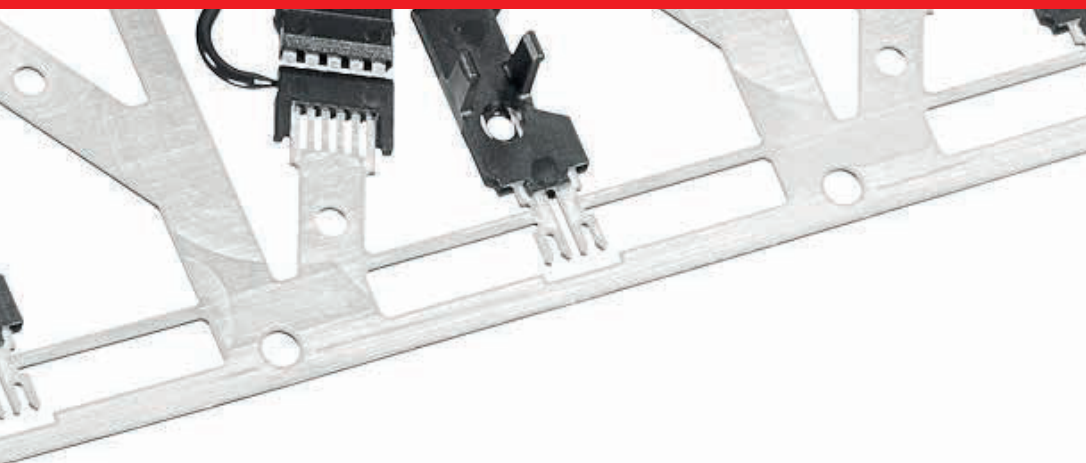
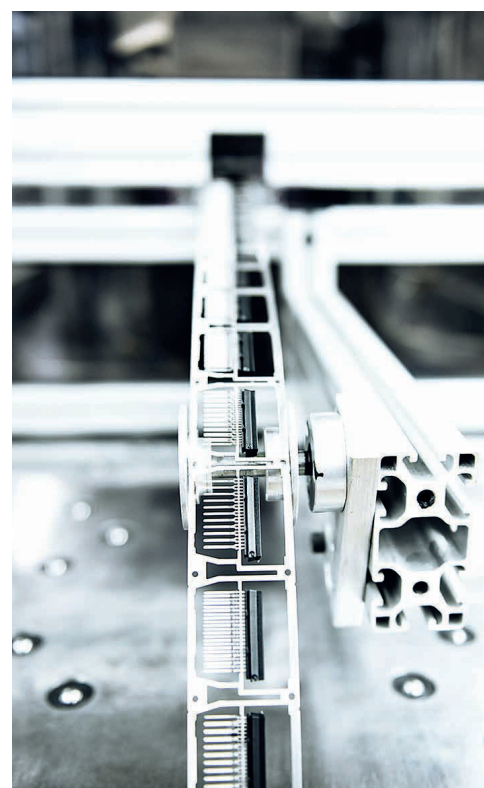


360° PROJECTS BY INOVAN

PLASTICS TECHNOLOGY



360° PROJECTS BY INOVAN

THINK. THINKING IT THROUGH. THINKING IT THROUGH RIGHT FROM THE START.
THERE REALLY ARE DIFFERENCES //--

During implementation at the latest. When things take longer, become more expensive or turn out to be much more difficult than expected. So, by all means it is a kind of art: the art of thinking it through right from the start. It has a lot to do with years of experience, deeper understanding and overall implementation expertise.

Starting from a wide selection of plastics, we create metal-plastic composite components in combination with stamping, injection moulding, assembly and testing processes – all from a single source.



