PRODUCTS AND CONCEPTS FOR RAILWAY VEHICLES

Ideas taking shape – worldwide.
CONTENTS

You know about us. 4
Tradition, quality, innovation 6
Gangway systems for railway vehicles 8
• Trams 10
• Metros, subways & suburban railways 14
• Mainline railways 18
Quick-change window systems 22
Rubber systems 24
Polyurethane interiors 26
Polyurethane exteriors 28
Ramps & lifts 30
Service portfolio 32
Contact 34
YOU KNOW ABOUT US.

Our successful collaboration over many years speaks for itself. The HÜBNER name is synonymous with continuously evolving technology. Every time you ride a tram or train, change rail compartments, or look out of the window, you will encounter HÜBNER products worldwide.

Quality to meet the highest standards

For decades, HÜBNER transport technology products have been the first choice internationally. Our products prove themselves as consistently reliable throughout the world.

Our strong customer orientation is exemplified by the products we produce, which consistently meet or surpass expectations for uniformity, durability and precision. Our latest new developments such as rolling side walls for gangways, intercar barrier, the combi-bridge and the aerodynamic fairing systems are also the result of our know-how and dedication. We will make your ideas ready for series production.

A family enterprise with values

In 1946 Kurt Hübner laid the foundation for today’s international HÜBNER Group with his rubber product repair business. Ever since, a spirit of invention and creativity have characterised our enterprise. Throughout the world over 2,100 highly qualified HÜBNER employees conquer challenges day after day with an impressive array of solutions.

HÜBNER satisfies customer requirements with efficiency and ingenuity. Our employees work closely together with our customers to develop innovative solutions. This cooperative relationship is the key ingredient to our success and the foundation on which this family enterprise stands. You can rely on HÜBNER. That’s a promise.

Global knowledge with local presence

HÜBNER offers the advantage of wide-ranging synergies. These synergies have been developed by our experiences in many different countries and environments resulting in a broad spectrum of products. Customers trust our knowledge and feel confident about leaving their concerns and demands in the hands of our engineers.

In addition to our headquarters in Kassel, HÜBNER has subsidiaries in Brazil, China, France, Hungary, India, Italy, Malaysia, Russia, South Africa, Sweden, UK and the USA. These subsidiaries are supported by sales partners and commercial representatives in over 30 countries.
TRADITION
QUALITY
INNOVATION

HÜBNER products for railway vehicles stand out with their safety, high-quality workmanship, extraordinary comfort and durability.

Precision & consistency
HÜBNER delivers customers tailor-made solutions for rail components, complete systems and entire series. You will realize significant value from our project management, development and production expertise, which has been acquired through many years of experience. Our uniform worldwide production standards guarantee that product quality achieves a consistently high level.

Safety & functionality
HÜBNER products comply with all prevailing international standards and requirements, and frequently far exceed the required level of compliance. And this includes the requirements for materials and components in rail vehicles as specified in the EN 45545 standard. Numerous certifications attest to the high standards of our products.

Research & development
As part of HÜBNER’s tradition, we are continuously rethinking and devising new ways to improve our products through research and development. HÜBNER’s research and development departments are constantly inventing and testing innovations to material in order to improve fire safety and optimise the sustainability of our vehicle articulation systems. It is our objective to develop environmentally friendly systems for universal applications.

The attractiveness of a vehicle is an important recognition factor for many transport businesses. With HÜBNER, you can leave the monochrome world behind by integrating your gangway into the overall design of the vehicle to achieve a striking appearance. The latest trend is the use of novel, translucent bellows materials that allow daylight to penetrate the gangways between carriages, thus creating a new and welcoming sense of space.

Ideas that shape the industry.
Developments pioneered by HÜBNER are today proven products for railway vehicles:

- Folding bellows made of rubber-coated fabric
- Corrugated bellows for extensive lateral movement
- Sound- and heat-insulating double-corrugated bellows
- Quick release coupling systems
- Folding and corrugated bellows made of highly fire-retardant fabric
- Linking bridges for passenger safety and comfort
- Flexible, interior side walls
- Rolling side walls
- Coloured motif bellows
- Fairing systems to improve aerodynamics
- Intercar barrier
- Quick-change window systems
- Rubber systems
- PUR front bumpers
- Ramps
GANGWAY SYSTEMS FOR RAILWAY VEHICLES

HÜBNER develops gangway systems for railway vehicles operating on tramways, metros, subways, suburban and mainline railways for regional, long-distance and high-speed transportation.

In all fields, the gangways must be able to withstand severe stresses and satisfy the highest safety and comfort standards. With HÜBNER you can rely on the best-possible fire retardancy, sound insulation and service life. We can furnish you with customised solutions ranging from individual passage widths to special designs.
A modern local transport system has to meet many requirements – agility around tight curves, safe and spacious such as aisles for passengers, effective sound insulation, and robust and reliable functionality.

