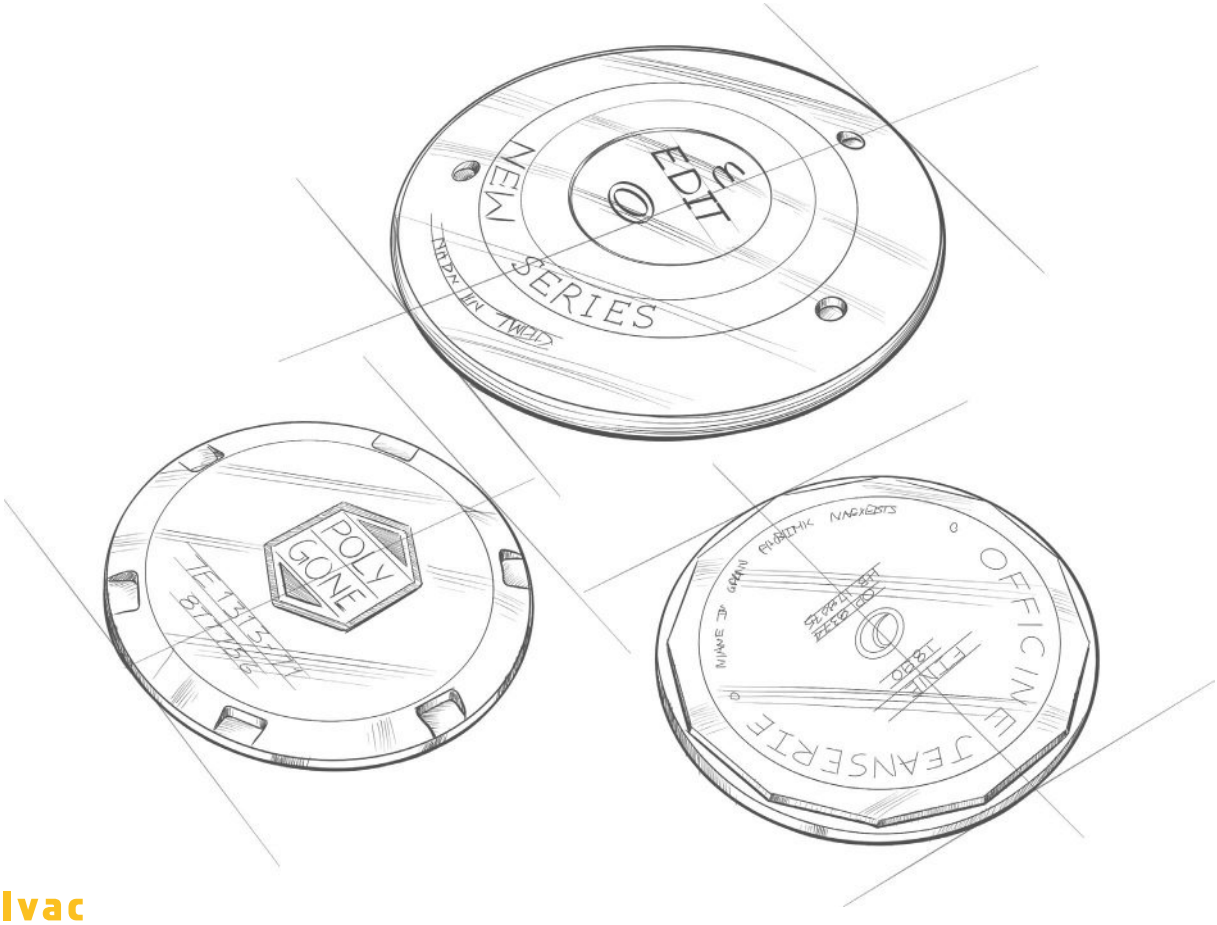
sylvac

SYLVAC PS16 V2 LV Smart

Superior performance: These benches provide accurate measurement of watch cases, rings and intricate components that are otherwise difficult to handle, ensuring consistent and reliable results. With a proven track record in demanding applications within the watchmaking industry, this bench can be relied upon to deliver accurate measurements every time.



