www.rubis-precis.com

MACHINING

HIGH ACCURACY

HARD MATERIALS & METALS

Summary

DISCOVER OUR KNOW-HOW —

1948 CREATION OF RUBIS-PRECIS & MICROPIERRE

1960 DIVERSIFICATION OF ACTIVITY

1991 RUBIS-PRECIS & MICROPIERRE PLANTS

1998 2008 EXTENSION OF THE BUILDING FOR RUBIS-PRECIS & NEW PREMISES FOR MICROPIERRE

PURCHASE OF DPL FRIATEC WHICH WILL BECOME HIGH TECH CERAM **2011**

ACQUISITION OF THE GROUP BY SENIOR **2017**

CONSTRUCTION OF A NEW FACTORY FOR RUBIS-PRECIS **2019**

INTEGRATION OF NEW PREMISE 4 000 M2 FOR RUBIS-PRECIS **2020**

THE RUBIS-PRECIS GROUP

RUBIS-PRECIS IN CHARQUEMONT, MICROPIERRE IN BESANÇON & HIGH TECH CÉRAM IN DARVAULT.

The origin of the group dates back to 1948, at the time Rubis-Précis and Micropierre are two competing companies. Specialized in the cutting of watchmaking gemstones from synthetic materials: Ruby, Sapphire, Spinel.

In the 1960s, Rubis Précis diversified into the machining of metals and alloys mainly by bar turning and in the production of mounted assemblies combining metal parts and hard materials.At the same time, thanks to its experience with diamond grinding, Micropierre turned to the abrasive machining of new materials : technical ceramics for advanced sectors.

In 1991, the Rubis-Précis group acquired Micropierre.In 1998 and 2008 Rubis-Précis proceeded with two successive extensions of its premises bringing their total surface area to m² . Meanwhile, Micropierre moved to its current site in the La Fayette area in Besançon with a surface area of 2,150 m². More functional and more spacious, these developments enabled the group to optimize its machines thanks to a multi-year investment program.In 2011, the group acquired DPL Friatec, a company specializing in the machining of technical ceramics, a German company renamed High Tech Céram. This strengthened the group as a leader in the field of the machining of technical ceramics.

At the start of 2020, the Rubis-Précis company moved into its new 4,000 m2 premises.

Thanks to a multi-year investment program the Rubis-Précis Group, Micropierre, and High Tech Céram are at the forefront of technological evolution. The loyalty and trust of our customers are, for us, the recognition of the quality of our products and our services.

THE GROUP SPECIALIZES IN THE PRODUCTION OF HIGHLY TECHNICAL PARTS IN METAL AND HARD MATERIALS.

We machine ceramics and metals, from the simplest: Brass, Bronze, Nickel silver, Aluminum to the most technical: Stainless steels of all kinds, Titanium, Gold, Platinum, Molybdenum, Tantalum, Tungsten, Niobium, Magnesium.

THE SPECIFICITIES OF THE GROUP

COMPANIES SPECIALIZED IN THE PRODUCTION OF HIGHLY TECHNICAL TURNED PARTS, MACHINING OF HARD MATERIALS AND CERAMICS.

High-precision machining with diamond bit finishing on technical ceramics and hard materials.

The use of special composite materials for many applications.

Mechanical machining of precious metals and alloys. And very high precision machining of ruby, sapphire, and tungsten carbide.

Parts for the luxury industry: watchcase middles, decorative elements, rivets, and many others for the fields of leather goods and jewellery making.

The execution of mounted assemblies over small, medium, and large series.

The development of mounted assemblies incorporating hard materials, and assemblies with various and varied metals.

Assembly technologies using gluing, press fitting, driving in, crimping, brazing, soldering, laser welding, ...

The turning of high precision parts.

Mechanical machining: grinding, boring, milling, drilling, turning, tapping, threading on various grades of stainless steel (303-304-316L), brass, nickel, silver, bronze.

