
LIGHTING
SOLUTIONS
ALL IN –
FROM ONE SOURCE
IN EUROPE
Your project partner for the
development and production of
electromechanical products

CUSTOMISED ELECTROMECHANICAL PRODUCTS

We have been developing and manufacturing electromechanical components of the highest quality for decades. With our development team specialising in mechanics and electronics, our in-house toolmaking in Germany and injection moulding and PCB manufacturing in our production facilities in Europe, we are also experts in the field of customer-specific electromechanical components for lighting and electrical industry.

Because of the network within the VS Group and the close cooperation between the individual specialist teams, we have a wide range of expertise in the areas of mechanical and electrical development, material selection, tool technology and manufacturing processes for injection-moulded made from thermoplastic materials and PCB manufacturing.

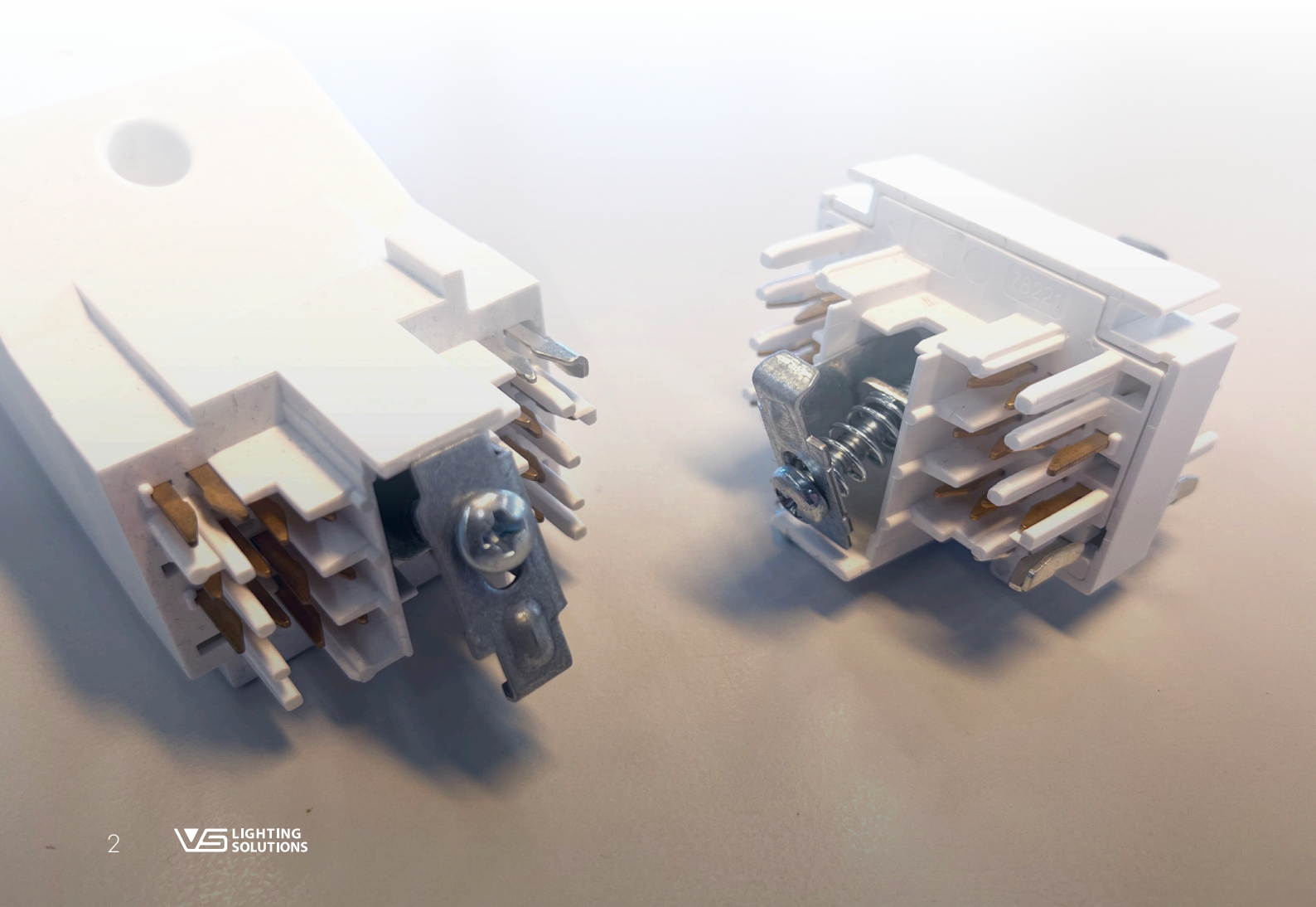
We actively accompany our customers at every stage of the project with our experienced project team. As a reliable development partner, we support our customers in the development, manufacturing, testing and verification processes.