Dimensional check of main plate



sylvac

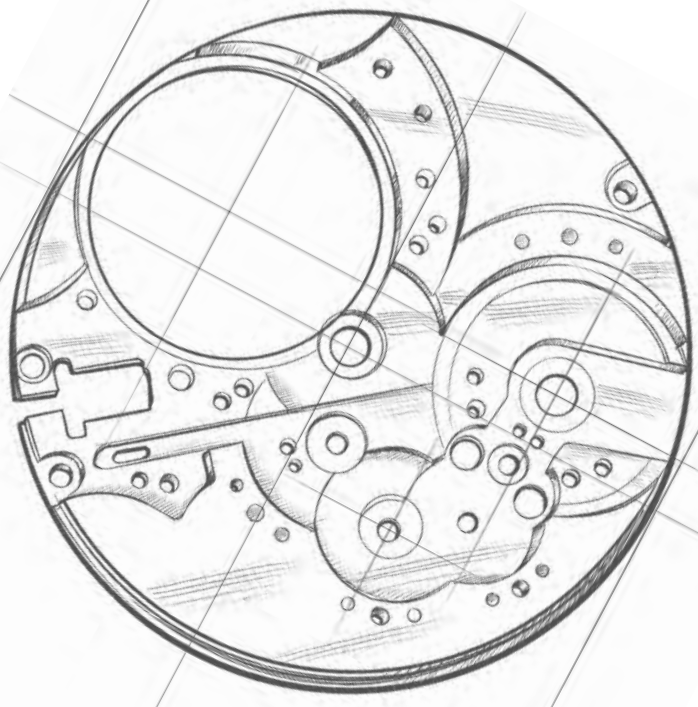
SYLVAC VISIO V3
Machine series with manual or motorised zoom

- Simple operation
- Easily accessible
- Robust and sturdy
- Areas of application such as medicine and the watchmaking industry

sylvac

SYLVAC VISIO V3

- Full HD camera
- Improved image quality
- New Software design
- Video/schematic window with automatic switching
- Robust granite structure
- High-quality guidance system
- Manual measuring table with rapid displacement system
- Sylvac Vista Software with CAD comparison function
- Manual or motorised zoom
- Three programmable lighting functions
- Laser pointer for accurate positioning
- Easy handling



Optical measurement of external contours

sylvac

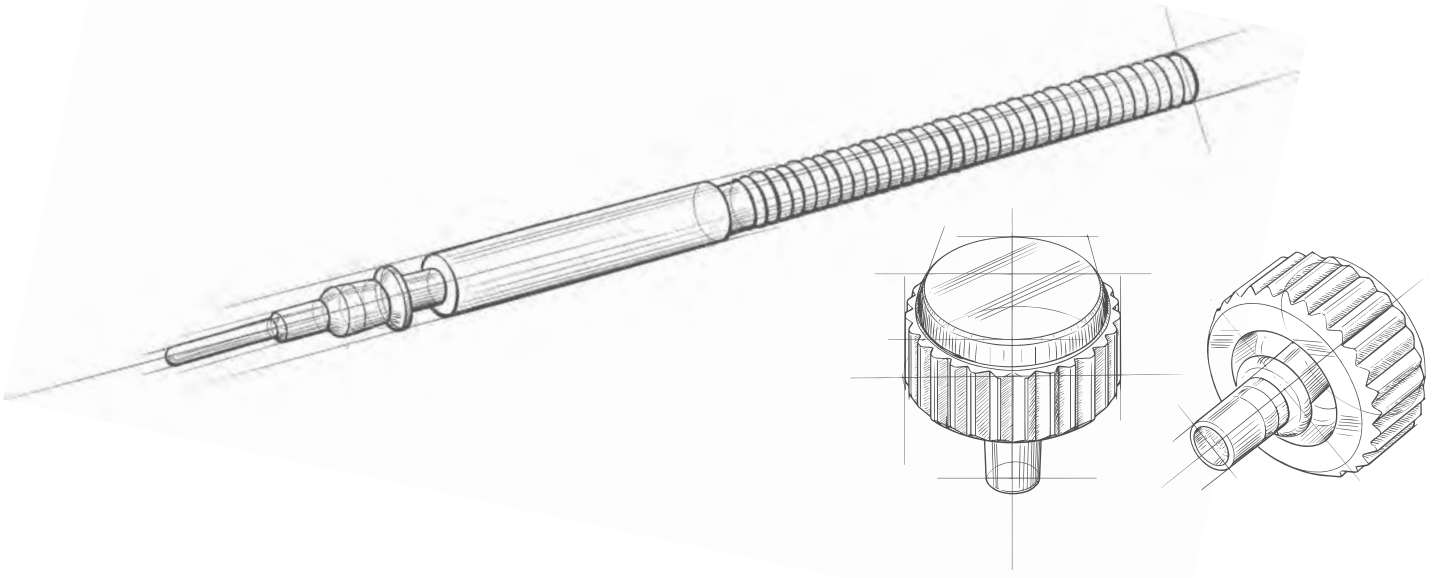
The SYLVAC SCAN S25T
This high-resolution and highly accurate machine is ideal for measurements on small cylindrical parts up to Ø 26 mm and 200 mm in length, where measurement time and accuracy are of great importance.