360° PROJECTS BY INOVAN

PLASTICS TECHNOLOGY

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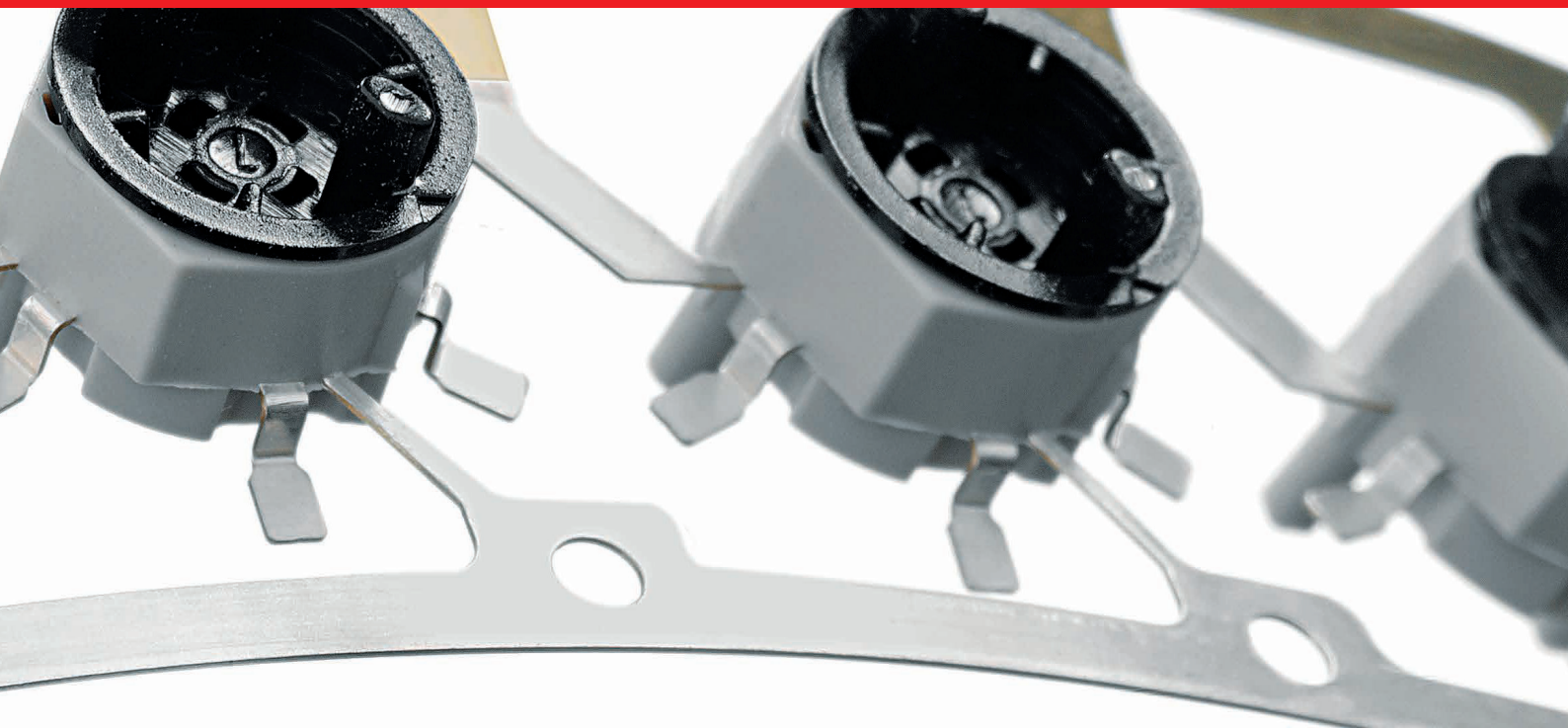
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THINKING IT THROUGH RIGHT FROM THE START

PLASTICS TECHNOLOGY

INTRODUCTION

ONE STOP SHOP

We work together with our customers to develop optimal and customized solutions for complex assignments. Product development, project management and our tooling shop, ensure professional and customer-focused implementation, thanks to our longterm experience in handling a variety of products.

Our expertise in the areas of stamping, surface, contact and plastics technology allows us to offer all key technologies from a single source. We are able to take advantage of the synergies to not only produce components but also system solutions for instance in the form of functional assembly groups.



WHY WE CAN DO IT BETTER

ENGINEERING MATERIAL TECHNOLOGY



CONTACT TECHNOLOGY



FASTENERS & PRECISION PARTS



It is not just a question of having the proper mindset. If you want to think through a project right from the start you also need the proper lineup. What differentiates us from our competitors is not just our commitment, but also our ability to fulfil this commitment in an extraordinary way.

Thanks to our many years of global activity, we have for one 60 years of experience in development and supervision of very complex projects. Furthermore we offer a production depth that makes us unique on the market.

