

POLYDEC



 MICRO-TURNING

THINK BIG – MANUFACTURE SMALL



The love of a job well done predominates in our region, known as the birthplace of watchmaking. This has had an undeniable influence on the philosophy of our business, in which the main objective is to fully meet the needs of our customers over the long term.

The desire to innovate, reinforced by strict high quality standards, has allowed us to become one of the leaders in our markets. We constantly seek to push the limits of what is “technically feasible” by keeping a sustained focus on technological development. This vision is made concrete by continually renewing our machine fleet.

Personal and technical skills are essential elements in our development. This is why we make every effort to ensure an environment that is conducive to training, development and achievement for our employees, while constantly seeking to improve and excel.

We are convinced that our success is based primarily on that of our customers, so we take particular care in maintaining our relationships with them. This attitude of seeking to establish a true partnership with our customers is an integral part of our business culture.

A handwritten signature in black ink, appearing to read 'C. Konrad'.

Claude Konrad, President Polydec SA

POLYDEC IN A NUTSHELL

Main business activity

- Bar turning of micro-parts from simple ("Escomatic") to complex shapes (5- to 9-axis CNC)

Dimensions

- diameter from 0.05 to 4.00 mm (.002 to .157 in)
- max. length 50,00 mm (1.968 in)

Materials

- carbon steels
- stainless steels
- copper alloys
- precious materials
- titanium

Tolerances

- ± 0.002 mm (.000075 in) depending on the material and shape of the part

Industries

- automotive
- watch industry
- electronics
- medical

Certifications

- ISO 9001
- ISO/TS 16949
- ISO 14001
- OHSAS 18001

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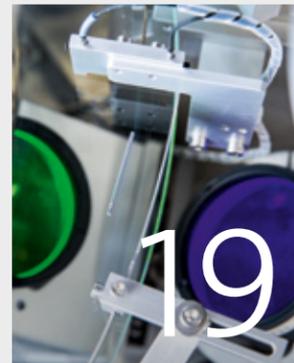
REALIZED PARTS



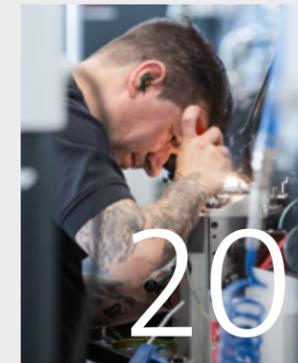
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ABOUT US

WHO IS POLYDEC?

Polydec SA is a major supplier in the global micro-bar turning market.

Polydec produces approximately half a billion parts per year:

- in high volumes for automotive instrumentation
- in medium production runs for micro components used in the fine watchmaking and electronics industries
- in more limited quantities for the medical sector

This success is not the result of chance: the skills of our employees and our desire to respond to customer needs by meeting their requirements and lead times have made Polydec SA a trusted and appreciated partner in various industries.