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ONE OF THE WORLD LEADERS IN THE FIELD OF MICRO-TECHNOLOGIES.

Surface treatment, power coating annealing and electroplating.

Flat and cylindrical lapping and polishing techniques.

OUR STAFF

- Experienced, motivated, flexible and competent
- Strongly involved, responsible and versatile
- Direct contact with your requests

QUALITY POLICY

- Continuous improvement of our operational means
- ISO 9001 certifications
- An efficient management system in the image of a company that is constantly evolving

SALES REPRESENTATIVES

- A team of 3 sales technicians who are attentive to customers
- International mobile sales representatives
- The guarantee of a service adapted to the request

COMPETITIVE ADVANTAGES

- The manufacture of complex parts in a short time
- The management of all types of series: prototyping, small, medium, and large series
- The complementarity between the three entities Rubis-Precis, Micropierre and High Tech Ceram

FIELDS OF APPLICATION

AERONAUTICS & AEROSPACE

We manufacture various parts for these areas of activity such as connectors, gyroscopes, accelerometers, watertight bushings, ...

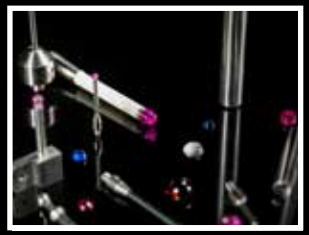
METROLOGY & MEASURING INSTRUMENT

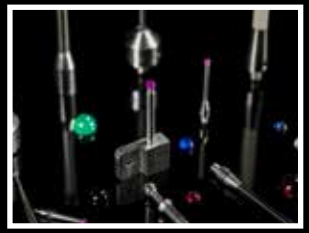
The Rubis-Précis Group manufactures contact and touch-sensing probes made of Tungsten Carbide, Ruby, and Ceramic. We handle the machining and assembly of high precision ruby beads with stainless steel, titanium, or ceramic parts.

But also parts for instrumentation and equipment such as : high precision sapphire and tungsten carbide bearings and pivots, sub-assemblies for meters (water, electricity, and gas), measuring instruments, anemometers, parts machined from blueprints, ...









SCIENTIFIC & ANALYSIS MACHINES

The Rubis-Precis Group machines parts for manufacturers of scientific machines such as spectrometers, pyrometric sensors, isotopic elemental analysis machines and materials analysis machines.

MEDICAL, BIOMEDICAL & PHARMACEUTICAL INDUSTRY

For this cutting-edge field, the Rubis-Précis Group manufactures components for pacemakers, analysis devices, implants, biocompatible ceramic femoral heads as well as various precision components for surgical tools.

And also, components that are used in machines specialized in medical biology, such as pistons for dosing pumps, sealing valves, components for haematology analysers and endoscopes, etc.

ARMAMENT & DEFENSE

We are Defence Secrecy Level approved and we are involved in the manufacture of precision components in technical ceramics and various metals such as micro-mechanisms and sub-assemblies for the military industry and for missiles.

RESEARCH & LABORATORIES

Component manufacturing for a number of global research institutes in the nuclear field, basic research and for ultra-high vacuum and high vacuum such as high strength Sapphire tubes.

LUXURY INDUSTRY

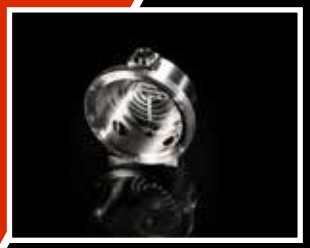
For the watchmaking and jewellery industries we manufacture: decorative elements, cases, and coins made from Gold, Platinum, Silver, Ruby, Sapphire, and Zircon.The Group manufactures for the leather goods industry: rivets, eyelets, bottom studs, buckles, carabiners, shoulder strap fasteners, ...