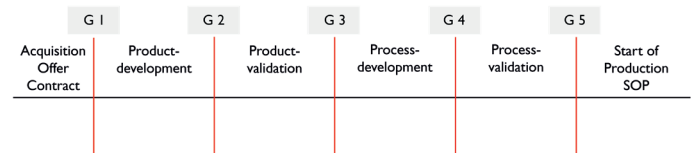
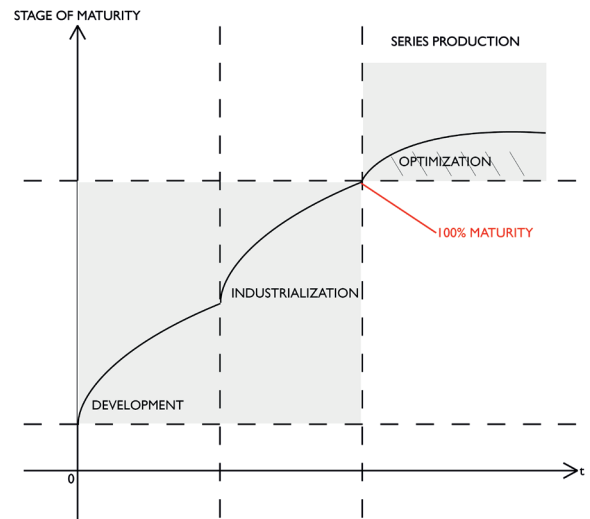
PRODUCT DEVELOPMENT

Our development services range from developing a product to series production readiness with modern 3D CAD systems. Our customers can also commission specific development services in form of designing, calculation or prototype construction, for example for replacement parts. This allows us to identify potential problems promptly in advance and to correct them.

PROJECT MANAGEMENT

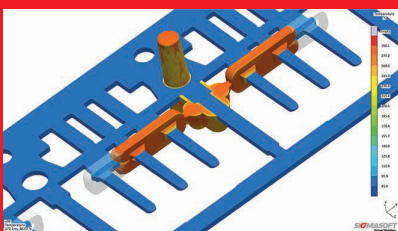
Our experts accompany the entire product development process continuously. With an efficient collaboration, they observe and optimize the topics quality, costs, timing and engineering based on defined milestones (gates 1-5).

Our structures and our expertise allow us to continuously improve our finished products even beyond the market launch (100% maturity). This allows us to integrate lessons learned and best practice solutions into series production.



3D-SIMULATION

Our software allows us to map complex simulations and inspect the product in advance for quality and manufacturing feasibility.



Following simulations can be executed:

- » tensions in the component and placement device
- » cooling time
- » shear rate during the injection moulding process
- » interior injection and tool pressure
- » closing forces for the injection moulding machines

- » component behaviour after multiple injection cycles (tuning phase)
- » thermal behaviour in injection moulding tools
- » identifying hot spots
- » identifying cavities and sink marks

