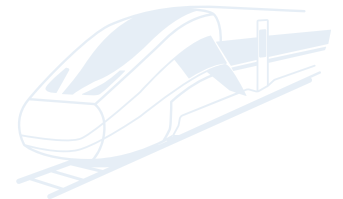
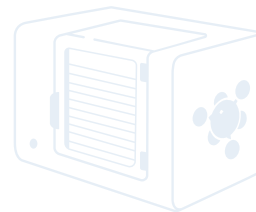
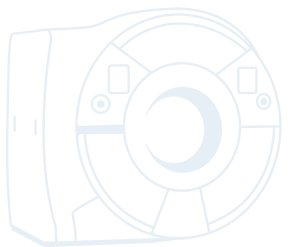




# HOMBACH

We perform different

Innovative and high quality casing / cover solutions







Customer satisfaction   Passion   Cost effectiveness   Quality   Flexibility   Know-How   Innovation

# Hombach – We perform different

## ONE STOP EXPERTISE

Ernst Hombach GmbH & Co. KG is a one stop solution provider for innovative and high-quality cladding and special solutions from plastic.

We support our customers from the early design phase through all development and production steps and also offer maintenance and support services, which far exceed industry expectations.

### We perform different

Thanks to European twin-sheet technology, which was developed by Hombach over 30 years ago, we are able to replace conventional manufacturing methods and also to create products that would not exist without twin-sheet.

Our customers include global market leaders on all continents and in virtually all industries.



Timo Tobolla (CEO), Dieter Schlager (Head of Development), Friedrich Frömmel (COO)



# Our philosophy

## CUSTOMER SATISFACTION & INNOVATION “MADE IN GERMANY”

As a medium-sized family business with over 75 years of tradition, we place customer satisfaction at the heart of our company philosophy.

Our customers discover this as soon as they make an enquiry, through contact with our expert

and highly dedicated partners, who develop innovative and high-quality yet cost-effective solutions that are “Made in Germany”.

Our twin-sheet method also offers unique possibilities in terms of implementation.

*“Through our particular enthusiasm for our technology, our customers’ products and our ambition, we can achieve something extraordinary and unique. Our passion for innovation and our love of detail are reflected in our company slogan – we perform different.”*

*(Timo Tobolla)*





# Quality

## WE PERFORM DIFFERENT

The quality of consulting services and development processes as well as product quality are key factors when it comes to customer satisfaction.

Our commitment to quality begins with product design and development and permeates all aspects of the value chain.

Hombach has been certified to DIN ISO 9001 since 1994. All specifications and processes are recorded using the latest IT systems. These systems support us both in our daily quality control tasks and with advanced product quality planning (APQP such as FMEAs or QM plans).

In addition, and not only for our railway transportation customers, we are certified to DIN 6701-2 (adhesive bonding of railway vehicles and parts).



*“Our passion for outstanding product quality is also reflected by our long-standing relationships with customers, suppliers and service providers.”*

*(Timo Tobolla)*





# Company & environment



By concentrating all of our development and production steps in one location, we can react flexibly and quickly to requests and modifications while maintaining our high quality standards.

Committed employees are essential, together with modern manufacturing technology and compliance with all occupational safety and environmental standards.

Hombach invests continuously in the latest machine and plant technology, and therefore has one of the most cutting-edge and comprehensive machine parks in the industry. This ensures not only the best possible quality standards, but also committed employees, efficient working practices and a high level of cost efficiency.

## **We perform different**

Our investments extend far beyond the norm. We take our environmental and commercial responsibilities seriously.

A PV system connected to modern battery storage systems already covers more than 1/3 of our power supply needs and also charges our fleet of electric cars for the Sales team.

More than 90% of our plastic waste is recycled; much of it for high-quality components right here in the company.