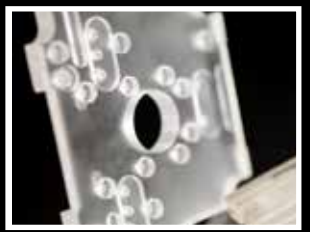


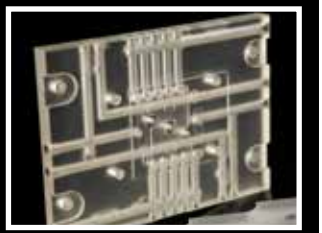












INDUSTRY

The activity of the Rubis-Précis Group covers the entire industrial sector, such as fasteners and tools made of metals and hard materials.

OPTICAL & FIBER-OPTICAL

For optical fibre, we manufacture connectors, lenses and other precision components from zirconium oxide, sapphire, quartz and Zerodur®.We regularly manufacture Quartz and Sapphire windows for electro-optics.We can offer our customers optical quality polishing, thin-layer and anti-reflective deposits on metal parts and hard materials.

SEMICONDUCTOR

We produce parts for the demanding technologies of chipping and bonding, such as chucks, wafers, grippers, pods, ...

As well as components in the physical science of photonics: laser, opto-electronic crystals, diodes, modulators, optical amplifiers, ...

HARD MATERIALS

THE RUBIS-PRÉCIS GROUP IS ABLE TO MACHINE AND POLISH ALL HARD MATERIALS AND ALL TECHNICAL CERAMICS, IN ORDER TO BEST MEET YOUR NEEDS. THE EXPERIENCE AND COMPETENCE OF OUR TEAMS WILL GUIDE YOU TOWARDS THE BEST CHOICES —

ALUMINA (AL2O3)

Alumina or aluminium oxide (Al2O3) has good mechanical resistance to high temperatures, high electrical resistivity, good thermal conductivity, it is a material of great hardness, it also resists very well to wear. Alumina is the material most frequently machined by the Rubis-Précis Group, we work with it for various and varied fields of activity. It is found in electrical connectors and insulators for high current and voltage, high temperature probes, medical implants, pistons, nozzles, bearings, wearing parts, crucibles, mechanical joints, etc.

- Bearings, wearing parts, crucibles, pistons, nozzles
- Mechanical joints and implants

ZIRCON (ZRO2)

Zircon has good mechanical properties at high temperatures, low thermal conductivity at room temperature, excellent wear resistance, great hardness, polishability, good chemical inertness, high resistance to attack by metals and thermal shock.

- Polished parts
- Pistons
- Valves
- Implants
- Cutting blades
- Watch cases
- Cabochons
- Bracelet links
- Items of jeweller

SAPHIRRE (AL2O3)

Sapphire is a single crystal of alumina, it is undoubtedly the second hardest material that exists, just behind diamond. It has excellent resistance to thermal shock and high temperatures with a melting point at 2000°C. In the polished state, it is completely transparent. Sapphire is appreciated for its natural beauty. It is suitable for the watch industry, but also for more technical environments for precision fields. Ideal for demanding applications as it is acid resistant, has low electrical conductivity and is stable against external influences.

- Portholes and windows
- Optical and watch
- Surgical materials
- Prisms and lenses

SILICON NITRIDE (SI3N4)

Silicon Nitride is appreciated for its great hardness, low density, good resistance to wear, abrasion, corrosion, and thermal shock.

- Sealing rings
- Tooling
- Wear parts
- Welding nozzles
- Protective grids

BORON NITRIDE (BN)

The properties of Boron Nitride are: its high thermal conductivity and dielectric strength, its low thermal expansion and dielectric constant, its excellent resistance to thermal shock, its microwave transparency, its good machinability, and its lubricant properties.

- Foundries
- Furnace linings
- Thermocouple sleeves

BORON CARBIDE (B4C)

Its main quality is its very great hardness. Boron Carbide also has high thermal conductivity, good resistance to wear, to strong acids and to alkalis.

- Security
- Nuclear energy/ Defence
- Body protection vests

FERRITE (C4AF)

Ferrite is a ferromagnetic ceramic, it offers good electrical and magnetic conductivity.