FINITE ELEMENT METHOD

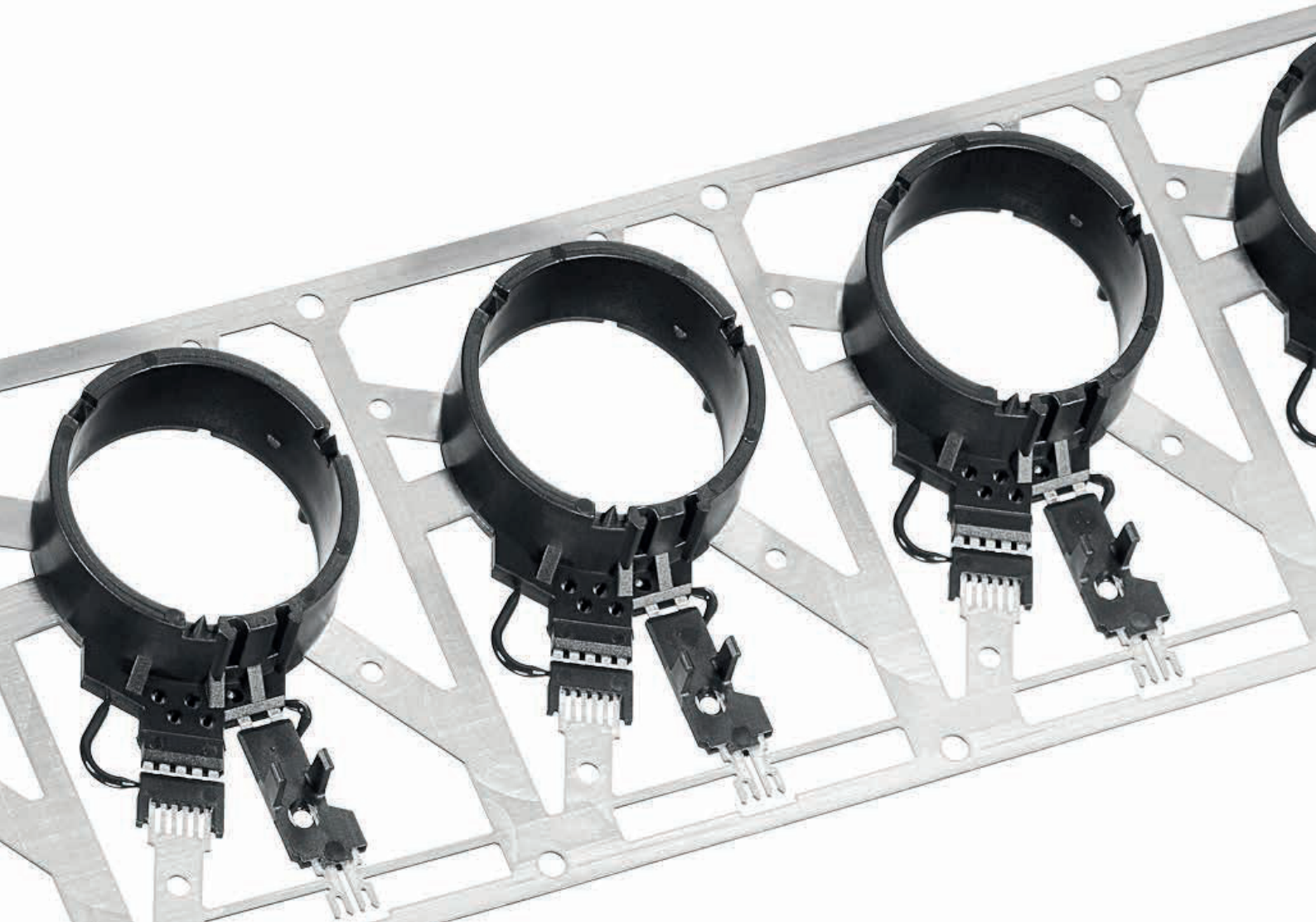
Our portfolio further includes simulations with the finite element method. This enables us to complete mechanical strength calculations to illustrate load curves. We use it, for instance, for safety latches and snap locks.

PLASTICS

We process all common reinforced and non-reinforced technical plastics and high-performance plastics. These include not only plastics for standard applications PA6.6 and PBT but also for high temperature applications PPS, PPA and LCP.

An excerpt of our plastics and their uses is provided in the table below:

PLASTIC	APPLICATION
standard application	
PA 6.6 GF30 / Ultramid	components subject to high mechanical loads
PBT / Pocan B4235	used in the automobile in the engine mount area for electrical components with rough environmental conditions, including housings and connectors
high temperatur applications	
LCP / Vectra EI 30i	components under heavy thermal load
PPS GF 30 PPA GF 40 / Grivory HTV – 4X1	used, for instance, for engine plug systems, for reflow processes, etc.



APPLICATIONS

The industries INOVAN supplies are just as diverse as the whole plastics technology. Our products don't just ride along in the car; they are also used in battery, electrical, communication and medical technologies.

Our products are used, for instance, in the automotive industry in mechanical components for ECUs, in components for electric steering aids, in components for xenon lighting and for distance sensors.



INDUSTRIES

The high level of innovation offered by our customers shapes our own work. Creating complex components demands not only creative solution expertise, but primarily the combination of different manufacturing technologies. Our broad portfolio of technology makes us a leading supplier of customer-specific solutions.