GANGWAY SYSTEMS FOR TRAMS

Safety & comfort
Specifically designed to meet the requirements of trams, we develop and produce folding and corrugated bellows for every need. The bellows compensate for all extreme movements, such as around tight curves. This allows passengers comfortable, safe access to the individual sections of the carriage. Floor parts that are simple to remove permit easy access to the vehicle’s articulation system for maintenance purposes.

Shape & colours
Our special head covering fits in seamlessly with the lines of the tram. The closure of the tram’s lateral contours significantly improves the overall appearance of the vehicle. Meet your desired tram design and appearance with HÜBNER’s designer folding bellows. These bellows can match the shape and colour of your vehicle for a seamless look.
Gangways as complete systems

HÜBNER supplies you with either individual components or the whole gangway as a complete system. You will have only one contact for the whole system, so that we can reduce the error rate arising from technical and mechanical coordination processes to a minimum.

Components:
- Single or double articulation at the bottom
- Articulation with degree of pivoting, pitching and rolling freedom at the top
- Folding, corrugated or double-corrugated bellows
- Articulation floor with turntable and floor plate
- Portal frames made of aluminium profiles
- Energy guiding systems for power supply or roof drainage
- Air channels for good ventilation
- Flooring matches the vehicle
- Integrated lighting

Individual & innovative

HÜBNER articulation systems stand out due to their durability and high load-bearing capacity coupled with low weight. Our newly developed FX 1000 allows the transmission of a compressive or tensile force of 1000 kN at an effective weight of approx. 40 kg. Additional adapter designs permit us to tailor the system exactly to customer installation requirements.

This confirms our claim of launching innovative technical systems on the market.

To meet new technical demands, we are expanding our portfolio by soft-rolling articulation systems. These articulations can be delivered with preloaded springs if required.

In addition, our comprehensive range of products includes articulations of the type pivoting articulation with wishbone and pitching articulation with Panhard rod.

FX 1000 – the compact universal articulation for trams

The diversity of vehicle types used has previously required the articulation to be adapted individually to the respective vehicle. The new FX 1000 from HÜBNER offers more room for adaptability.

Hinge & pitching articulations – light & flexible

HÜBNER’s new generation of articulation systems for trams is attracting great interest due to its low weight and its capacity of bearing higher loads. The previous upper vehicle articulation, which provided excellent service over many years was constructed mainly of cast iron parts. A new design made of sheet metal elements offers weight reduction plus the advantages of customer supplied vehicle integration for flexible accommodation of different vehicle types and customer requirements.
HIGH-COMFORT GANGWAYS FOR METROS, SUBWAYS & SUBURBAN RAILWAYS

Wide passageways, enhanced sound insulation, fire-retardant safety and excellent protection against vandalism are the hallmarks of our high-comfort gangways for metros, subways and suburban railways. The flexible interior connections feature linking ceilings, side walls and linking bridges. The elastic inner lining compensates smoothly for every vehicle movement along its even, continuous surface.

Flexibility
We match our high-comfort gangways perfectly to every vehicle type. Safety and sound insulation are enhanced via a selection of surface configurations that best fit environmental conditions. These enhancements are integrated into our special gap covers for ceilings and bridges as well.

HÜBNER’s high-comfort gangways are available in one-piece or two-piece versions with single-corrugated or double-corrugated bellows depending on your requirements.

Design
Individually matched to your vehicle type, the gangway design may come as a complete gangway or as two gangway halves that couple together. We recommend two gangways halves when vehicles are frequently detached from a trainset. This allows for greater flexibility when carriages are bi-directional.

Coupling technology
The attachment of the vehicle gangways, which are made of welded or powder-coated aluminium profiles, comprise the screw-on frame to the vehicle and the coupling frame forming the locking unit. The centring system on the coupling frame facilitates easy and straightforward coupling, keeping downtime to a minimum.

Corrugated bellows
Dependant on your requirements, we can provide either an economical lightweight design featuring single-corrugated bellows or double-corrugated bellows for enhanced sound insulation. The same high-quality materials are used for either option. They feature the following special qualities:

- Fire retardancy
- Cold and heat resistance
- UV resistance
- High tensile strength and abrasion resistance

Our mission is to deliver top quality and maximum durability. The selection of different bellows material thicknesses and coordinated designs means we can satisfy every individual sound and heat insulation requirement.

Floor connection systems
HÜBNER linking bridge absorbs all carriage movements, thus allowing passengers to walk safely and comfortably through the gangways. In addition to gap- and step-free movement compensation, the newly developed combi-bridge also provides a simplified interface and thus fits exactly between the vehicle’s front walls. It is also self-supporting and barrier-free (TSI PRM).