- Magnets
- Automobile components
- Micromotors
- Toroids

ZERODUR ®

This is a ceramic that has a very great hardness, good chemical stability and excellent vacuum properties as well as being non-porous and impact resistant. It offers good polishing accuracy as well as good thermal stability.

- Appreciated in the field of Astronomy

SILICON CARBIDE (SIC)

This material is of great hardness, is highly resistant to thermal shock, has low thermal expansion and high thermal conductivity.

- Friction
- Wearing parts
- Chucks
- Gaskets

MACOR ®

This is a glass ceramic that combines precision with speed and ease of machining. Its main assets are: good electrical and thermal insulation, strength, and rigidity. It can also be polished and used up to 1000 ° C. Its very good machinability reduces manufacturing costs.

- Nozzle
- Pistons
- Mesuring sensors and insulators
- Isolators
- Material can be metallized and brazed

RUBY

Ruby is composed of a single crystal of aluminium oxide with chromium oxide. It is a material that has a high hardness and excellent chemical resistance. Transparent, scratch resistant, appreciated for its aesthetic quality. Ruby also possesses technical qualities which grant it good general usefulness.

- Sprinklers
- Sealing valves,
- Balls
- Feeler pins
- Bearings
- Decorative cabochons

QUARTZ

Quartz is a very good thermal and electrical insulator. It is a hard material that withstands high temperatures. It is also known for its good optical quality, it is transparent to infrared and permeable to UV.

- Semiconductor
- Portholes
- Lens
- Prisms
- Tubes

MATERIALS TABLE

	ALUMINA	ZIRCONIA		BORON CARBIDE	SILICON CARBIDE	SILICON NITRIDE	ALUMINIUM NITRIDE	QUARTZ	ZERODUR®	MACOR®
	AL 96 à 99,7	MgO	Y2O3	B4C	SIC	Si3N4	AIN	SiO2		
PHYSICAL PROPERTIES										
Density (g/cm3)	3.98	5.7	6	2,45 - 2,52	>3,16	3.2	3.32	2.22	2.53	2.52
Porosity	0	0	0	< 0,1	0	0	0	0	0	0
MECHANICAL PROPERTIES										
Max. Working Temperature (°C)	1850	900	1200	2000	1450	1400	1800	1200	600	800
Hardness (vickers)	2300	1100	1300	3800	2600	1600	1100	500	630 (knoup)	/
Young's Modulus (GPa)	310	200	200	450	410	315	310	50	91	67
Poisson's ratio	0.27	0.29	0.29	0.15	0.17	/	/	/	0.24	0.26
Flexural strength (MPa)	380	500	1000	450	400	900	>300	75 - 90		94
Tenacity (MPa.m1/2)	2_3	8	10	3	4	7.5	3.35	0.6		/
Structural performance (Mpa 20c)	2500	2000	2200	1400 - 3400	2200	2500	>2000	600 - 720		350
THERMAL PROPERTIES										
Linear expansion (10-6)	8.6	10	11	4.5	4_5	3.1	5.6	0.4	0.05	12.6
Specific heat (J/kg/K)	1025	400	400	/	0.6	/	/	750	881	/
Thermal conductivity (W/mk)	26 - 35	2.5	2.5	/	110	19	180	0,99 - 1,63	1.646	1.5
Melting point (°C)	2050	2700	2700	2450	2500	/	/	1710	/	/
Thermal shock resistance	low	good	low	/	very good	very good	excellent	good	good	good
ELECTRIC PROPERTIES										
Electrical resistivity (Ωm)	$> 10^{12}$	$>10^{7}$	$>10^{7}$	/	10^{6}	10^{10}	5×10^{12}	10^{16}	$2,10^{11}$	10^{16}
Dielectric rigidity (Kv/mm)	12	/	/	/	/	15	>20	/	/	>20
Dielectric Constant (1MHz)	0	/	/	/	/	/	8.6	3,6(10 GH)	/	6 (1kHg)

The values are for guidance only

METAIS & ALLOYS

THE GROUP MASTERS MECHANICAL MACHINING: GRINDING, BORING, MILLING, DRILLING, TURNING, TAPPING, THREADING ON STAINLESS STEELS (303-304-316L), BRASS, NICKEL SILVER, BRONZE ...