Over 900 employees make their contribution to manufacture unique products from these industries:

- » automotive technology
- » battery technology
- » electronics and electrical technology
- » renewable energies
- » home appliances
- » information and communication technology
- » machine and systems engineering
- » medical and laboratory technology
- » lock and fitting technology

TOOLING SHOP

With over 60 years of experience in high performance and stamping tool construction, INOVAN is your competent partner. To guarantee economical series production, it is essential to combine our expertise with the most modern production technologies available. This is the only way to reliably handle large-scale series production projects.

We are happy to provide, advice and develop your stamped or plastic part alongside you. We can help you with material selection, design and function.

Our highly trained design team always provides the highest precision. Outstanding flexibility allows us to professionally implement customer requests.

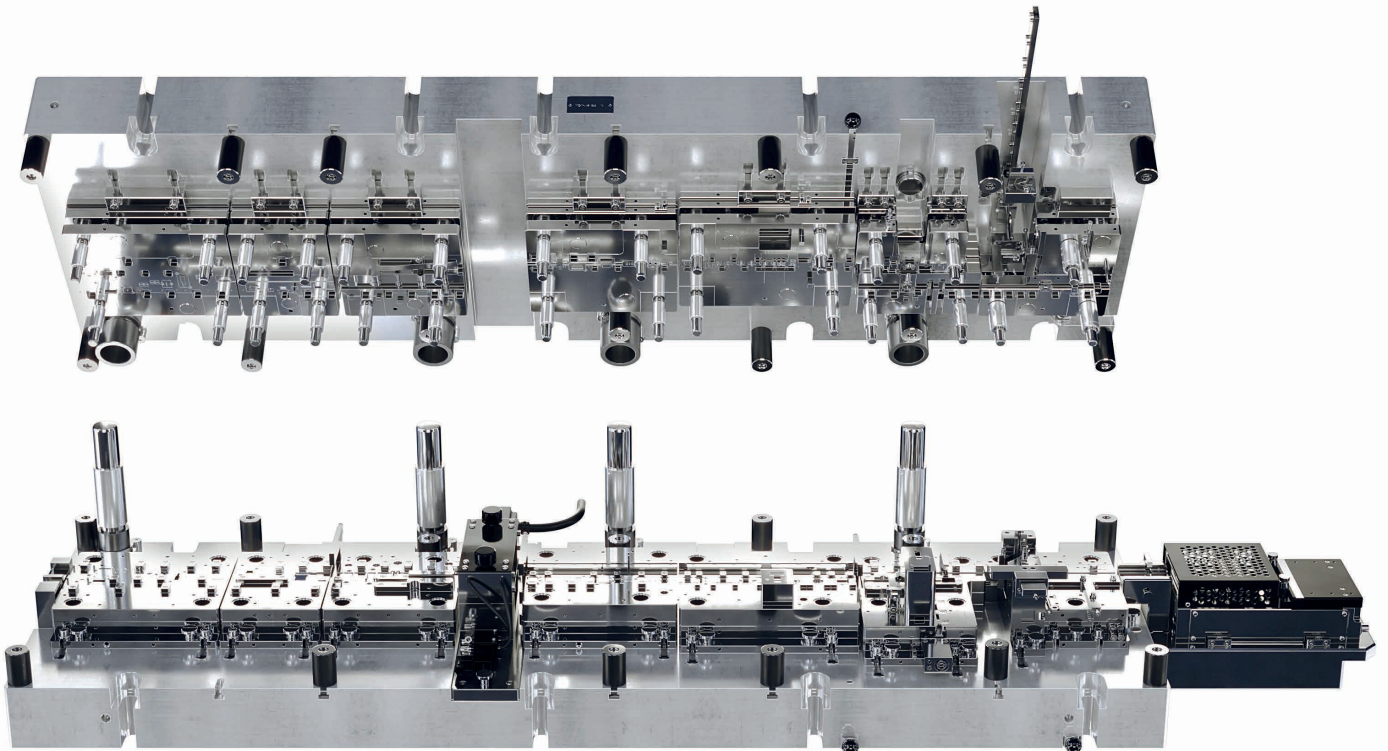
When designing and developing our modern progressive tools, we already keep the function of your product in mind. Component dimensioning and material selection for mechanical components are aligned with your quantity requirements. In every tool we make, our focus is on durability and inexpensive replacement parts.