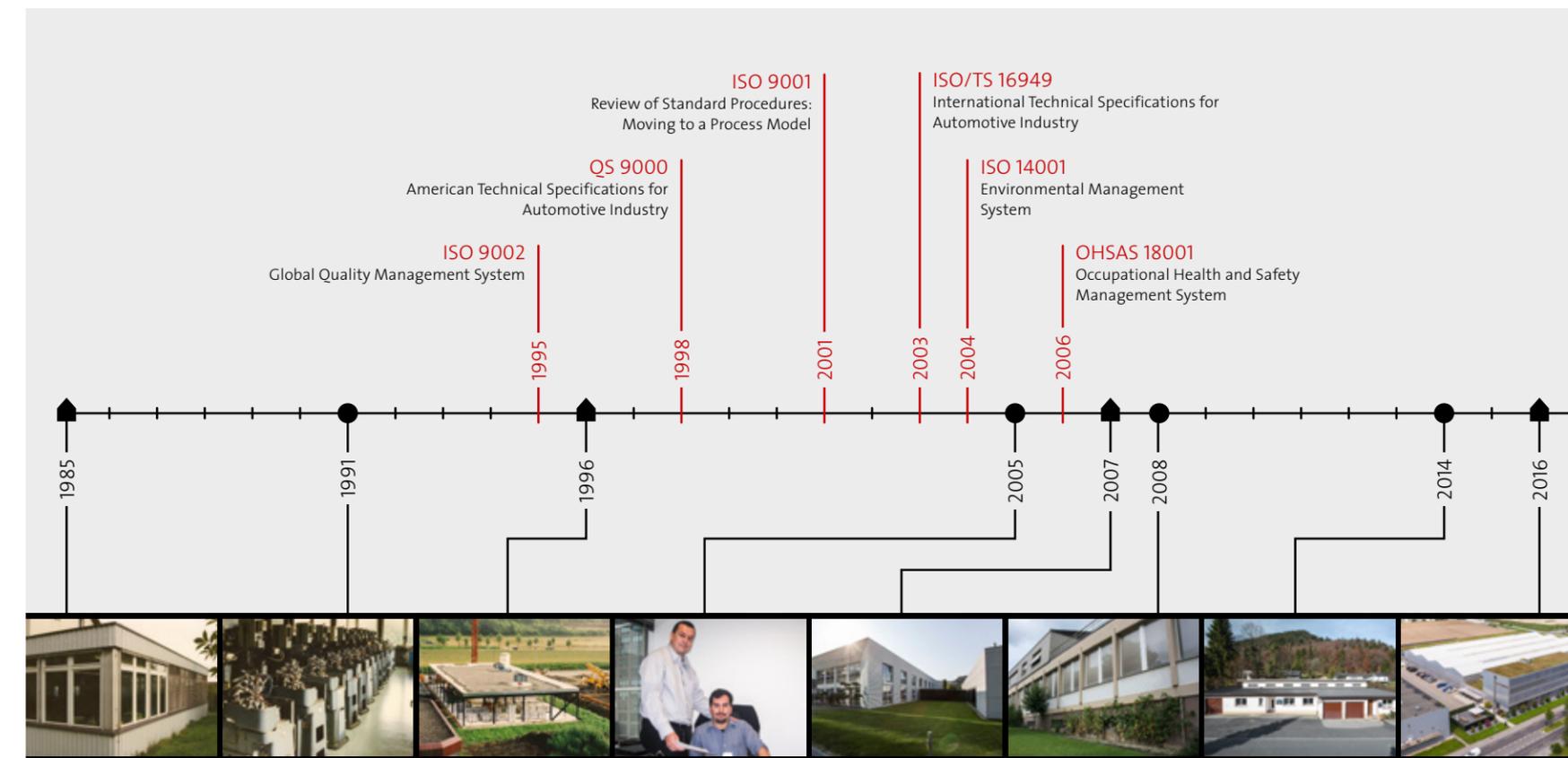
Feasibility studies, specific developments, material selection, prototype production and series manufacturing are among the services we provide on a daily basis.

Established in Bienne, at the heart of the watchmaking industry and near to an internationally renowned microengineering school, Polydec SA benefits from highly qualified personnel. Dynamism, expertise and the extensive experience of its staff guarantee constant innovations for the benefit of our customers.



HISTORY

OVER 30 YEARS OF EXPERIENCE



Founding of Polydec in Evilard | New legal formation: Polydec becomes a corporation | Construction of the first building in Biel | Opening of the Chicago office, Polydec International Inc. | Inauguration of the second building in Biel | Purchase of the warehouse in Péry | Acquisition of the majority share in the Swiss micro turned parts company Roger Maeder SA in Court, Switzerland | Move to new 10,000 m² premises

SWISS TURNING A PROFESSION BASED ON PASSION

Since the company was founded with five Petermann P4 turning machines, Polydec SA has worked its way up to become a trusted partner for high-precision micro-turning. Its stock of mainly “Swiss-made” machinery enables Polydec SA to offer a wide range of products.

Simple Parts in High Volumes – “Escomatic” Turning Machines

“Escomatic” turning machines, either cam-type or CNC, are used mainly for simple parts such as pins, shafts or knurled shafts.

Due to its short cycle times, this method has the advantage of improving productivity, allowing the company to achieve long production runs at competitive prices compared to parts produced with sliding headstock turning machines.

Complex Parts from Small to Large Runs – CNC Automatic Turning Machines with Sliding Headstock

Automatic turning machines with numerical control are reserved for the production of parts with complex shapes. They all contain an additional feeder which automatically loads the material in bars. Other technical tasks can be performed during the same operating cycle: polygon operation, milling, drilling, tapping, threading or even knurling.

Additional Treatments

Other additional operations can also be performed:

- polishing
- heat treatments
- galvanic treatments (nickel plating, gold plating, etc.)
- special surface finishing (sunray polishing, black polishing, etc.)