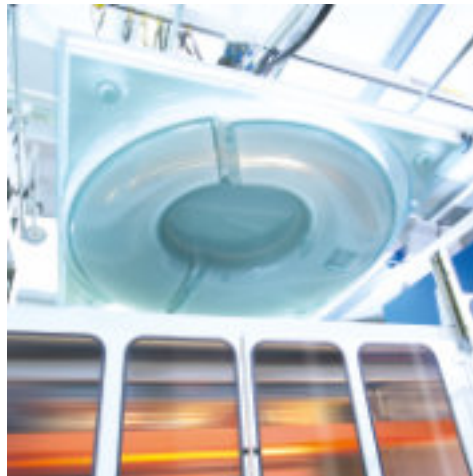
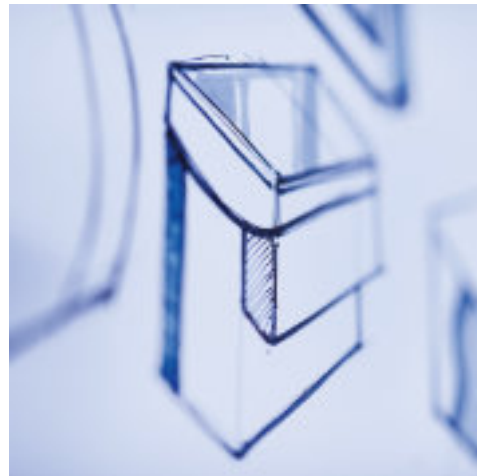
Cutting-edge plants and machines ensure that operations use resources as efficiently as possible.





# Range of services

-   
DESIGN
-   
CONSTRUCTION
-   
PROTOTYPING
-   
THERMOFORMING
-   
TWIN-SHEET
-   
CNC MILLING
-   
BONDING/JOINING
-   
FINISHING
-   
COMPLETE ASSEMBLY
-   
LOGISTICS
-   
PARTNER NETWORK



# Design shows quality

## DESIGN FROM THE OUTSET

The high-quality design of capital goods is no longer a secondary consideration. The performance of machines and devices and the quality that can be achieved are better appreciated if the external design reflects the performance. This is true not only at trade shows and other sales events, but also in daily use at the customer's plant: a modern design will inspire confidence in the performance, durability and quality

of the machine. In addition, high-quality design of course also guarantees ergonomic and easy operation.

Hombach therefore employs experienced product designers/industrial designers, who can effectively bring together the designer commissioned by the customer, the customer, and the technical implementation.

*"... this enables us to bring together the needs of the designer AND the technical implementation in terms of quality, technology and economic efficiency."*

*(Timo Tobolla)*



DESIGN



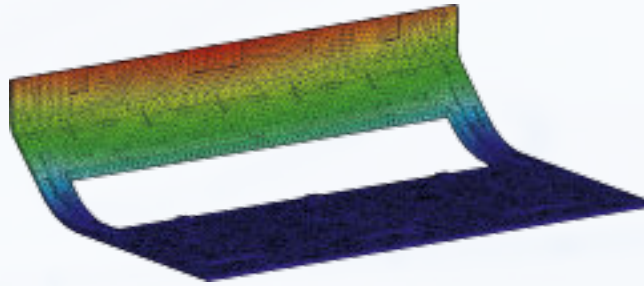
# Development/construction

## FOCUS, PASSION, EXPERTISE

The actual construction of the desired design while taking into account all the requirements of the specification is completed in close consultation with our customers.

Development does not aim to simply utilize in-house methods; instead the most appropriate technology is considered for each part in terms of the best possible quality, economic efficiency and technical implementation.

All constructions are performed using cutting-edge CAD systems. This ensures problem-free data exchange even for demanding and wide-ranging constructions.



Throughout all development steps, our customers are supported by an experienced Project Manager and progress is monitored and agreed.

Ongoing staff training in manufacturing technologies and materials enables us to provide professional advice and development that keeps pace with and often even exceeds current standards. Our hugely innovative and passionate workforce pave the way for unique high-quality solutions.

### **We perform different**

Our services don't end when a product is ready for mass production. Efficient packaging and transport solutions, interactive assembly/service guides and ongoing product improvements are also part of our range of services.