YOUR ADVANTAGE:

- » tooling technology at the highest level
- » 60 years of experience
- » highly complex stamped parts from all common materials, material thicknesses and widths
- » integration of stamping / forming and assembly processes into the extrusion process
- » tool maintenance

OUR PORTFOLIO:

- » prototype tools
- » modern progressive tools
- » hybrid tools: Preforms, stamping modules, assembly, finished parts
- » specialised tools for bonded items: Dry running water meters, technical cleanliness
- » x number of cavities in the tool design possible
- » INOVAN press-fit contact and EloPin®



STAMPED-BENT TECHNOLOGY

The precision of our tool construction is proven in our high-speed presses and automatic machines. The quality and economic efficiency offered by our production process is clear. Our systems can handle the entire stamping process, including moulding, welding, riveting, rolling and cleaning.

We focus on the customer and their product – down to the last detail. Our product portfolio even includes producing micro-stamped parts at the edge of what is technically possible, with an erosion wire diameter of 0.03mm.

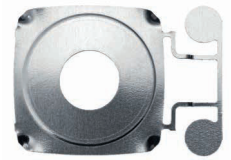
No matter whether you only need select stamping technologies from us or want to take advantage of our full expertise – our goal is to continuously improve and develop technical standards.

YOUR ADVANTAGES:

- » modern automatic stamping presses facilitate economical production
- » laser welding, resistance welding and riveting available
- » feeding rivets and pins to the progressive tool
- » cleaning stamped parts

OUR PORTFOLIO:

- » stamped and bent parts
- » micro stamped parts
- » bondable stamped parts
- » snap domes
- » pressfit pins
- » welded / riveted contacts
- » battery components
- » deep drawn parts
- » cold formed parts



SURFACE TECHNOLOGY

With modern strip electroplating systems, we offer our customers optimal solutions for selective strip and lead frame coating. These are characterized by their economical use of precious metals, low contact resistances, wear-resistant layer combinations and corrosion-resistant surfaces suitable for soldering and bonding.

Highly precise measurement technologies monitor compliance with our high-quality demands. Layer thicknesses are measured continuously over the entire conveyor system. In our own laboratory, we can complete not only common quality tests, but also test nano layers from 5 nm and bonding and soldering capabilities. Process baths are regularly monitored by our analytic laboratory and supplemented as needed, ensuring consistent coating quality.

POSSIBLE COATINGS:

- | | |
|----------------------------|--------------------------------|
| » nickel | » bondable gold |
| » pure tin | » palladium/nickel |
| » tin/lead | » palladium |
| » silver | » copper |
| » hard gold | » nickel/phosphorous |
| » ductile (malleable) gold | » (copper-) tarnish protection |

YOUR ADVANTAGES:

- » lowest precious metal consumption with modern coating processes
- » online measurement of layer thicknesses
- » measurement of nano layers on the newest X-ray measurement machines
- » testing for bonding capability in our own laboratory

SURFACES

- » solderable surfaces
- » adhesive
- » bondable surfaces:
 - gold
 - nickel/phosphorous
 - copper
 - nano layers (Pd,Au)

WE COAT FOR YOU:

- » full strips, lead frames and wires
- » all sides or selective

OUR PRODUCTION

The consistently high quality we offer in designing and building our tools is reflected in stamping and galvanising, and is also ensured in our precision injection moulding.

With our production lines and an automation level of >90%, we can guarantee economic efficiency and quality assurance at high quantities.

Our modular systems are designed both for over-moulding complex progressive hybrid components and for combining a wide range of inserted components.

OUR MACHINE FLEET:

- » reel-to-piece technology
- » reel-to-reel technology
- » systems with blister tape packaging
- » system with workpiece carrier circulation system
- » 2K injection moulding
- » camera inspection and monitoring
- » revolving test machine
- » Linear test machine
- » 350-2000kN interlock

OUR DELIVERY FORM:

- » endless reel goods
- » blister package, endless on SMT reels
- » single parts in trays
- » single parts as bulk goods



COMPONENT ASSEMBLY

With modern assembly systems and a wide range of different technologies, we complete complex assembly steps to create a finished unit for applications where over-moulding is not an option.

This creates a functional assembly that stands out for narrow tolerances and high quality.