With a complete 2D part scan that takes less than 3 seconds, inspection times are reduced, scrap is minimised and overall productivity is increased.

The completely new user touchpad enables intuitive operation directly in the workshop with automatic 1-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 offering includes Reflex SCAN+ software and a PC, making it easy to measure a variety of elements in an intuitive way




lvac

Assembly and Service

10,000 ARTICLES, 220 MANUFACTURERS

For decades, customers in the watchmaking and microtechnology industries have relied on our comprehensive range of professional tools, maintenance and operating equipment.

Complete range for the watchmaking industry:

- Workshop equipment and furniture
- Measuring equipment
- Hand-operated equipment
- Devices and machines
- Maintenance and consumable materials
- Occupational safety

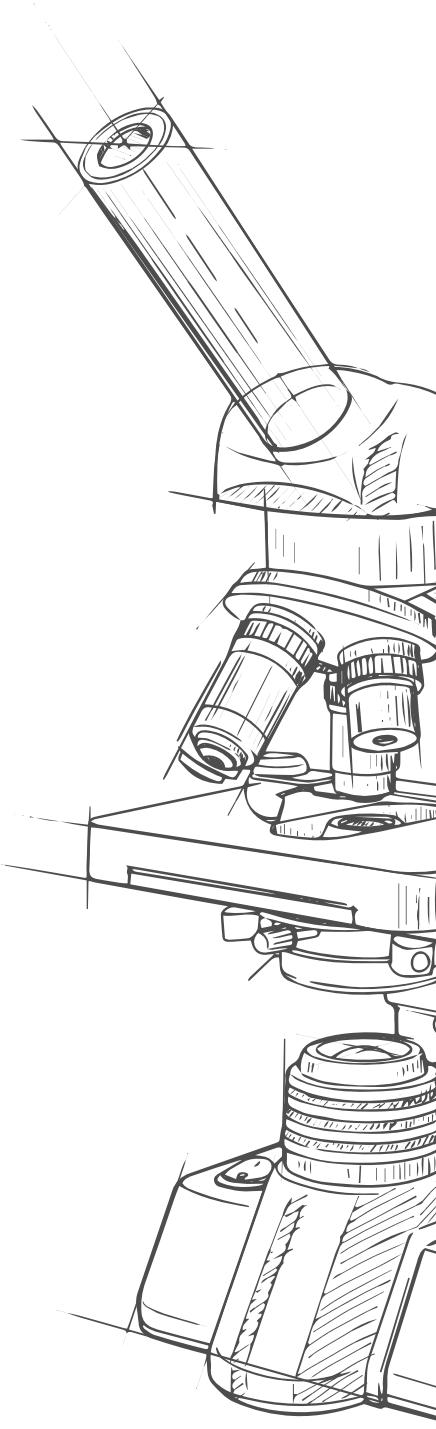
LOÏC CHÂTELAIN
Head of Horlogerie,
Brütsch/Rüegger Tools

« Our new product range for the watch-making industry has established us as a full-service supplier for the global watch sector. »