CONSTRUCTION



# Material and industries

## INDIVIDUAL REQUIREMENTS

Individual customer, industry and product requirements call for a high degree of flexibility and freedom in material selection.

Our manufacturing processes can make use of virtually the entire range of thermoplastic materials.

We operate using the thermo-sheet and twin-sheet method, processing materials such as ABS, PC, PET, PMMA, PS, PP, PE, PPSU, PEI, PVC in the field of chipping as well as polyamide, POM, PTFE and also - through our partner network - duroplasts such as epoxy and plemol resin, PUR systems and all common metals.

From this wide selection of options, properties can be chosen that ideally match the requirements of each industry. For example we can meet:

Fire standards as per  
UL 94V-0  
EN 45545  
ECE R118  
FAR 25.853

Biocompatibility  
Anti-bacterial properties  
UV stability  
Chemical resistance  
Increased temperature resistance







# Prototyping

## CLOSE-TO-PRODUCTION QUALITY

**Short implementation times are our daily routine.** Regardless whether you need a sample, a functional model or even an initial small batch in close-to-production quality, we can provide these in a short time frame.

We use a wide range of methods (e.g. 3D printing, vacuum casting, CNC milled parts, prototype molds, etc.) that always specifically match the requirements of the prototype. This not only pro-

vides an initial impression of the product in its original size, but can also be used to prevent and check for pinch points or may be important for preproduction delivery, enabling a faster time-to-market.

**We perform different** Our current machine park and in-house finishing services enable us to create prototypes in a single piece of up to 3000 mm x 3000 mm in al-

most series quality. Larger models can be created on request in separate pieces (which may also be necessary for transport reasons).



# Toolmaking & CNC milling

Prototyping, toolmaking, jig making and gage making, as well as reworking for thermoform and twin-sheet parts are performed at Hombach on 5-axis CNC milling centers up to sizes of 3000 x 3000 x 1200 mm.

With ten 5-axis CNC milling centers and two 3-axis milling centers, we can meet our customer's demands for maximum precision. This is ensured by our expert team, who have over 30 years of experience in this field, and by the investments we have made in the latest CAD/CAM systems together with cutting-edge machines and controllers.

## **Toolmaking and jig making**

From prototypes, through small batch molds, bonding/assembly and CNC equipment to tempered aluminum molds, at Hombach all products are developed on cutting-edge CAD/CAM systems in order to achieve the required quality cost-effectively for parts.





We excel in both quality and form





# Thermoforming

## COST-EFFECTIVE IN LARGE DIMENSIONS

### Quick and cost-effective implementation even without painting

Hombach has been producing parts using the thermoforming process (also known as vacuum forming) for over 50 years. We currently have a machine park of 10 thermoforming systems (6 of which can also be used for twin-sheet processing) with maximum forming area of 3000 mm x 2500 mm at a max. deep drawing height of 900 mm. We specialize in high-quality parts in small and medium quantities, where these can be either palm-sized or large-format parts with an area of over 7m<sup>2</sup>.



### What is thermoforming or vacuum forming?

In thermoforming, unlike many other processes only one mold (or half a mold) is required for production. This is one of several factors which means that high-quality parts (similar quality to injection molding) can be made at comparably low mold costs.



### Raw material

The raw material (semi-finished product) used is a thermoplastic plastic sheet (fixed in a machine frame), which is warmed using heaters until it reaches a pliable state. In this state, a mold is applied to the material and a vacuum is created between the material and the mold (vacuum forming). Thanks to the mold and external cooling, the material sets and retains the form even when the mold is removed.



# Twin Sheet

## TWIN-SHEET PROCESS

Twin-sheet thermoforming is a unique process that offers the advantages of thermoforming while eliminating its disadvantages.

### European twin-sheet process

The European twin-sheet process was invented by Hombach at the end of the 1980s and developed into an innovative technology. The twin-sheet process offers extensive technological possibilities and excellent flexibility.



In addition to our 50 years of experience in thermoforming, we have over 30 years of expert knowledge in the field of twin-sheet thermoforming. Our many years of sustained functionality, professionalism and quality are the result of sophisticated technology and comprehensive development work within the company.