These post-turning operations are performed either in-house or outsourced to trusted specialist partners – most of them certified – working to strict quality standards imposed by Polydec SA. Parts can be finished to specification, offering customers an all-inclusive service.

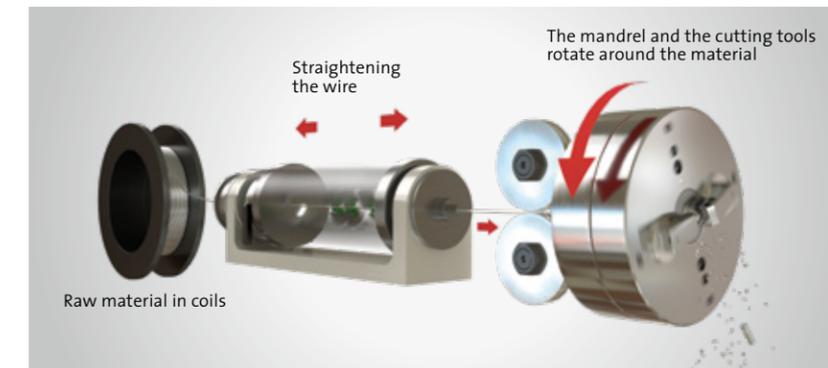


MACHINING TYPES



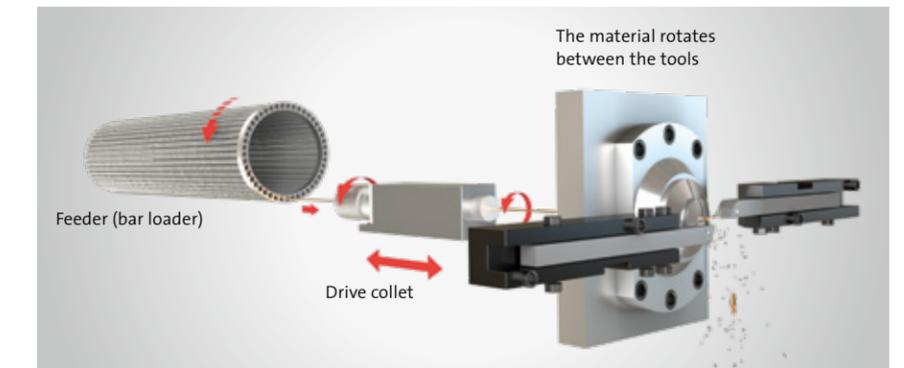
“Escomatic” Turning Machines

With this type of machine, the raw material is fed in as a wire on a reel. The wire is first precision-straightened, then machined using tools turning around the raw material.



CNC Automatic Turning Machines with Sliding Headstock

Unlike the “Escomatic” process, the raw material is in bar form and turns on itself. In this case, the tools are fixed.



CUSTOMERS AND TECHNOLOGIES

4 BUSINESS AREAS – 2 PROCESSES



AUTOMOTIVE

- shafts for micro-motors
- shafts for radial rotors
- shafts for stepper motors
- output shafts
- fuel injection pump shafts
- knurled shafts



WATCH INDUSTRY

- cylindrical pins
- curb pins
- posts
- caps
- eccentrics
- watch screws with black polished head
- studs
- fastening keys



ELECTRONICS

- test plungers
- pogo pins
- battery connectors
- electronic micro-components
- semiconductors
- sensor pins
- spring contacts
- probes



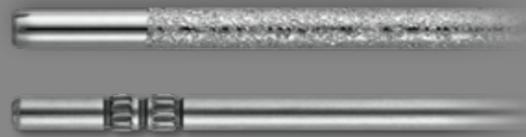
MEDICAL

- insulin or morphine pump components
- medical micro-components (for obturators, endoscopic instruments, etc.)
- neurosurgical implants
- medico-dental tools and instruments
- maxillofacial micro-screws
- components for medical electronics
- components for micro-robotics