Metrology – Quality control

TORQUE SCREWDRIVER

RUN-OUT GAUGE



MICROMETERS

DISPLAY UNITS

CONTROL LIGHTS

VIDEO MICROSCOPE

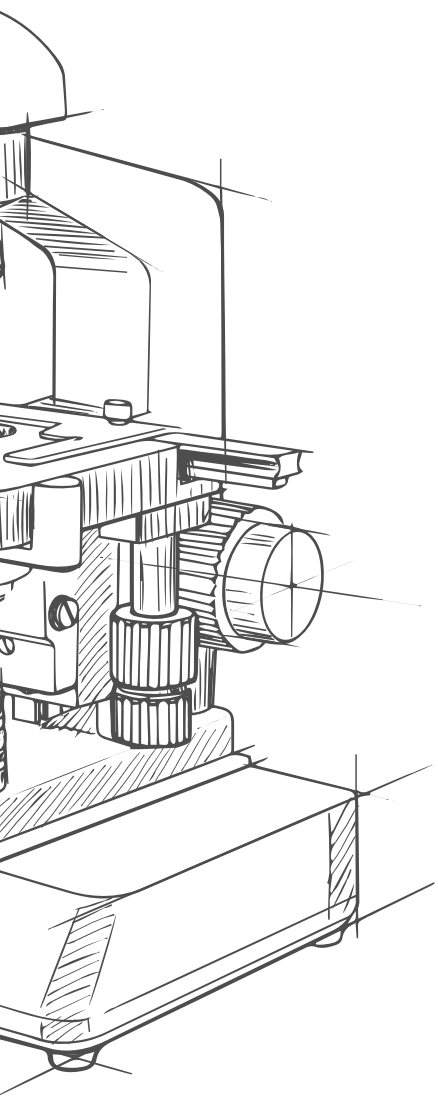
CONTROL TOOLS

MICROSCOPE

TORQUE METER

TESTING AND MEASURING INSTRUMENTS

HORIZONTAL LENGTH MEASURING INSTRUMENTS



MEASURING INSTRUMENTS FOR MECHANICAL WATCHES

GAUGE PINS

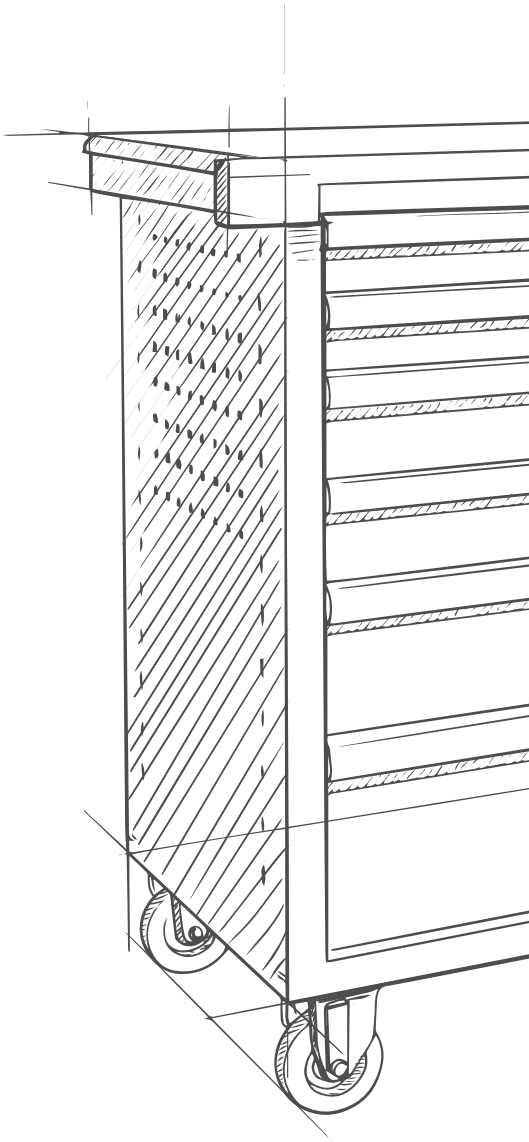
GAUGE SLIDES

VERNIER CALLIPERS

Workshop equipment – Furniture

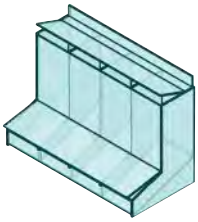
CHAIRS

WATCHMAKER'S WORKBENCH

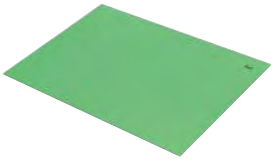