Productive and energy-saving twin-sheet technology offers the customer a wide range of options.

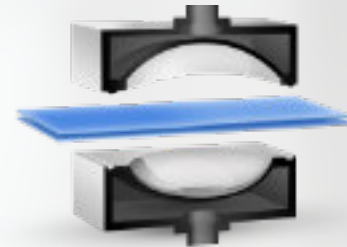


  
THERMOFORMING

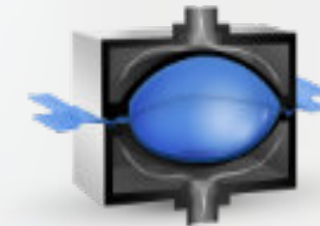
  
TWIN-SHEET



# Twin-sheet in detail



1. Phase: Heating



2. Phase: Forming



3. Phase: Cooling down and deforming

While in thermoforming one sheet is heated and then formed, in the twin-sheet process this happens with two sheets either one after another (American twin-sheet version) or simultaneously (European or Hombach version = simultaneous twin-sheet).

This leads to the creation either of hollow parts, which are similar to a tank (with two negative molds) or products similar to a panel/housing, where one half of the mold is negative and the other half is positive, i.e. following the shape of the first sheet.

Although twin-sheet is effectively an improvement on the thermoforming process, they are not generally competing processes. Instead, the twin-sheet process often replaces other technologies such as GRP/RTM parts, sheet metal cladding, SMC and PUR methods, etc.

## Many reasons, depending on the part:

- Excellent stiffness at low weight
- Greater design freedom with high precision
- Almost all thermoplastic materials can be used
- Use of recycling material for technical parts (no downcycling)
- High recyclability of parts after use
- Integration of hidden fixing solutions
- Outer and inner shell can feature quite different geometries and functions, both of which are fully dimensionally stable
- Visible parts do not require painting
- Wide selection of materials
- Fire protection classes  
UL94 V-0, EN45545HL2/3 R1, ECE R118, FAR 25.853
- Parts dimensions up to  
3000 mm x 2500 mm x 900 mm
- Different material colors inside/outside



TWIN-SHEET



# Bonding and joining



## Secure connections, not only in railway transportation

Many years of experience in joining processes and cutting-edge technologies and systems ensure high-quality, lasting connections between different materials.

During development and design, we focus both on durability and on maximum recyclability.

For bonding, Hombach is certified to DIN 6701-2A2. In addition, a wide range of other joining technologies are available:

- Bonding
- Riveting
- Ultrasonic welding
- Hot wire welding

Or the direct integration of fixing solutions in the twin-sheet process, which ensures maximum recyclability.



BONDING/JOINING



# Finishing

Finishing ensures high-quality design combined with functionality.

Hombach is a specialist in high-quality industrial coatings for both plastics and metals using the wet method.

Cutting-edge coating systems and our processing expertise create high-quality design surfaces and haptics, as well as adding properties that are not offered by the base material:

- UV resistance, long-term color-fastness
- Scratch/abrasion resistance
- Anti-microbial properties
- ESD protection or electrical conductivity
- Biocompatibility
- Lighting effects without LEDs
- Resistance to (chemical) cleaning agents

Modern spray booths and robots provide efficient and high-quality coating of an area up to 10m<sup>2</sup>.