Our product developments can be as varied and individual as the possible mechanical solutions itself. Whether you have an idea or can already provide a detailed specification, we are happy to take on board your requirements and wishes and are fully committed to developing a solution.

We also offer the option of perfectly coordinating mechanical parts with electrical contacts and circuit boards and integrating them ideally into your product.

VS Tool manufacture

With our in-house tool construction, we guarantee highly flexible development and production for demanding projects - especially with regard to complex geometric designs and material choices.



Over 50 years of experience in the design and manufacture of injection moulding tools for electromechanical components and a high-quality machine park with automated processing sequences are the basis for the quality, precision and durability of the tools and therefore also for your products.

VS injection moulding production

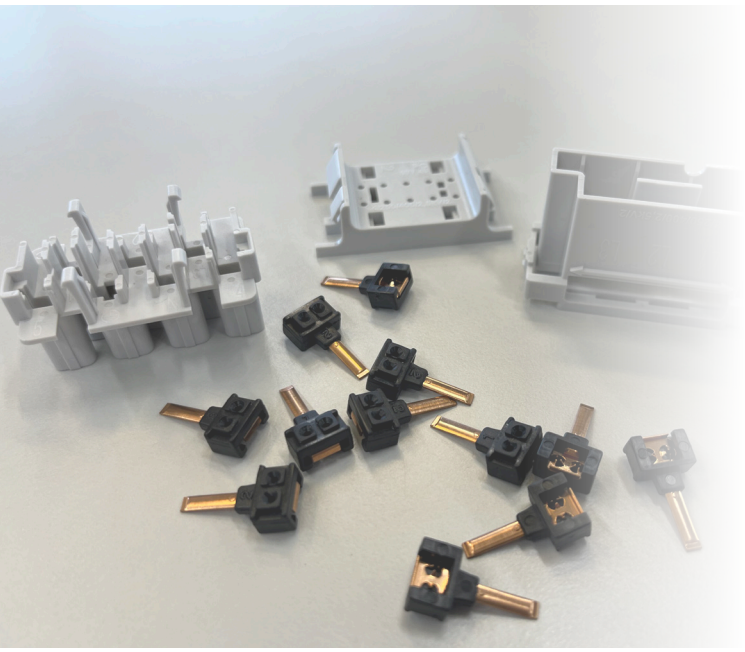
Our automated manufacturing processes in plastics processing with modern machines are the basis for the production of thermoplastic components. The high demands placed on the material also include flawless workmanship. We place the highest demands on quality. Our quality measures during production, such as dimensional checks and visual inspections with documentation via our CAQ system, guarantee a consistently high standard.

DEVELOPMENT AND MANUFACTURING PROCESS

We offer you support from our experts at any time, no matter what phase of project development you are currently in. In electromechanical engineering the complexity could be high. To combine mechanical and electrical tasks needs a wide and high level of expertise.

1. **Development** – Concept development, evaluation of mechanical and electrical functions and assembly process
2. **Prototypes** – Production of prototypes by 3D printing
3. **Component design** – Plastic and production-oriented layout, interface consideration and material definition
4. **Simulation** – Assessment of filling, flow and warpage behaviour, strength analysis, derivation of design adjustments
5. **Tool construction** – Development of tool concepts, construction and complex injection moulding tools, integration of manufacturing processes and new technologies
6. **Toolmaking** – High flexibility with in-house toolmaking, modern technology and processing centers, precise and prompt implementation of tool projects, modifications and repairs
7. **Production of prototypes** – Series quality - realisation through the use of flexible master mould concepts
8. **Production concepts** – Suitable production solutions with modern injection moulding machines from 35 to 500 tons clamping force, automated assembly of printed circuit boards
9. **Assembly** – Partially automated assembly of mechanical and electrical components by skilled workers
10. **Validation** – Taking over article-related process validations, assessment of quality features during production, early detection of process deviations

COLLABORATIVE DEVELOPMENT – IN ALL PHASES OF YOUR PROJECT



For our customers, we are more than "just" a supplier. We are a technology partner, solution finder and development partner. Based on your ideas and requirements, we develop a customised product that fits your application perfectly.

During project planning, our focus is on time and quality targets, cost-effectiveness and innovation. The know-how of our experts is incorporated into every development project in order to create innovative and technically outstanding products based on the requirements of your final product and application.

Thanks to our specialisation in electromechanical design, our team are familiar with the special requirements and have mastered the holistic range of services for successful product development. Coupled with the knowledge of your technology specialists, the result is a product that is more perfect than can be achieved through separate development.