BRASS (CUZN)

Highly appreciated for its many qualities, Brass can be used in many fields of application because of its ease of use, its resistance to corrosion, its malleability, and its ease of maintenance.

- Simples brasses : Copper and Zinc
- Leaded brasses : 40 % Zinc and 1 to 3% lead
- Brasses withour lead
- Special brasses

STAINLESS STEEL

Stainless steel is an alloy of iron, carbon, and chromium. It shows good resistance to corrosion and temperature variations, it is appreciated in the food and medical industries for its hygienic properties. This alloy is antistatic, non-magnetic, polishable and durable. There are different types of stainless steel :

- Austenitic stainless steels : 303, 304L, 316L Duplex and Super Duplex
- Ferritic stainless steels: 430F and 420 B

ALUMINIUM (AL)

Its main characteristic is its lightness due to its low density. Aluminium also has good corrosion resistance as well as good electrical and thermal conductivity. It is a malleable metal that can be worked at low temperatures without risk of breakage. It is also waterproof and does not let smells, light, or micro-organisms pass. It preserves heat, reflects light and is 100% recyclable.

PLATINUM (PT)

Platinum is a precious and rare metal. It has good physical and chemical properties: it is malleable, resists abrasion and tarnishing, does not oxidize in the air, does not corrode. Platinum also has very good catalytic properties. It is used for all of these reasons in various fields of activities.

- Pacemakers & Valves
- Bulkhead fittings & Electrodes

GOLD (AU)

Gold is a very dense precious metal. It has excellent thermal and electrical conductivity. Gold is durable, in other words inert, which means that time does not alter its purity and value because it is insensitive to oxidation. It is also appreciated for its malleability and resistance to chemicals and acids. It is almost impossible to destroy gold.

- Jewellery
- Advanced technologies
- Gilding

SILVER (AG)

Silver is a precious metal that is a very good electrical conductor, it is also a good light reflector, but its mechanical strength is low.

- Jewellery
- Electronics
- Mirrors

STEEL

Steel is a mixture of iron and carbon. Its main properties are: good thermal conductivity, good tensile and elastic strength.

TITANIUM (TI)

Titanium is a light and hard metal, it is very resistant to erosion, corrosion, and impact at low and high temperatures. It is also biocompatible. Appreciated in the fields of aeronautics, surgical instrumentation, implants.

TANTALUM (TA)

Tantalum is highly resistant to corrosion and this is undoubtedly its strongest point. With a melting point of around 3000°C, it has one of the highest melting point of all the elements, with only tungsten and carbon having slightly higher melting points. It is ductile, malleable, and resistant to acids.

MOLYBDENUM (MO)

Molybdenum is a versatile material. Its melting point of 2623°C, which is extremely high, adds to this a high thermal conductivity and a low coefficient of thermal expansion. Thanks to its remarkable chemical and mechanical properties, it adapts to the most delicate requirements in a wide range of applications.

- Nuclear
- Petroleum
- Semiconductor

TUNGSTEN (W)