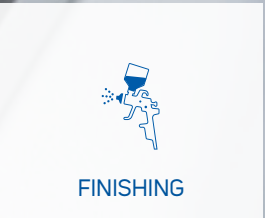
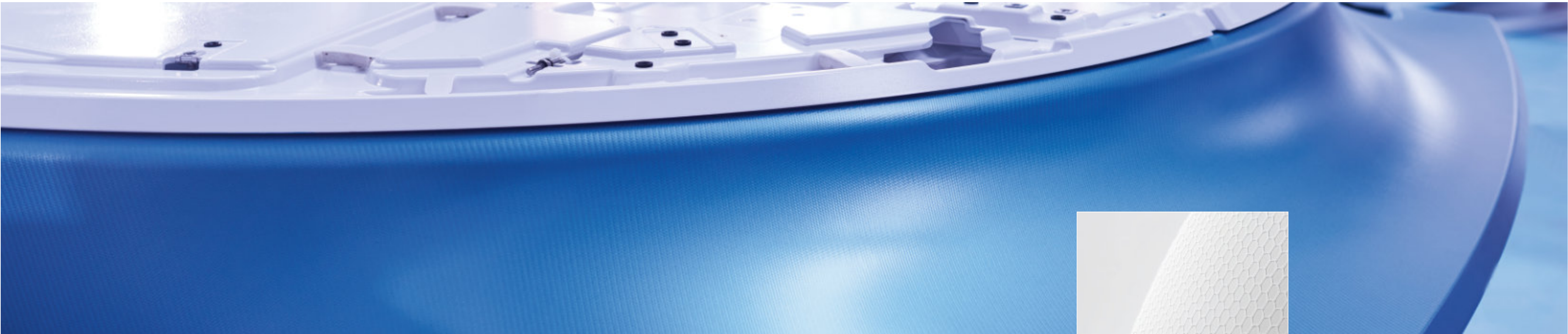
We also offer other finishing options such as:

- Screen printing
- Pad printing
- Metallic coatings
- Laminations, films



FINISHING







# Component assembly

## Complete components instead of just parts

The assembly of complex parts is another service that we offer as a one stop solution provider. We also offer our customers a wide range of logistics concepts, which enable us to meet individual customer requirements quickly and precisely.

In component assembly, both simple and complex components are assembled professionally. ESD-compliant assembly is performed in specially designed areas. We are able to implement processes that are individually tailored to the

product and the customer. This includes for example the creation of mechanical and electronic test equipment for carrying out 100% final testing.

Depending on customer requirements, either the customer can provide the components or we can take over the entire procurement process, be it for metal, electronic, plastic or other components and whether local or global procurement is involved either with specified suppliers or suppliers selected by us.