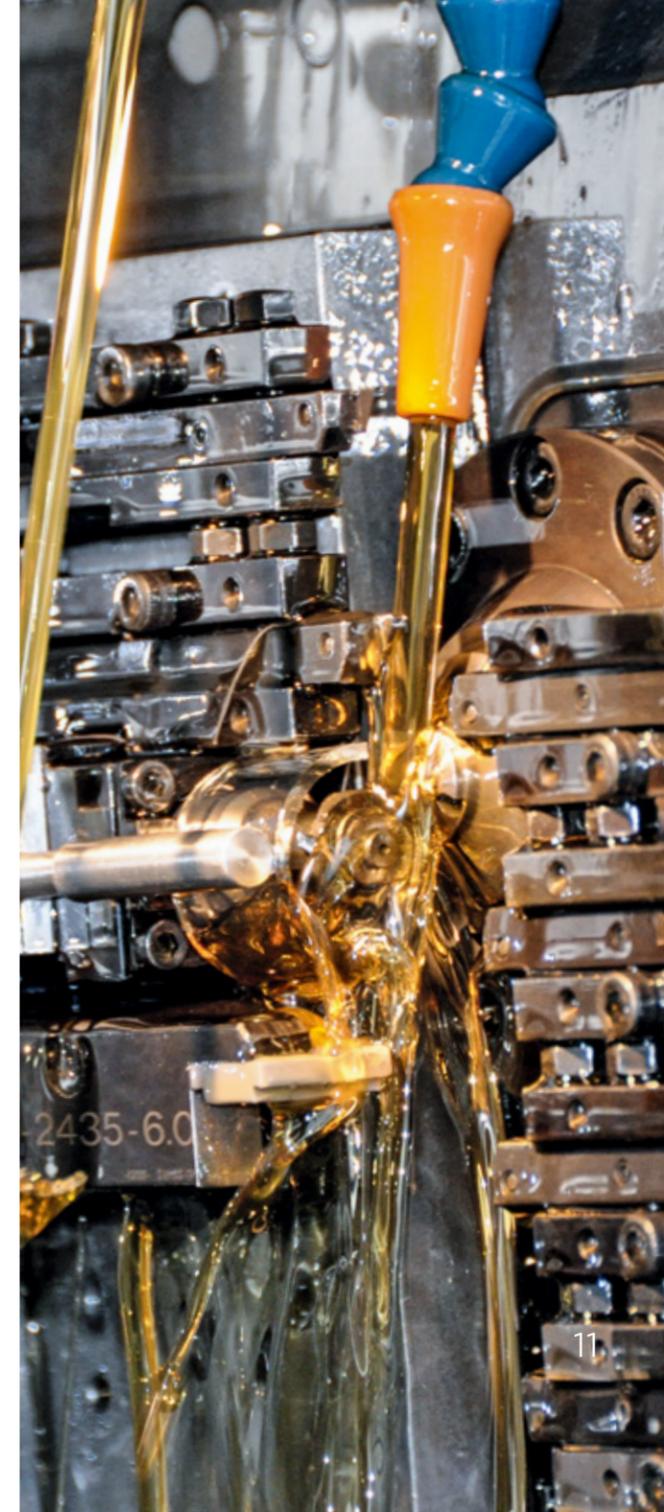
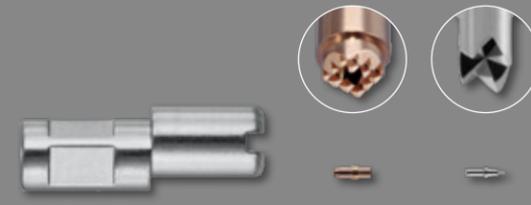
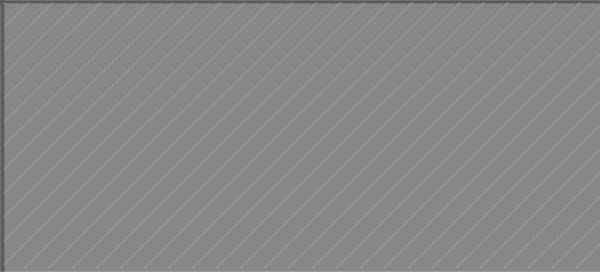
“ESCOMATIC”

- large volumes
- parts with simple design
- raw material on reel
- cutting tools turn around the material



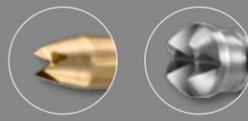
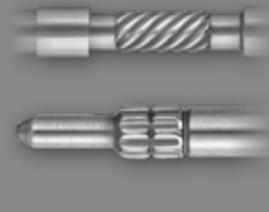
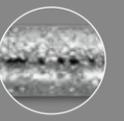
CNC SLIDING HEADSTOCK

- small to large runs
- parts with complex shapes
- raw material in bars
- the material turns on itself and the cutting tools are fixed