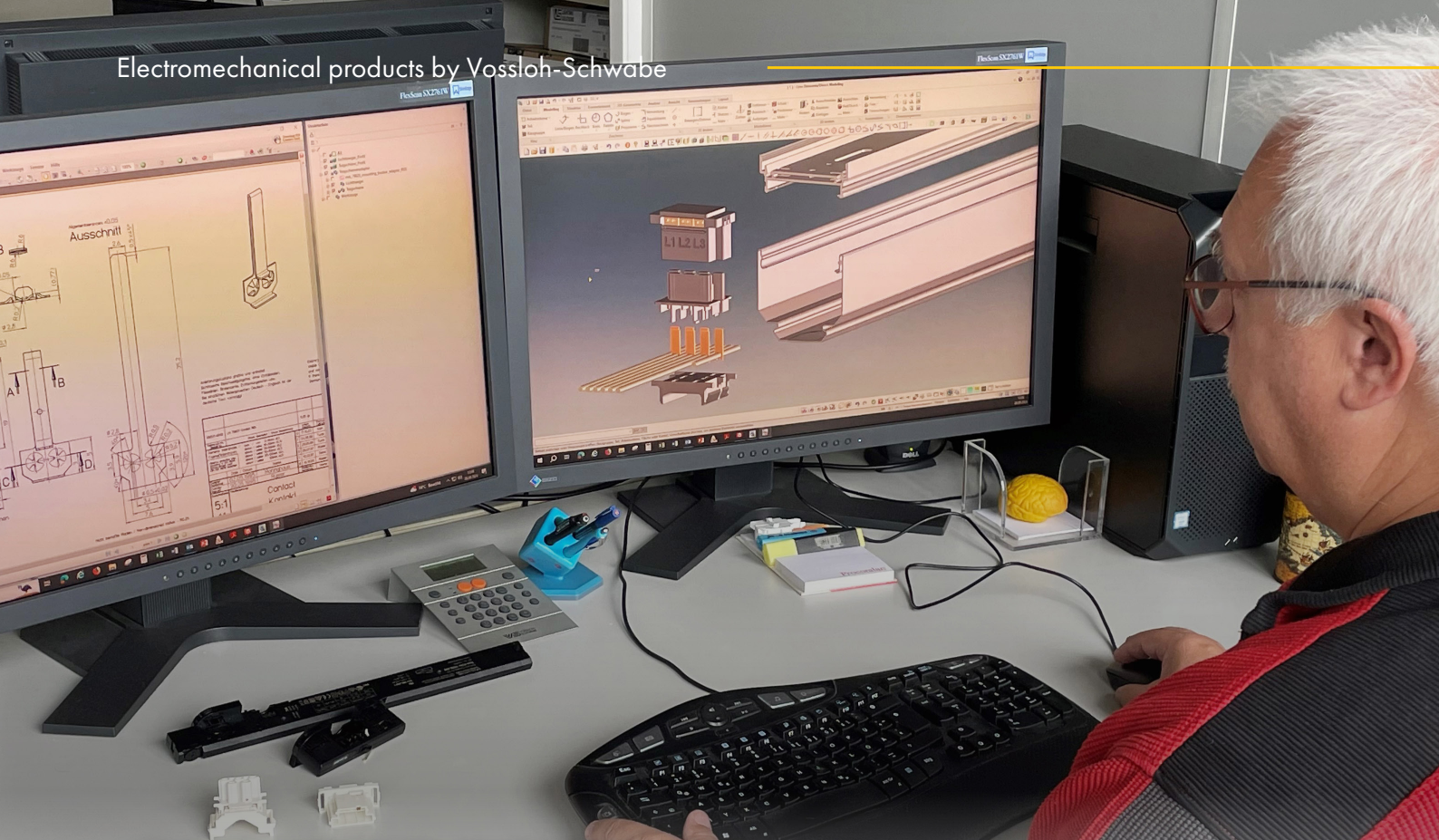
Together with you, we analyse the respective application and the framework conditions of the task. Taking existing technologies into account is just as important to us as offering alternative implementation options. Once the concept has been created and the mechanical and electrical functions have been achieved, we assess the manufacturability and make recommendations for adjustments. Tolerance considerations as well as error and influence analyses are already integrated in this step.

Our services

- Concept development
- Design of electrical and mechanical functions
- Optimisation of design for tooling and plastic production
- Risk and tolerance assessment
- Concept for automated manufacturing
- Provision of 3D data of the components and assembled products

"In addition to the complex mechanical and electrical functions, also economical requirements are a key aspect at the concept phase of our design process. Our service goes beyond pure functional design. Rather, we see ourselves as a partner to our customers and also support them in downstream processes such as optimisation of investment cost for tooling and automatized manufacturing. Sustainability of production, packing and logistics from our production plants in Europe to our customer are considered at the very beginning of the project ."

Christian Gerstberger, Head of development



CONCEPT DEVELOPMENT – YOUR IDEA TAKES ON SHAPE

Based on your requirements, the first step is to development of concepts mechanics and electrical contact systems. The concept development takes into account the product function but as well economical aspects of tooling and production cost.

This also includes the evaluation of wall thicknesses, material selection as well as subsequent disassembly for recycling.