COMPLETE ASSEMBLY

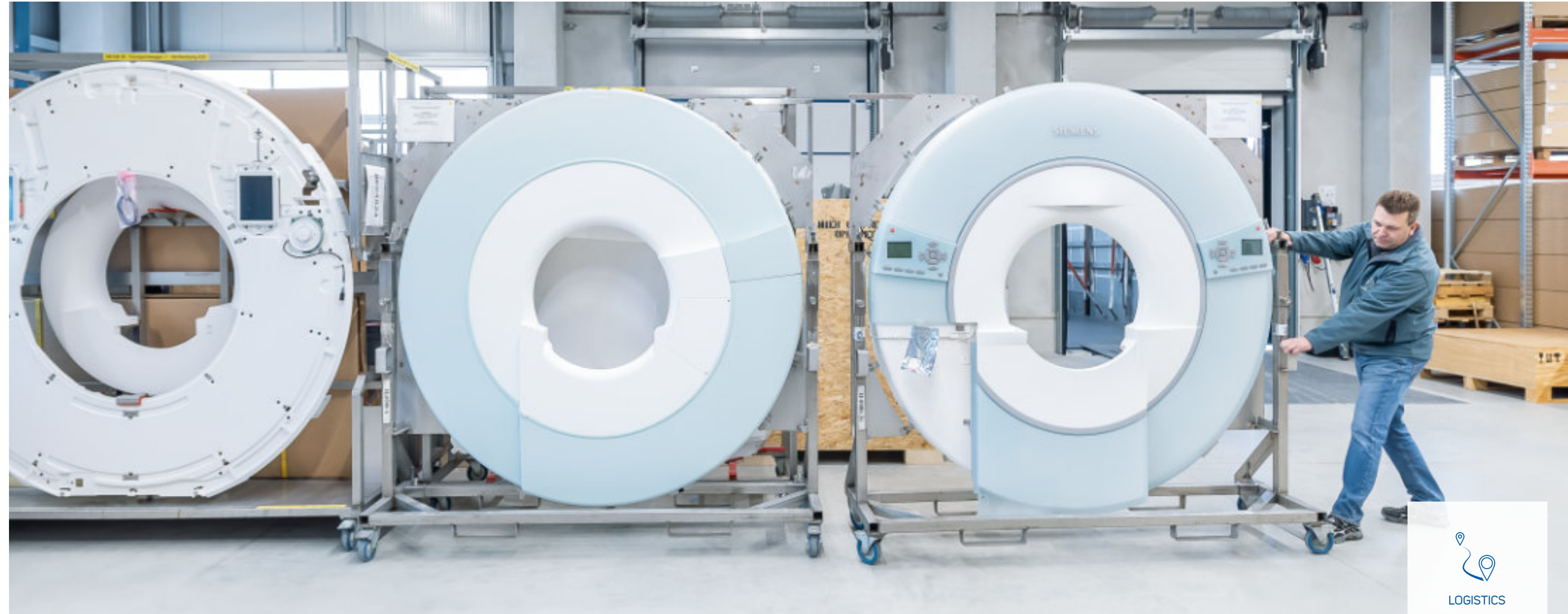


# Logistics & packaging

## We perform different

We develop and produce customized and environmentally friendly packaging solutions using cutting-edge machine technologies directly in our factory, starting from a batch size of just one.

We can also offer our customers this same level of flexibility in logistics. Customer-specific delivery concepts such as "just-in-time" delivery are part of our standard services and are tailored entirely to customer requirements.





# Partner networks

Hombach is a complete solution provider:  
We offer one stop solutions

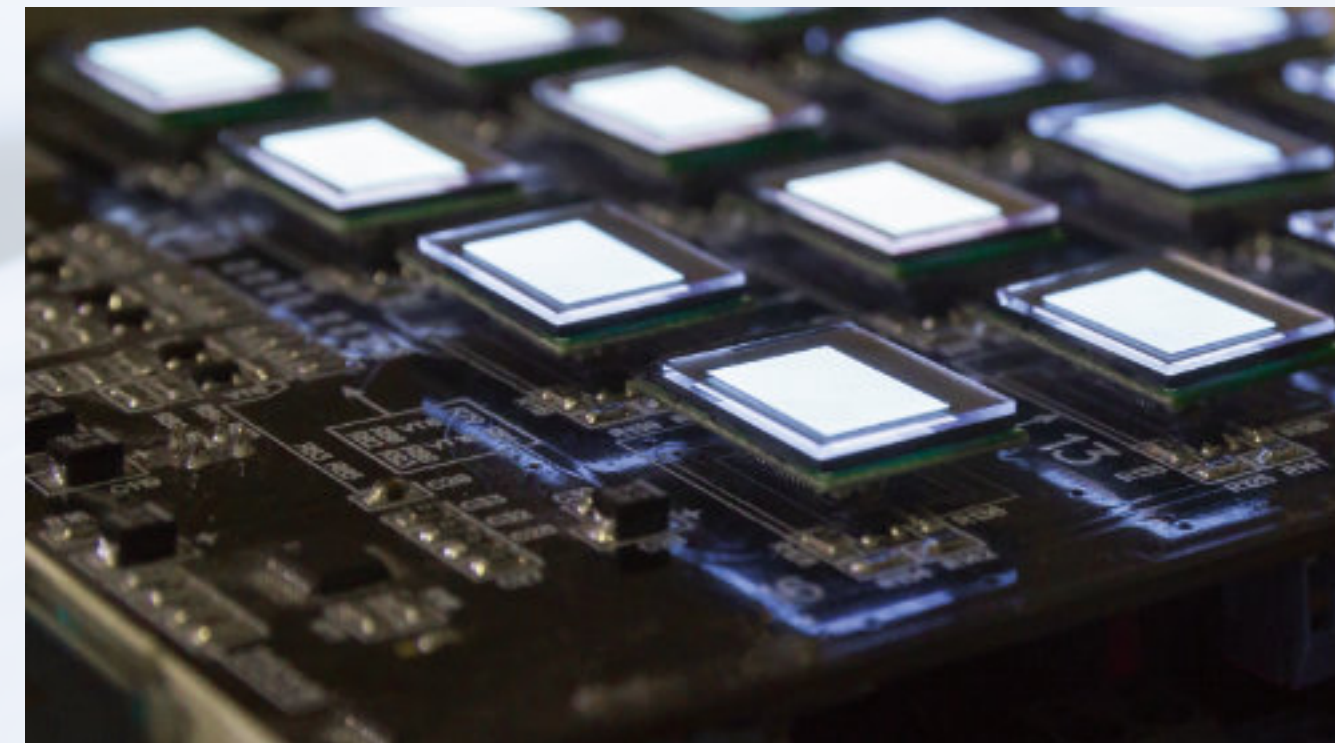
Hombach provides complete, one stop solutions that are state-of-the-art in terms of quality, technology and cost-efficiency – We perform different.