PNEUMATIC HANDPIECES

FINGER COT DISPENSER



WORKBENCH TOPS



VACUUM PENS

PEEL-OFF ADHESIVE MATS

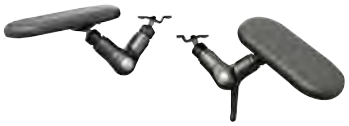
ESD PRODUCTS

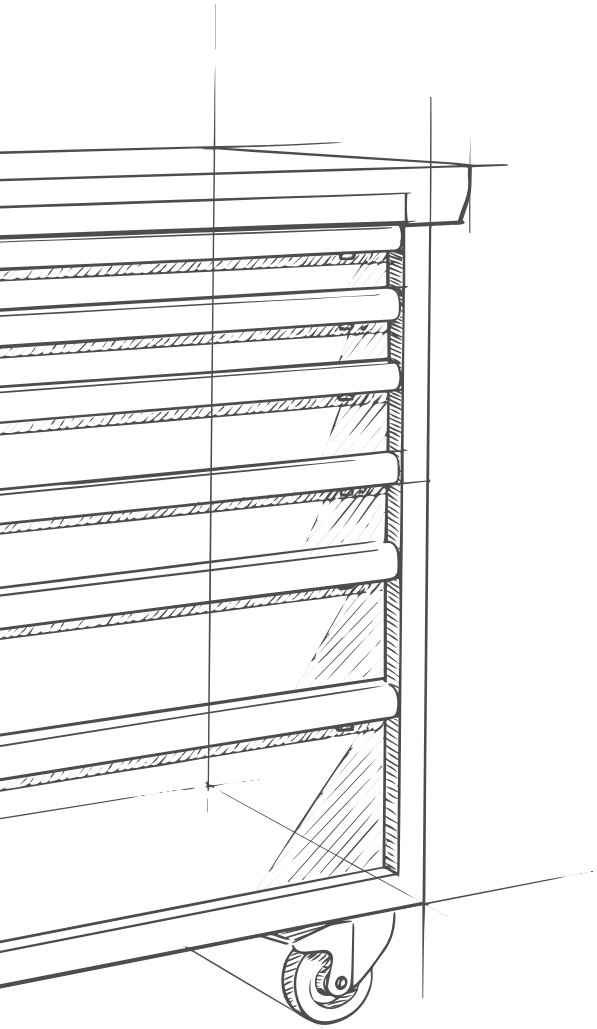
CLOTHING AND PROTECTIVE GEAR

ASSEMBLY STATIONS

SAFETY WASH CONTAINERS

ARMRESTS





LAMPS

DRAWER INSERTS

AIR-VACUUM DISTRIBUTORS

STOOLS AND STANDING AIDS

VICES FOR WATCHMAKER'S WORKBENCHES

Devices – Machines

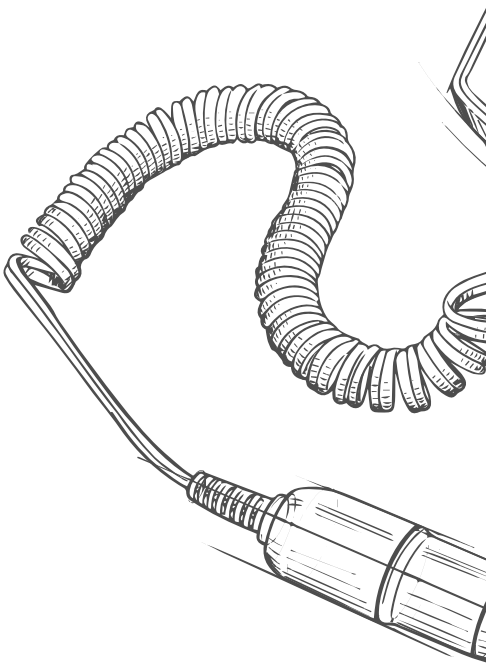
SIMULATION CABINETS

WATCH ESCAPEMENT TESTERS

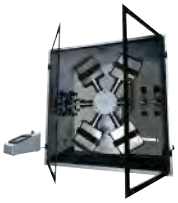