In this phase, simplifications can be introduced by adapting components and planning modern tool technologies, which can result in considerable savings potential.

In this step the design task is as well to make us of variable master moulds of VS which could be used by producing new inserts instead of a complete new tool.

After the concepts have been finalized and agreed with you, the first prototypes could be produced by modern 3D printing or soft tools.

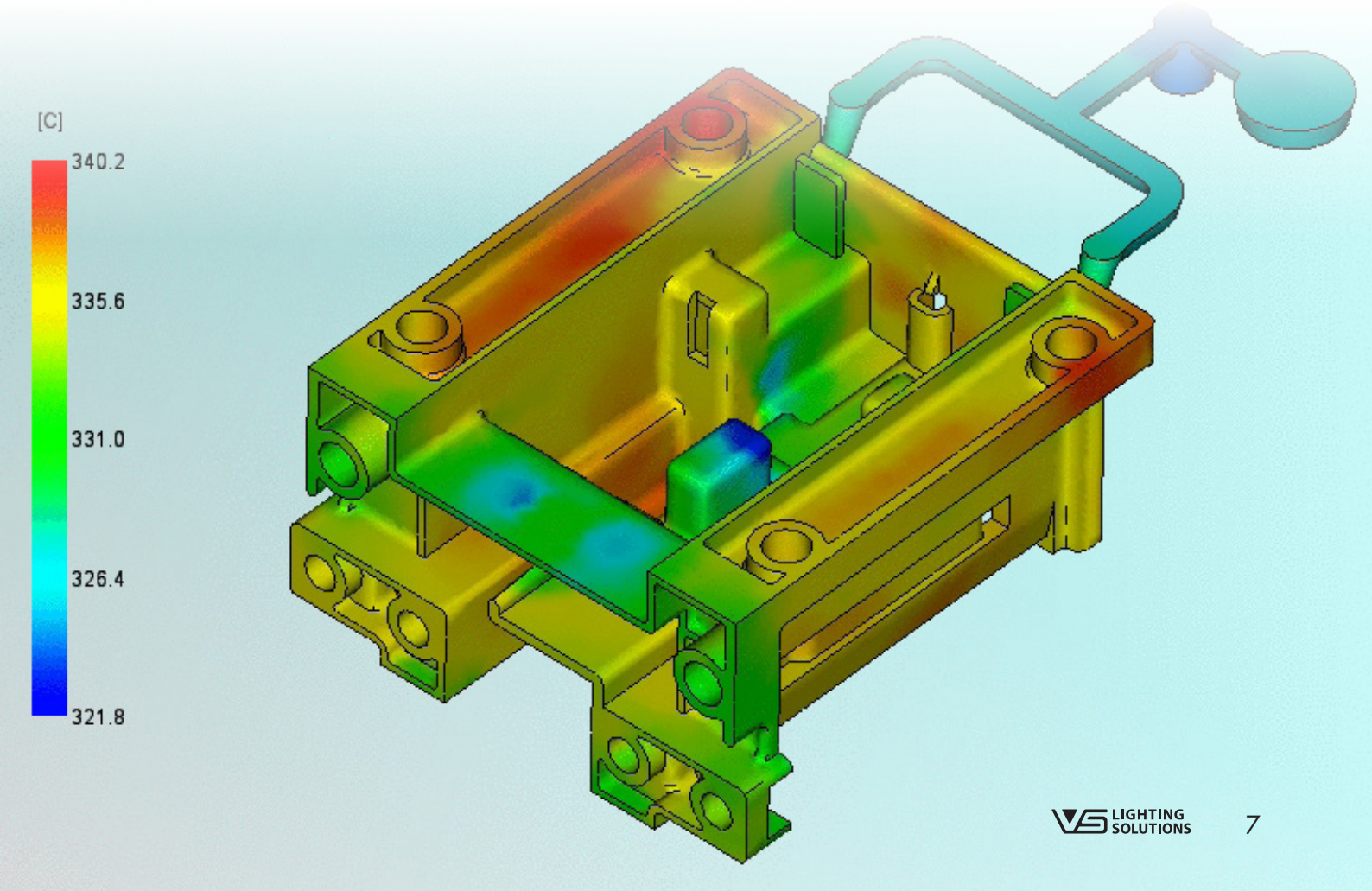
Furthermore, these prototypes make it possible to physically test the complete function of the product and optimize the design accordingly. This allows all those involved in the process to be convinced of the future end product before the start of series tooling.

Mouldflow analysis, the basis for optimal tool layout

Mouldflow analysis forms the basis for optimum production and quality of the plastic parts. With the help of flow simulations, quick and precise statements about the filling behavior and the expected distortion of the component can already be obtained before the tool design phase. Statements can also be made about the temperature conditions in the mould as well as the ideal positioning and design of the gating depending on the geometry of the component and the planned plastic. This allows initial concepts to be verified and potential problems with filling and flow lines to be identified at an early stage. The findings are incorporated into the subsequent tool design. This speeds up the entire development process and avoids cost-intensive reworking of the tools.