In order to offer the full potential of the market, Hombach considers virtually all materials and manufacturing technologies available on the market from the very start of the project. Customers can therefore request a complete one stop solution from us, if required.

Hombach has built up an extensive partner network of specialists for every technology.

Starting with the local area, this extends to include partners from all around the world, with the aim of achieving optimum performance. This includes, for example, specialists from the fields of:

- Injection molding/SFI
- GRP/RTM
- SMC
- PUR/hard/flexible foam systems
- Sheet/bend laser processing
- Turning and milling
- Coating
- Sealing
- Electronics
- Lighting/LEDs
- Soundproofing and insulation materials



PARTNER NETWORK



# We perform different

With individual lighting solutions, design effects or innovations that support efficiency, weight reductions or new product types, every day we embrace new ideas, requests and demands from our customers and use them to develop products that are more than “just” cladding.

Hombach offers complete solutions that combine expertise, passion and technology, helping our customers to convert innovative ideas into unique products.

**We perform different.**



High-end lighting solutions / LED effects



Multi-color screen printing



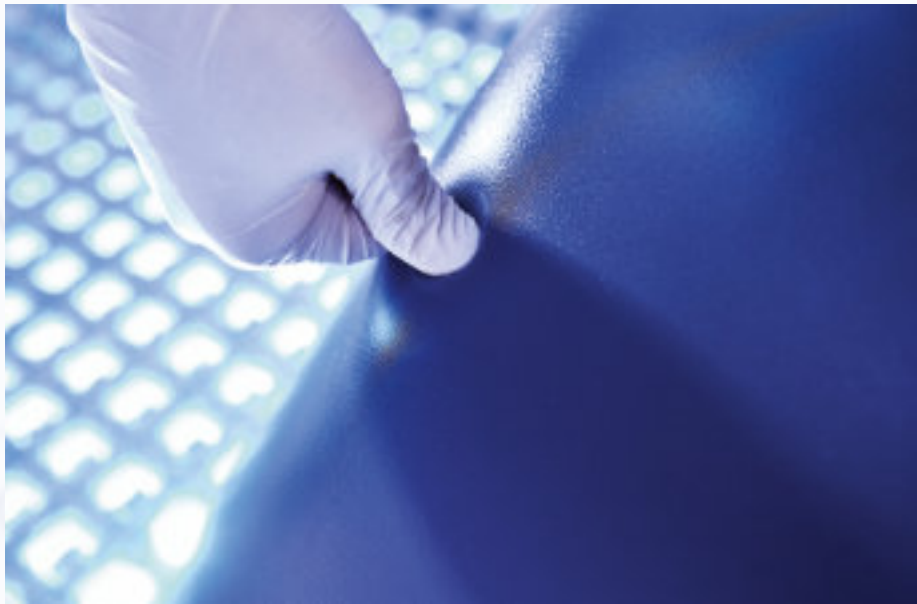
Foam air ducts



Translucent special material developments (frost-look)



Foil heat exchangers



Hard/flexible combination incl. sensors









# HOMBACH

We perform different

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