ELECTROPNEUMATIC PRESSES

MICROMOTORS AND ACCESSORIES

THERMAL PRINTERS



WATCH WINDERS



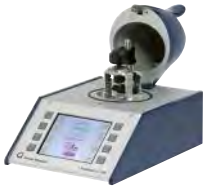
ULTRASONIC CLEANING DEVICES

DRYING DEVICES

MAGNETIC FIELD METERS

CLEANING MACHINES

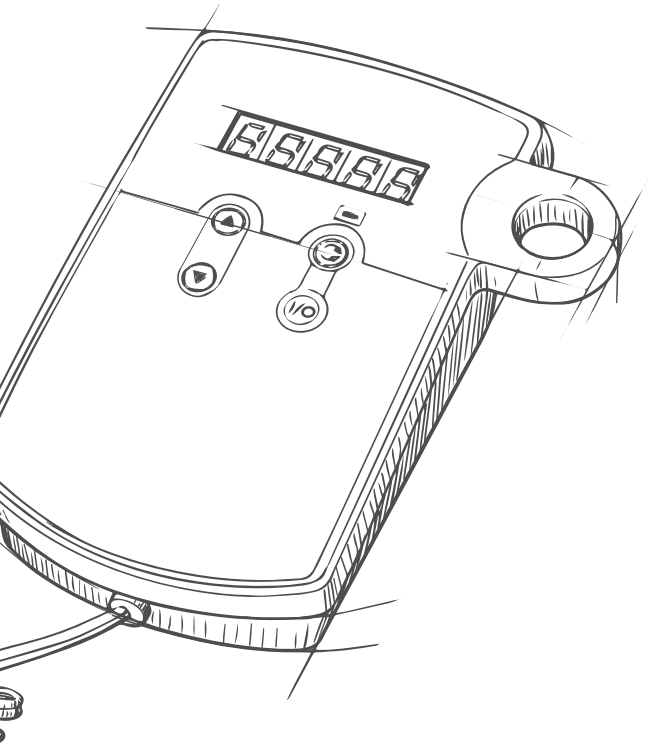
LEAK-TESTING DEVICES



GRINDING MACHINES

POLISHING MACHINES

STEAM-CLEANING DEVICES

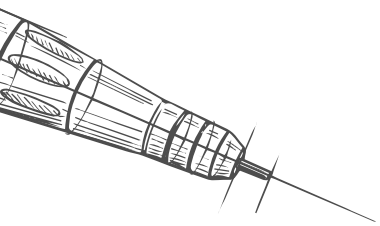


DEMAGNETISING DEVICES

LUMINESCENCE TEST DEVICES

AIR PURIFIERS

ESD PRODUCTS



TORQUE METERS

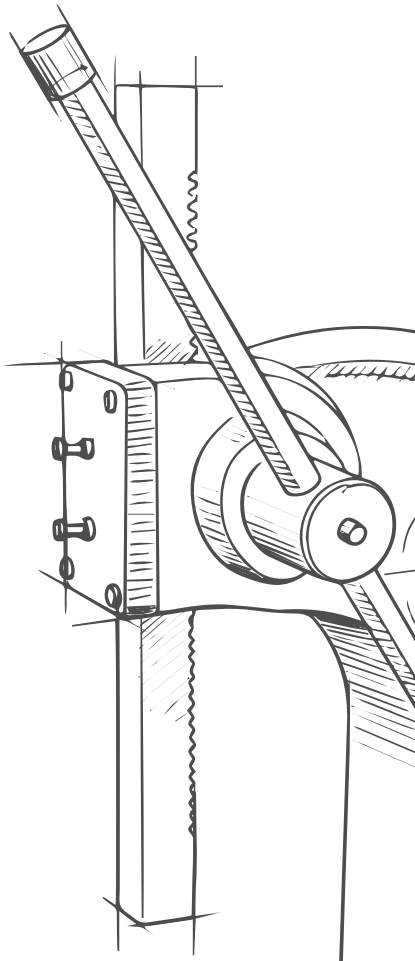
TESTING DEVICES FOR ANALOGUE QUARTZ WATCHES