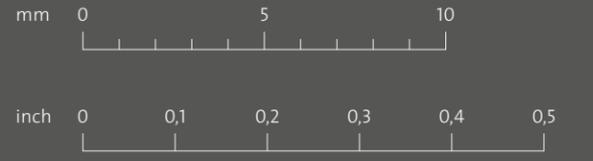




OPERATIONS IN ADDITION TO BAR TURNING

	BAR TURNING			POST FABRICATION CAPABILITIES			ADDITIONAL CAPABILITIES		
	Polygon operation	Knurling	Hobbing	Polishing	Heat treatments	Galvanic treatments	Black polishing	"Frosting"	Sunray polishing
DESCRIPTION	Hobbing of points or facets (without interrupting the rotation of the raw material).	Shaping of the material using toothed wheels. The recesses obtained may be straight, heli-coidal or cross-shaped.	Machining the teeth on wheels, gears and pinions.	The workpieces are mixed with carriers, abrasives and additives and then agitated for several hours (or even days) in vibrating bowls.	Hardening consists of heating steel workpieces to between 800°-1000°C, then cooling them quickly. The material becomes hard and brittle. Tempering consists of reheating the workpiece for a second time to a lower temperature until it reaches the required hardness.	Nickel or gold plating: Depositing of a fine layer of nickel or gold on the workpiece using an electrochemical process, to protect it against oxidation. Passivation: Chemical alteration of the surface of the workpiece, to avoid oxidation.	Mirror polishing: Extremely flat polishing of the workpiece, giving a mirror effect. Domed polishing: Polishing and rounding of the workpiece edges, giving a mirror effect.	Formation of surface porosity by scratching with diamond-coated tools, with the aim of increasing the adherence of the overmoulded plastic part.	Small scratches for aesthetic effect, made on the flat and circular face of the workpiece, giving a sunray appearance under light.
EXAMPLES OF PARTS									
PRODUCTION	Internal			Internal	External			Internal	

REALIZED PARTS
PRODUCTS FOR ALL



MANAGEMENT TOOLS MANUFACTURING PROCESS

ERP (Enterprise Resource Planning) software centralises and saves the processes used by all the departments of a company in a single location, in order to efficiently manage and coordinate its entire business.

At Polydec SA, this software is fully developed and programmed in-house. All ERP solutions come with “basic” functions, plus an integrated management system (IMS) that combines quality, security and environmental features. This process enables companies to embed an authentic “quality culture” in their business.

This tool allows employees to quickly and easily identify their work priorities, which translates to time savings and peace of mind in daily operations.

Thanks to in-house IT development, Polydec SA can quickly and fully customise its tools while monitoring customer requirements and changing manufacturing methods.