Our services

- Optimisation of the plastic components for injection moulding process
- Assessment of the filling/flow and warpage behavior
- Validation of development results through prototypes
- Optimisation of the manufacturability and quality of the component

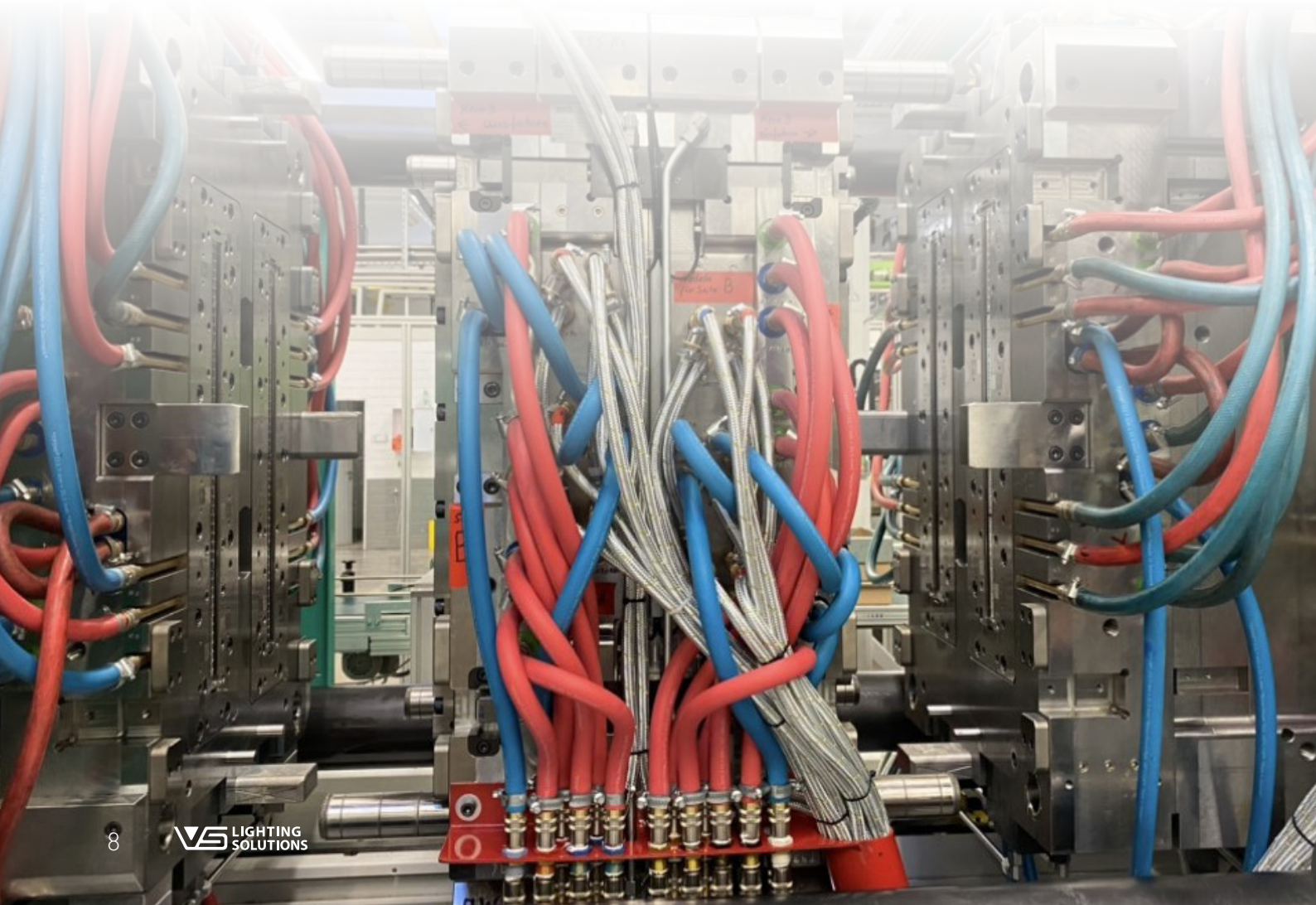


TOOL CONSTRUCTION – THE BASIS FOR TOOL QUALITY

Our specialised design engineers design the tools taking into account the economic framework conditions. Here, our experience from almost 50 years of injection mould construction and extensive technology-specific knowledge are incorporated.

Our services

- Development of tools for injection moulding processes
- Integration of ideal standard parts and sprue systems
- Component and process-optimised cooling
- Tool layout for very long tool life with the lowest possible maintenance requirements
- Modular concepts for different geometries from the same master tool



"The construction of the tool is the basis for the production of high-quality tools using state-of-the-art manufacturing processes. Our long-standing and successful collaborations are the result of intensive dialog between our tool constructors, our customers and our toolmaking department."