BOOSTERS

Presses

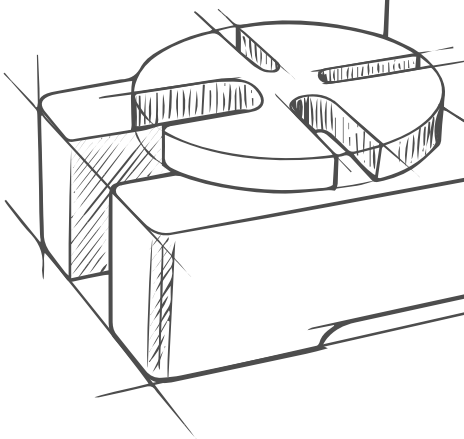
RACK PRESSES

PRESSES WITH LEVER AND MICROMETER SCREW



PRESSES FOR WATCH HANDS

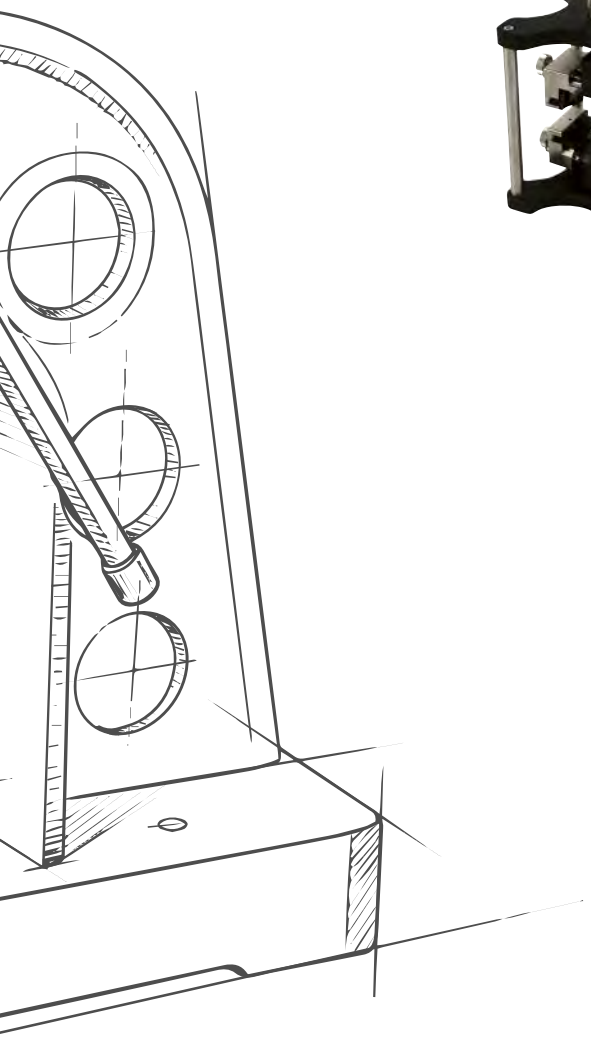
PRESSES WITH MICROMETER SCREW



PRESSES WITH HANDWHEEL

PRESSES FOR WATCH STRAPS

TOOLS FOR REMOVING BEZELS AND SNAP-ON CASE BACKS



IMPACT PRESSES

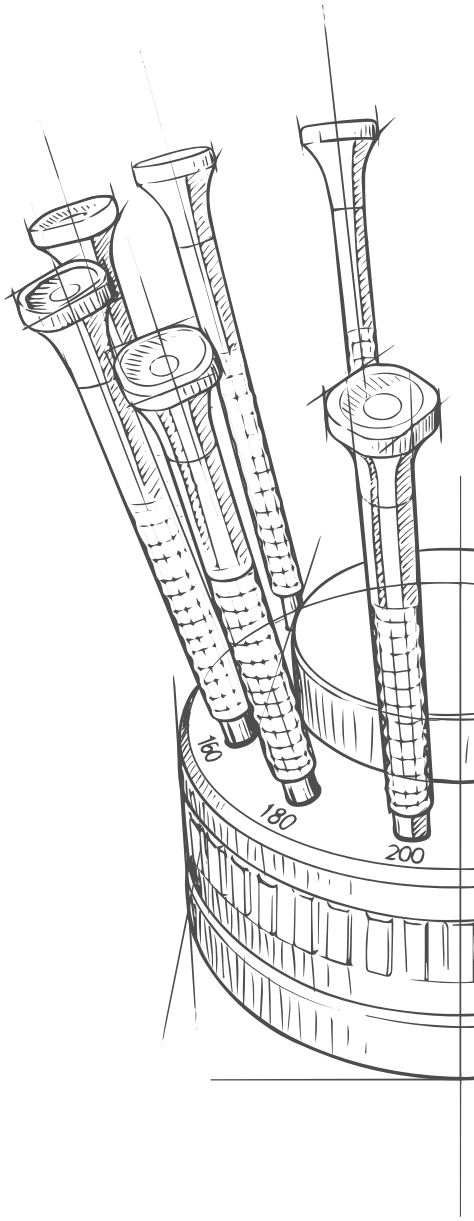
PRESSES WITH LOCKING MECHANISM

HEATABLE PRESSES

Hand-operated tools and tool holders

VACUUM TWEEZERS

HAND-OPERATED REAMERS



HAND PRESSERS

MAGNIFYING GLASSES

OILERS

PERSPEX WORK HOLDERS WITH "SLICK"