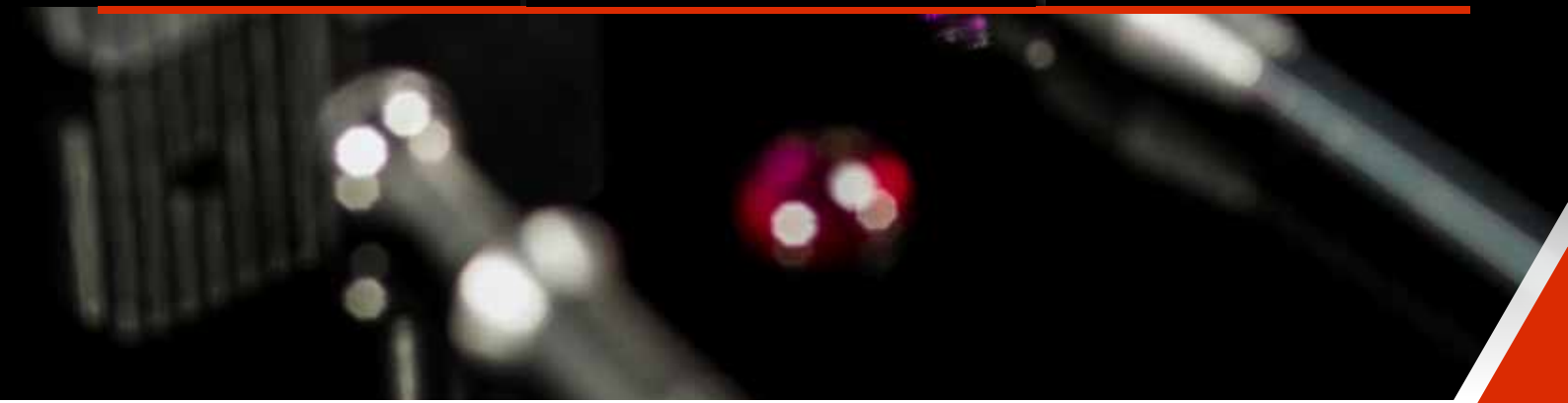
Its melting temperature is very high which makes it a highly heat-resistant metal. It is also very hard, has a low coefficient of thermal expansion and a high degree of dimensional stability.

- Nuclear
- Medical imaging

NIOBIUM (NB)

Niobium is a rare and light metal, it melts at a high temperature of 2410°C. Its technical properties depend on its purity. It shows a high general resistance, but more particularly against chemicals and corrosion. It is biocompatible and easily modulable.

- Aeronautic
- Space
- Superconductors



POLYETHERETHERKETONE OR PEEK

PEEK is a high performance thermoplastic. It combines excellent chemical and mechanical resistance over a large temperature scale (-40 ° C to + 310 ° C). It remains reliable, resists UV rays, has good electrical characteristics, can be implanted. Hard and stiff, it is a very durable material.

- Medical instrumentation
- implants

NICKEL SILVER (CU46ZN10NI42PB2)

Nickel Silver is a Cupronickel and Zinc alloy. Ductile and malleable, this alloy is resistant to oxidation. The higher its nickel content, the harder it will be.

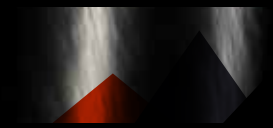
- Eyewear
- Watchmaking
- Locksmithing
- Manufacture of artcles and fashion accessories

INVAR®

Invar is an alloy composed of iron (64%) and nickel (36%), its particularity is to have a very low coefficient of expansion compared to other steels.

KOVAR®

Kovar is a derivative of Invar, it is an alloy of iron, nickel, and cobalt. Its chemical composition is controlled to ensure precise thermal properties.



BRONZE BERYLLIUM (CUBE2)

Has good thermal and electrical conductivity, good mechanical properties, its magnetic permeability is close to 1, which makes it almost non-magnetic.

- Electrodes
- Welding arrays

POLYOXYMETHYLENE OU POM

Thanks to its high crystallinity and its structure, POM has good physical characteristics, such as its excellent resistance to impact, abrasion, traction, and chemical agents. Polyoxymethylene also has good dimensional stability. It can be used at low and high temperatures and can be counted on for its good electrical insulation.

- Gears
- Friction parts

DELRIN ® (POM H)

Delrin is a crystalline plastic, its physical properties offer a good compromise between metal and plastic. Highly resistant and rigid against traction and impact, good dimensional stability, is used over a wide temperature range. Resists very well the attacks of chemicals, such as solvents but also moisture. Good resilience and endurance.