Thomas Wippermann, Development of injection moulding tools VS

TOOLMAKING – PRECISION IS ACHIEVED RIGHT HERE!

In our in-house mould and tool making department, the constructed tools can be created quickly and efficiently and the first injection moulded samples can be made available within a short time.

The required individual parts of the tool are manufactured using state-of-the-art production techniques. Our internal manufacturing guidelines guarantee a long service life and absolute precision of the tools, with all the necessary toolmaking steps being carried out in-house.

Our experienced specialists maintain their edge through on-going continuous improvement training programs. We also offer all the services of modern toolmaking, such as tool repair and maintenance, spare parts production and the complete production of new tools with up to 32 cavities. We use die-sinking and wire erosion, the production of graphite electrodes, HSC milling, laser welding and the production of surfaces structures using 5-axis high-speed milling machines.

Thanks to our in-house toolmaking department, we are flexible, which enables us to change products and create variants promptly, but also to transfer tools with some necessary adaptation work.

INJECTION MOULDING PRODUCTION CONCEPT – THERMOPLASTICS SPECIALISTS

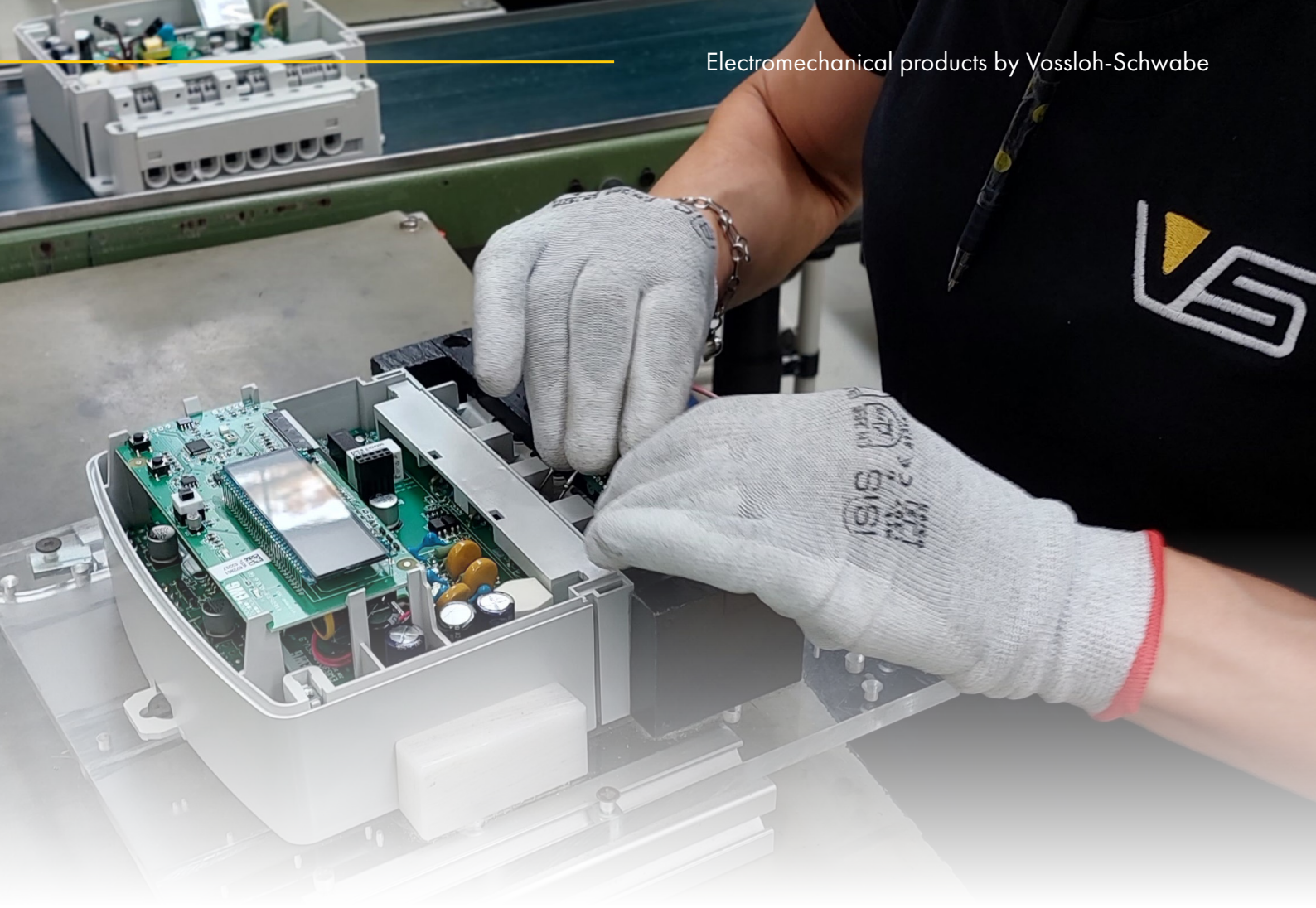
Experience with the behavior of very complex geometries out of different thermoplastic materials, length up to one meter and low tolerance requirements at same time is something that only a few manufacturers have and have really mastered in production.