EXTERNAL

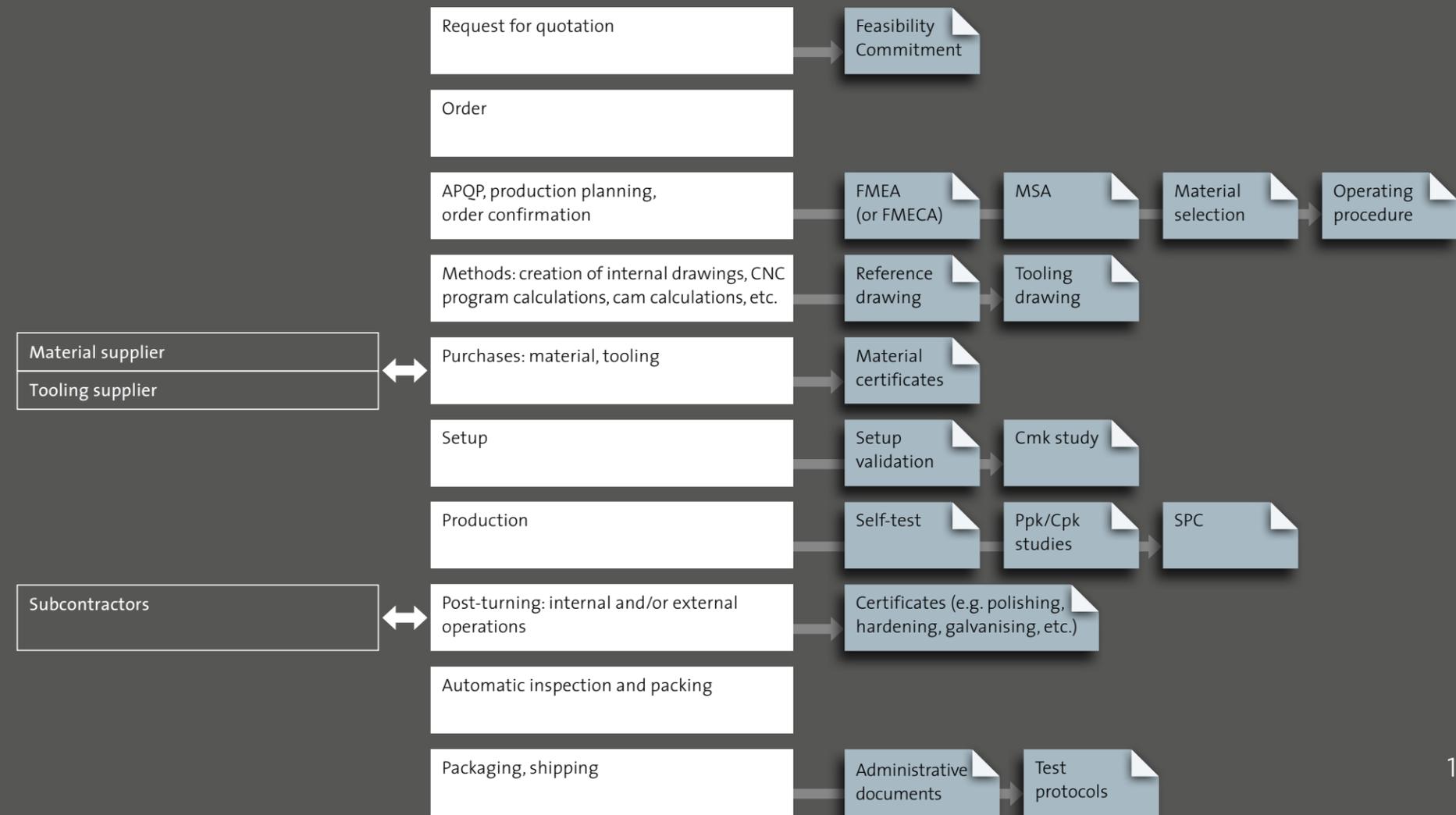
Qualification/validation of suppliers and subcontractors, external audits

INTERNAL

Qualification/validation of processes, internal audits

PPAP file

Qualification/validation of products, customer audits





CERTIFICATIONS AND STANDARDS QUALITY ASSURANCE & IMS

Over the years, Polydec SA has implemented an “Integrated Management System” (IMS) based on four quality standards for which it has been certified:

- The Polydec SA organisation has conformed to the requirements of **ISO 9001** since 1995. The processes and what they affect have been determined, responsibilities have been established, partnerships have been implemented internally as well as externally with customers and suppliers, and continued development is happening on a daily basis.
- The stringent technical specifications required by the automotive industry as defined by the **ISO/TS 16949** standard were adopted in 1998. Based on “Advanced Product Quality Planning” (APQP), all products are studied before being entered into production to guarantee their quality and the reliability of their timelines.
- Reasonable and responsible use of resources has motivated Polydec SA to implement an environmentally-friendly system according to the **ISO 14001** standard, which has been in place since 2004. It has a positive impact on the environmental effects of its business activity.
- Being aware of employee safety and well-being, Polydec SA wanted to establish its business culture with certification in line with the private **OHSAS 18001** standard in 2006. This is an internationally recognised work health and safety standard.

Integrating these methods guarantees that deliveries meet customers’ expectations while respecting the well-being of employees and of the environment.

The “Integrated Management System” (IMS) and certifications have become complete and indispensable tools for daily operations. The success of the IMS is proven by the long-term trust and shared commercial achievements experienced by Polydec SA and its customers.

PRODUCT QUALITY PROCESS CONTROL

Alongside its QA (Quality Assurance) and IMS (Integrated Management System), Polydec SA also boasts a large control infrastructure. In addition to conducting measurements and analyses at various stages of the manufacturing process, this department also:

- creates control plans
- validates the raw materials
- approves new products
- supports the manufacturing process analysis
- manages non-compliant products
- creates manufacturing lots
- collaborates with subcontractors
- services and maintains the measuring instruments (MSA)
- creates the control protocols, in line with customer requirements

Furthermore, any questions customers may have concerning quality and any related actions are managed and followed up by a Customer Quality Advisor.