MEANS OF PRODUCTION

8 400 M2 OF PRODUCTION AREA —

BAR-TURNING/ CNC WORKSHOP

Our bar-turning and CNC department has about sixty machines whose capacities vary for bar diameters between 1 and 32 mm. Our machines have between 4 and 5 axis for the machining of single parts, and up to 10 axis for very technical parts. All our machines are equipped with bar feeders which allow 24/7 autonomy.

Finally, some of our machines are equipped with grippers for the removal of fragile parts.

POLISHING WORKSHOP

We carry out polishing on automatic machines from standard quality to optical quality.

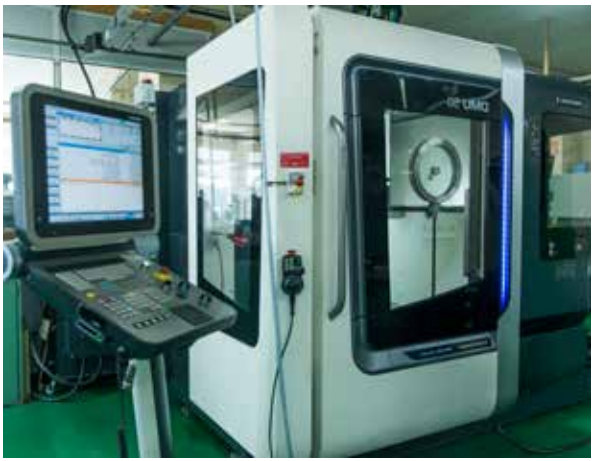
WORKSHOP FOR PREPARING HARD MATERIALS

In this workshop, we make initial sections from hard material on automatic cutting, turning, and flat grinding machines.

MECHANICAL & PROTOTYPING WORKSHOP

Our mechanical pole is equipped with conventional machining units, from a numerically controlled lathe with a bar feed up to diameter 42 mm or a billet feed up to diameter 200 mm, and also machining centres with 5 continuous milling axis.

This equipment allows us to use all our expertise on your prototype and pre-production requests and to meet all your micromechanical needs.



TUMBLING WORKSHOP

This workshop is equipped with a 2-liter capacity vibratory finishing machine for micro-parts, up to 30 litres for other parts.

ENLARGING WORKSHOP

We carry out the enlarging of holes to +/- 2 µ and outside diameter to +/- 3 µ guaranteeing the concentricity in the 5 µ on ruby and sapphire pieces.

FLAT GRINDING / GROOVING

- 15 machines 3 and 4 axis: conventional and numerically controlled

Maximum capacity: 1200 x 400 x 500 mm

CENTRELESS RECTIFICATION

- 4 machines Ø 0.40 to Ø 100 mm

CYLINDRICAL GRINDING

- 25 CNC machines: 1, 2, 3, and 4 pins, axis C

Maximum capacity: Ø 550 lengths 1,200 mm
Minimum capacity: Ø 0, 40 mm

BORING / LAPPING

- 12 manual and automatic machines

Maximum capacity: Ø 100 lg 1000 mm
Minimum capacity: Ø 0,30 mm

MILLING

- 6 CNC machining centres possessing 3, 4, and 5 continuously positioned axis
- 1 machining centre with 5 continuous axis with ultrasonic assistance

Maximum capacity: 500 x 400 x 350 mm

QUALITY CONTROL

- 3 air-conditioned rooms
- 3 optical 3D machines and 3 3D probing machines
- 4 measurement columns
- 3 profile projectors
- 3 roughness gauges..

FLAT LAPPING / POLISHING

- 1 double-sided grinder
- 4 single-side polishers

DRILLING

- 4 CNC drills and 5 manual drills

Maximum capacity : Ø 250 mm
Minimum capacity : 0.25 mm

CLEANING / MESH

- 6 ultrasonic baths: detergent + rinse + deionized water
- 1 toasting oven up to 1 400 ° C

CONTACT US

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