In order to achieve the high quality needed, special tooling techniques and tempering are required that have nothing to do with the plastic production of former compact parts.

The quality and tolerance requirements are in the range of 0,1 mm and can only be realised with considerable expenditure on tools and production equipment.

VS offers you this experience through our specialists and our conviction that these requirements can only be met by manufacturing in Europe for Europe.

In addition, VS can also manufacture completely sealed products to achieve higher IP protection classes. For this purpose, we have tested special sealing materials and assembly methods that guarantee reliable and durable sealing of the product.



We offer:

- 24/7 production at our plant in Serbia
- 40 injection moulding machines with 35-500 tons clamping force
- Automatic removal and packaging
- Latest manufacturing and cooling processes for complex tools
- Changing variants by swapping inserts
- Single- and multi-component injection moulding
- Tool maintenance and toolmaking
- Assembly of several components or complete assemblies
- Quality control and batch tracking during production

"To produce complex thermoplastic parts, maximum precision is required. That is why our injection moulding production at VS takes place under controlled process conditions. We work with over 40 modern injection moulding machines in our production plant in Serbia, which specialises in complex plastic parts like optics or extreme long thermoplastic parts. We also have a modern toolmaking facility here, which supports injection moulding production and can make short-term adjustments and produce spare parts. This shortens the delivery time and guarantees the high quality of the products."

Bernd Helleberg – Project manager


2024

VALIDATION – GOAL ACHIEVED?

In addition to manufacturing and qualifying the tools, validation is also essential. It ensures that the products can always be produced to a high quality, which in turn paves the way for a successful end product.

By integrating a risk management process into product development, critical product criteria can be identified at an early stage. These are then analysed and evaluated with the help of suitable product and process validations.

The aim here is to achieve the required functions and the tolerance specifications for the parts, which are essential prerequisites for the product's mechanical and electrical properties.

Performance measurements

Measurements show the result and performance of the design and production process. VS offers extensive measurement techniques for the assessment and measurement of mechanics and electrical functions. In addition to classic disciplines such mechanical and electrical tests according to the EN or UL standards, lifetime tests of the electronic parts could be done in our laboratories.

We could do optical measurements integrating sphere and perform thermal measurements with IR-cameras and thermocouples in heat chambers. Qualification can be done in TCT, THB, HAST, OLT, HTOLT, LTOLT chambers to evaluate reliability of electronic components.

For electromechanical products in particular, our equipment offers precise assessment and verification for reverse engineering. This involves reversing the development or production process, for example by recording and using the real geometies during initial sampling.

We offer:

- Electrical and optical measurement
- Thermal measurements of LED Modules
- Reliability tests of circuit boards in different chambers

QUALITY MANAGEMENT – CERTIFIED SYSTEMS AND LOCATIONS FOR YOUR PRODUCT

Development and simulation

Products for lighting technology are subject to diverse and stringent requirements. The goal of producing only high-quality and safe products is in our DNA. We guarantee this quality promise through our certified quality management system (QMS) in accordance with DIN EN ISO 9001.

All production locations are certified to ISO 9001. Environmental management at all production locations has also been certified to ISO 14001 since 2005. All quality-relevant processes are subject to permanent monitoring and are managed using defined key figures.

During the entire production process, all products are checked for compliance with Vossloh-Schwabe's high quality standards. To maintain this standard, employees are constantly trained internally and externally.

Quality assurance agreement

The quality of the goods and processes supplied by a supplier to VS is assured by a quality assurance agreement (QAA). The framework conditions for achieving the desired quality targets are determined by agreements with each supplier, which means that deviations of the end product from the standards specified by VS are ruled out at an early stage.

We offer:

- Management according to ISO 9001, ISO 14001
- Digital solutions for quality management and quality assurance
- Qualification of production locations, tools, systems and suppliers
- Validation of manufacturing processes

CONSULTING AND REALISATION – WE OFFER SYSTEM SOLUTIONS

Technical consulting

VS has extensive experience when it comes to the technical requirements of lighting technology. Based on the requirements of your application, we can define a complete system comprising electromechanical products optics, module and driver for you and thus make an initial assessment of which technical solution will deliver the most efficient and best results. Once the system has been created, the next step is the detailed design and coordination of the individual components and the integration of the components into your product ideas. We see ourselves as a system supplier who shares the responsibility of development with you.