AUTOMATIC INSPECTION AND ZERO DEFECTS

The 0 PPM target (number of defects per million parts) has become a key criterion in automotive subcontracting. Even though the entire Polydec SA production process is being managed, sometimes 100% inspection is required for large volumes.

Polydec SA has invested in the development of its own vision system. These PLCs use cameras or probes to take measurements. Over 1,000,000 parts are inspected every day.



R&D AND MECHANICAL ENGINEERING TECHNOLOGICAL SYNERGY

Polydec SA has its own R&D department and mechanical engineering workshop, with a team of skilled engineers working closely with specialist developers of innovative solutions.

Customised systems

The Polydec SA machine inventory is designed and constantly adapted to suit specific production requirements and the developments demanded by the current market.

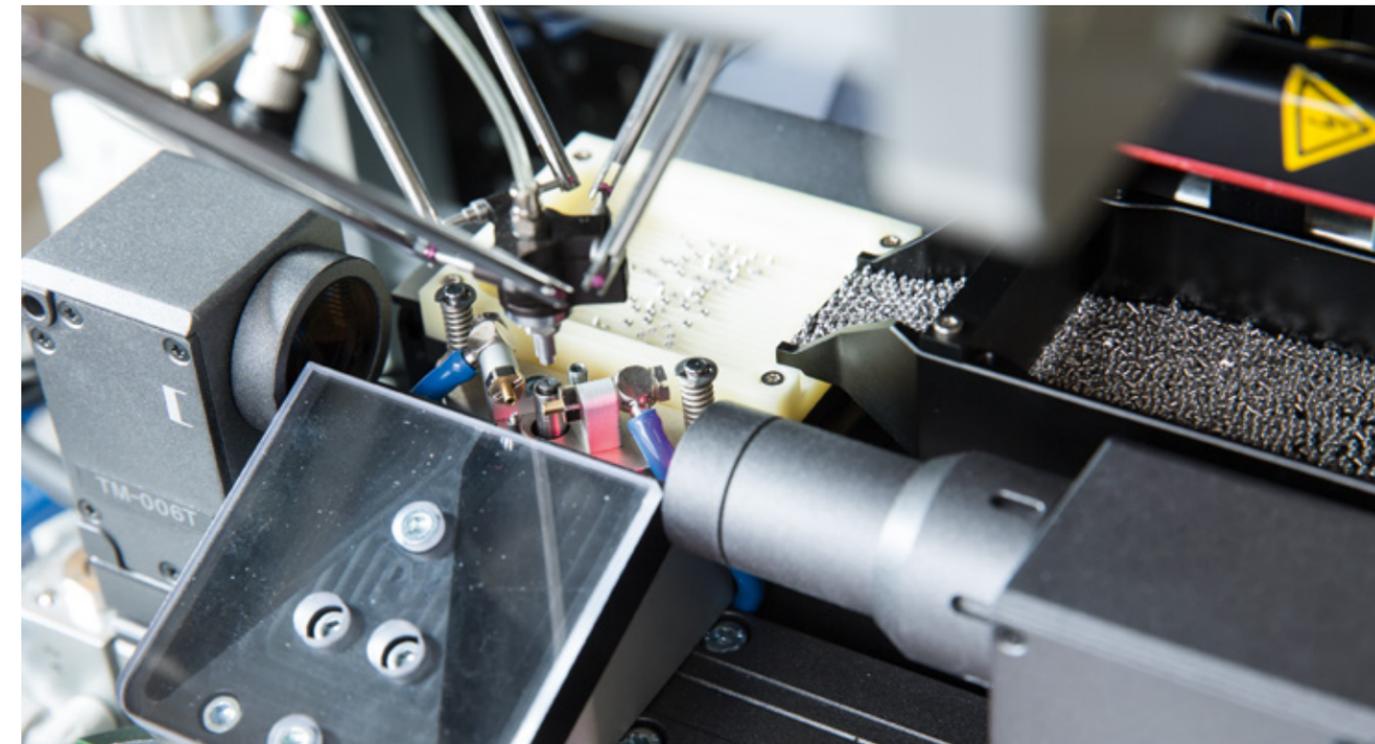
By developing its own systems in-house, Polydec SA is aiming to centralise as many operations and services as possible within the company to give it better control over its strategic processes.

“Made by Polydec” solutions

Aside from modifications to its “standard” machines, Polydec SA also develops and manufactures complete custom systems by integrating existing tools and devices.