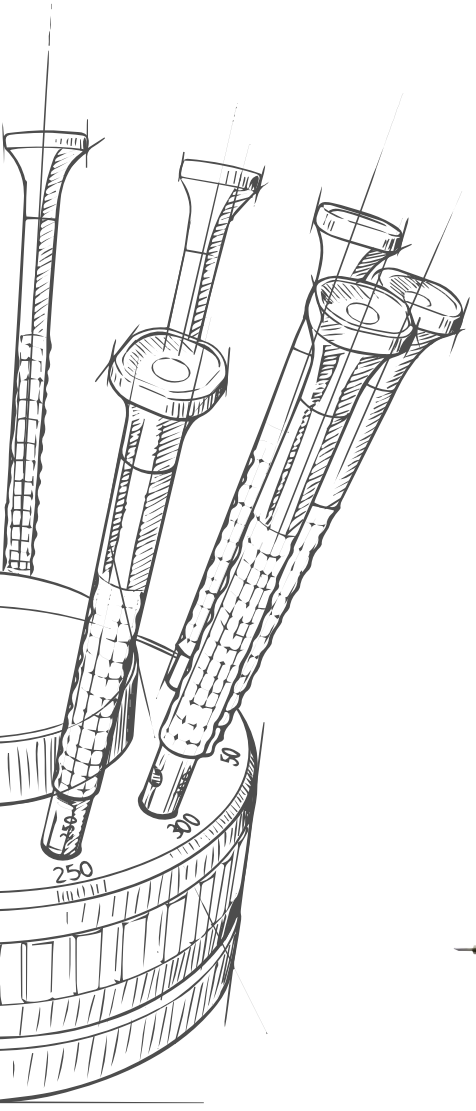
ROUND REVERSIBLE WORK HOLDERS WITH SPLIT RING ("SLICK")

EXPANDABLE AND REVERSIBLE WORK HOLDER WITH "SLICK"

TWEEZERS

WATCHMAKER'S SCREWDRIVER SETS

NESTABLE WORK HOLDERS



TORQUE SCREWDRIVERS

PIN CLAMPS

MANUAL BELLOWS

DIAL TOOLS

WATCHMAKER'S SCREWDRIVER

ASSEMBLY CUSHIONS

Chemicals / Cleaning

OILS

CLEANING BUDS

FINGER COTS

GLOVES

EPILAME-COATING

ADHESIVES

DISPOSABLE CLEANING CLOTHS

LIQUID DISPENSERS

THERMAL PRINTING PAPER

CLEANING AND RINSING PRODUCTS

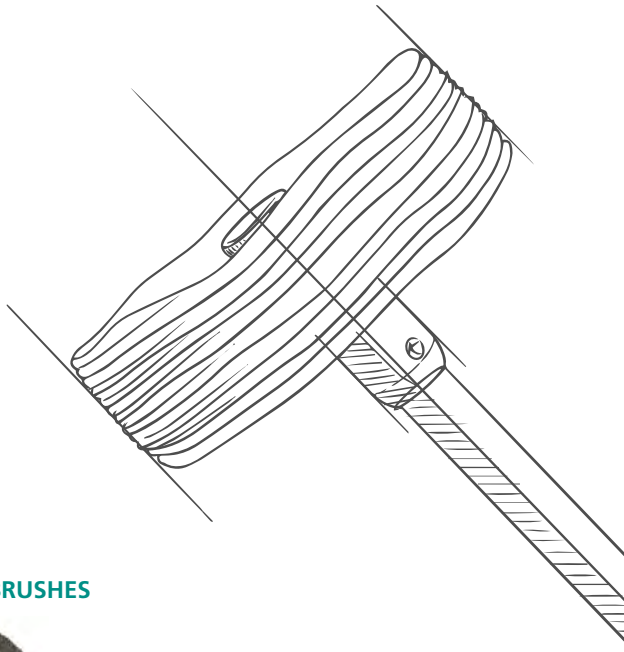
MICROFIBER CLOTHS

GREASES

Polishing

DIAMOND GRINDING PASTES

STONES



POLISHING BRUSHES

POLISHING PASTES

GRINDER HEAD BRUSHES

SHANK POLISHERS

COTTON BRUSHES

SANDPAPER

ABRASION DISCS

POLISHING DISCS

POLISHING CLOTHS

ABRASIVE BLOCKS

POLISHING STONES

POLISHING POWDERS

BRISTLE BRUSHES

GRINDER HEAD BRUSHES

WATCH-GLASS POLISH

SANDING

Our own brands

ETiC®

NOVOSTAR

GOLD SHARK

CUSTOMISED SOLUTIONS AND TOOLS

Looking for something truly special? We can meet any individual requirement. To this end, we have significantly expanded our expertise and capabilities for tailor-made solutions and customised tools.

We implement:
- Individual end-to-end solutions
- Special tools
- Product design and layout

OUR OWN BRANDS

Our own brands are well established in the watchmaking industry and meet the high standards of the watchmaking and jewellery industry.

Everything watchmakers and jewellers may need:
- Precision tools and gauges
- Maintenance and cleaning materials
- Movement oils
- Saw blades for the jewellery industry
- Hygiene and protective items

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

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Tools

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