Feasibility studies

Realising complex assembly units requires detailed prior consideration of the technical requirements and the production process. The mechanical mounting and the precise alignment of the system with the customer interfaces of the final product are another point that needs to be considered. New screwless, quick-to-assemble joining techniques are increasingly being demanded as a challenge for the circular economy. The plastic-compatible design of the component and the economical manufacture in the production process are considered just as much as the selection of the right material. Not to be forgotten is the planning of the right tool concept during the feasibility analysis in order to achieve the best possible relationship between tool costs, manufacturing costs and also the quality of the end product.

Sustainability requirements

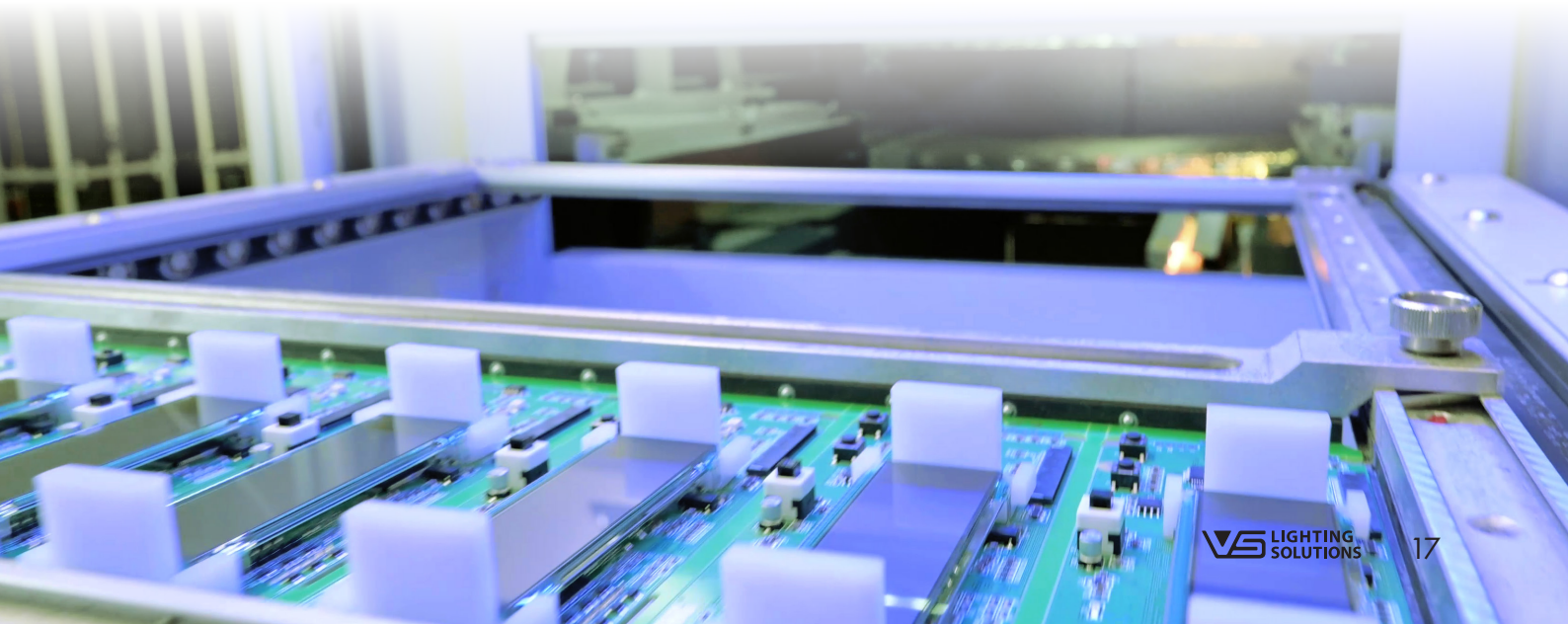
The requirement to produce the luminaire components sustainably in Europe and to dismantle them again at the end of their service life, separate them according to material and reuse or recycle them is an increasingly important requirement that can only be met by designing the electromechanical product accordingly and planning the recycling processes. In addition, the use of recycled materials or the use of plastic materials made from renewable raw materials is becoming increasingly important. VS has extensive experience in this area, which we would be happy to integrate into your project.

Regulatory Support - we know the regulations

When it comes to the certification processes for components or luminaires, we have many years of experience thanks to in-house testing in our VDE-certified laboratories for components. As the components must always be tested in conjunction with the relevant regulations, we can also advise you on this point and, if required, also offer individual tests of luminaires in our laboratories or support you in this regard.

All In - From one source in Europe

In addition to development, our production facilities also enable us to assemble VS components into prefabricated modules, test end products in accordance with regulations and finally package them. We offer you the opportunity to focus less on the procurement of components and production of assemblies and their logistics and instead concentrate entirely on your customers and markets. On request, we can offer you this service on a project-specific basis right from the planning stage of the final product, using our extensive capacities and cost-effective options in our production plants and logistics centers in Europe.



LIGHTING SOLUTIONS

WE THINK LIGHT FOR YOU

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Electromechanical products EN 10/2024