Possible combinations offered by our production include:

- » bending
- » stamping
- » embossing
- » thread cutting
- » riveting
- » screw fitting
- » welding
- » soldering

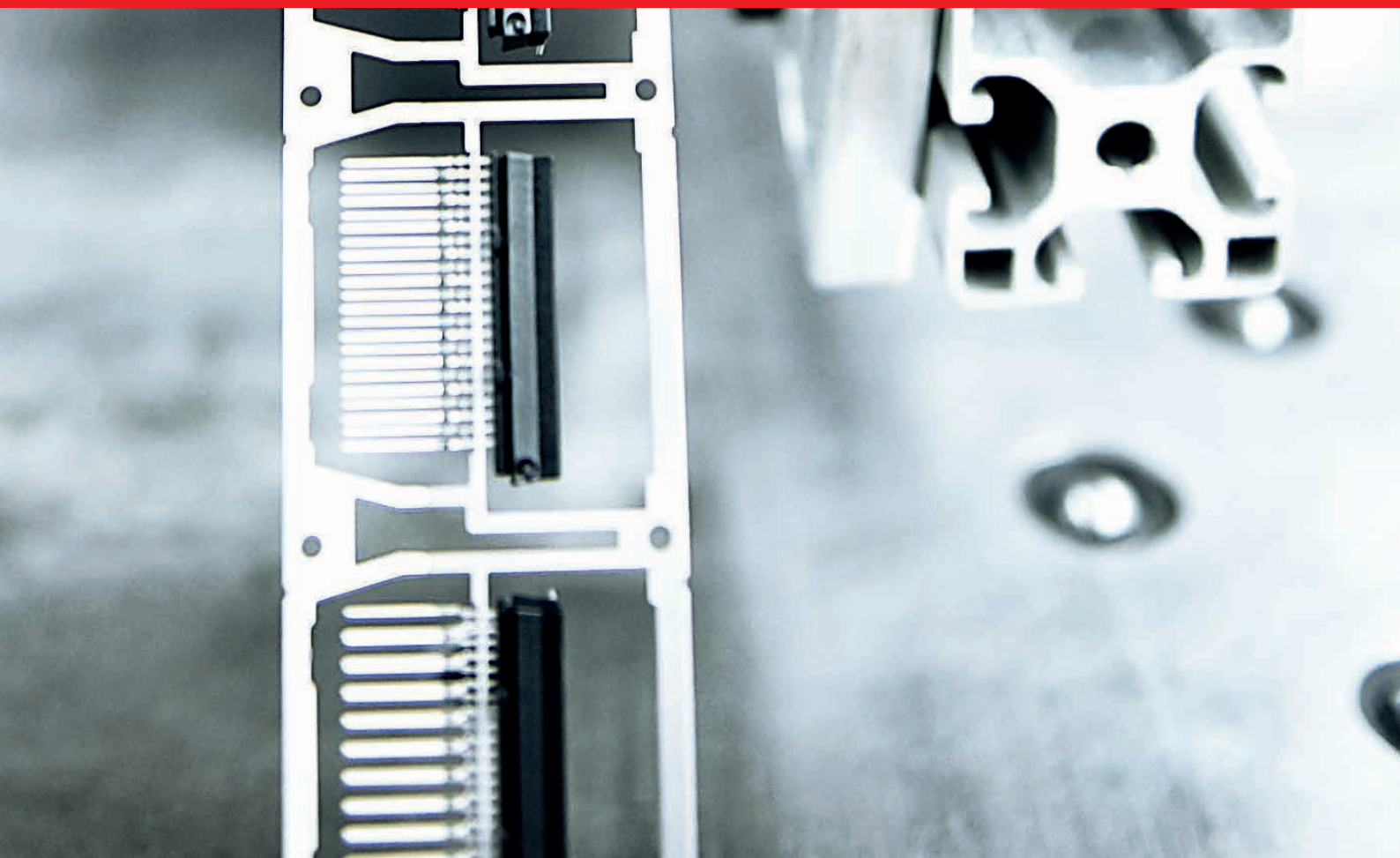


LET US THINK YOUR PROJECT THROUGH
RIGHT FROM THE START.
PLEASE CONTACT US.

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