Automated finishing machines create rough surfaces on parts. This finish is obtained by scratching with diamond-coated tools, with the aim of increasing the adherence of the overmoulded plastic part.



Measuring robot for micro-parts. Easily adapted to several types of parts, this small automated machine can simultaneously measure up to 16 dimensions with constant precision of $\pm 0.2 \mu\text{m}$ at a rate of 1.8 sec./part.

WORLDWIDE COVER AT YOUR SERVICE

Only a perfect understanding of needs enables the provision of a service that meets the strictest expectations. With this in mind, Polydec SA has implemented a structure that takes into account its customers and prospects.

In 2005, the company opened a wholly owned subsidiary office in Chicago directed by David Kouidri, Polydec International Inc. The company confirmed its desire to also establish itself in Asia. Since 2009, it has had a liaison officer in Japan, Yuko Sakai, to facilitate communication locally.

Development, product manufacturing and logistics are located in Biel (Switzerland). In Europe, follow-up and customer support are executed by Polydec SA. For North and South America and Asia, these services are managed by Polydec International Inc. in close collaboration with the head office.

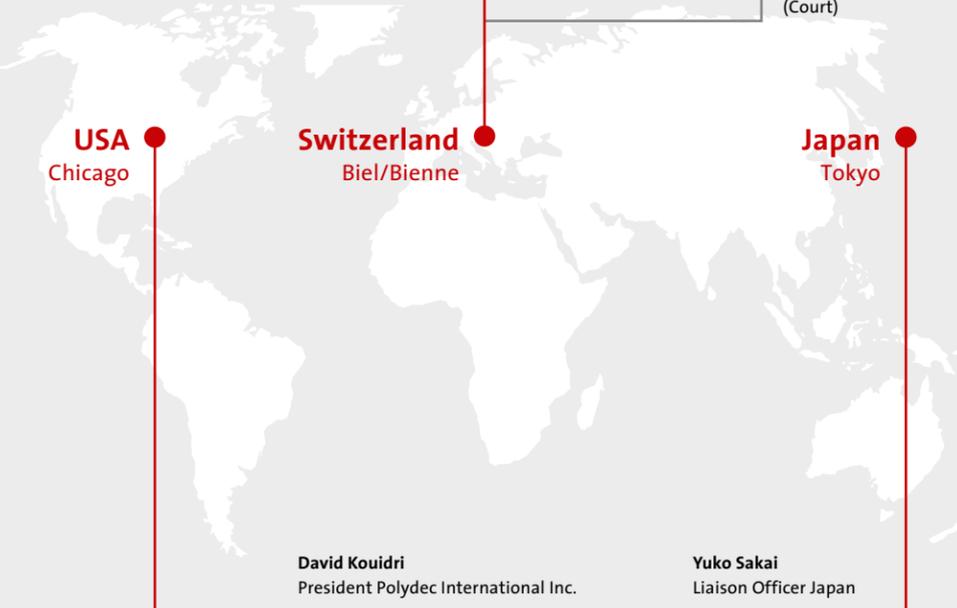
Today, Polydec SA is a manufacturer with worldwide influence, whose goal is to offer products and services of excellence that are adapted to each market!



Polydec SA
Head Office and Production



Roger Maeder SA
Polydec SA Subsidiary
(Court)



USA
Chicago

Switzerland
Biel/Bienne

Japan
Tokyo

David Kouidri
President Polydec International Inc.

Yuko Sakai
Liaison Officer Japan



SUBSIDIARY AND PARTNER

Operational for several years, Polydec International Inc. works in collaboration with Polydec SA to serve customers and develop the market outside Europe.

With support from engineers and specialists from the parent company, it is involved in a range of strategic projects in the American and Asian markets:

- consultancy and customer support
- order and production management
- market research and prospecting
- satisfaction surveys

Polydec International Inc. has enabled Polydec SA to strengthen its presence outside Europe and provides valuable support for the sales department.

THE TEAM TEAM SPIRIT

The achievements of these past few years have been made possible by the team spirit at Polydec SA. This success is based on the expertise and permanent investment of its sixty team members.

Particular emphasis is placed on maintaining and strengthening the trust of the staff. Polydec SA promotes transparency and dialogue within the company, which it believes are essential for success.

Through continued training, it encourages the development of both personal and technical skills.

In this way, the working environment becomes more peaceful and inspiring: two factors which help to meet challenges!



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