The special coatings and low-wear sliding materials used for bridge plates ensure a long service life.
Flexible & rolling side walls

In the 1990s, HÜBNER introduced a unique system of flexible side walls for gangways to the market. These side walls continue to provide a flexible connection between carriages increasing the available comfort zone in the gangways. The walls cover the bellows providing a noise-absorption effect and completely avoiding any exposure of moving edges in the train interior. In addition to these benefits, the highly vandalism-resistant interior lining is readily adaptable to nearly every vehicle type. The flexible side wall arches and extends to accommodate vehicle movements.

Flexible side wall – folding bellows with interior lining

The interior lining - consisting of linking ceiling, side walls and linking bridge/bridge plate – ensures a flexible connection between the cars and provides additional space for greater passenger comfort.

Besides functional requirements, the interior lining – which is to a large extent vandalism-proof – can be matched to the interior of a wide variety of vehicles thanks to our large selection of surface designs. Flexible side walls cover the corrugated bellows and are so adaptable that they automatically adjust to every travelling motion of the vehicles. Moving edges in the vehicle interior are completely avoided.

In addition, the interior lining of the high-comfort gangway enhances the sound insulation.

Rolling side wall – flat surfaces & lots of space in the gangway

With the new enhancement of the inner lining it is now possible to maintain all the advantages of the flexible side wall and at the same time to eliminate the arcing in the gangway through the new rolling functionality. This provides an entirely flat surface in the high-comfort gangway area.

The new rolling side wall allows the full clear passage area of the gangway to be maintained providing more space with lower weight. The rolling model allows for individual colour selection, the possibility of varnishing or the application of a decorative foil.
GANGWAYS FOR MAINLINE TRAINS

Our passenger gangways for mainline trains meet the highest standards for use in local, regional and long-distance travel. Thanks to their convenient, sophisticated design and the precise selection of materials produced in-house, all these gangways offer an extraordinary long service life, with low-maintenance and feature every attribute necessary to allow passengers comfortable and safe passage.

Flexibility

- Design: one- or two-piece
- Corrugated bellows: single- or double-corrugated bellows
- Floor connection systems: linking bridge, combi-bridge or bridge plate

Gangways for high-speed trains

Thanks to their high degree of pressure stiffness, flexibility and fireproofing, HÜBNER double-corrugated bellows for high-speed trains are capable of withstanding extreme mechanical loads and stresses. Our bellows are subjected to extensive in-house labora-tory and rig testing. These comprehensive tests have been developed for the most demanding conditions to guarantee perfor-mance and satisfaction of all requirements for every vehicle type.

Gangways for multiple unit & commuter trains

HÜBNER’s gangways provide the perfect fit for multiple unit and commuter trains. Our flexible systems blend harmoniously with the vehicle’s contours while simultaneously improving sound insulation and safety. Even the use in tilting trains with larger roll angles presents no problems for our linking bridges.

Front-end gangways

HÜBNER’s front-end gangways fit to the driver’s cab. Their functional design allows trains to be combined and extended easily, while still delivering a safe and pleasant passage. This is our answer to variations in ridership.

Special-purpose gangways

Explore the innovative imaginations of our engineers: if you have a unique concept with specific requirements, we will be glad to design a solution precisely tailored to your needs.

Double-decker car carrier trains

As an innovative leader of special purpose gangways, HÜBNER has engineered a lifting roof solution to meet the demands of dou-ble-decker car carrier trains. This solution enables the roof area of bellows to be raised so that vehicles can be loaded. After loading, the roof lowers back into position in alignment with the vehicle’s contours. Since 1994, the corrugated bellows are serving the cross-Channel trains between Great Britain and France. With a width of 4 m and a height of 5.3 m, this is the largest gangway in the world.

UIC-compatible gangway

HÜBNER’s UIC-561 compatible gangway meets the require-ments of the International Union of Railways (UIC) for passen-ger coaches. Along with the corrugated bellows, rubber spring elements compensate for the misalignment between cars. When coupled with the same type, the gangway provides a pressure-proof seal that protects the interior from the environment. This provides yet another example of the HÜBNER international standard for comfort and safety.
Efficiency in mobility – aerodynamic fairing systems

New development from the HÜBNER Group: trains can now reduce consumption on the track thanks to the new fairing systems. These systems provide a covering which is flush to the vehicle contour and completely encloses the gangway area.

From the wind tunnel onto the track

With the new generation of bellows, HÜBNER is setting the standard for energy saving, meeting the most demanding of requirements in terms of both ecology and economy. Extensive aerodynamic tests in the wind tunnel and special pressure testing by renowned institutes as well as innovative test methods paved the way for this new development. The extremely flat design of the corrugated bellows ensure an extremely smooth and thus aerodynamic exterior shell.

Energy efficiency is the future

In future, energy efficiency will be even more closely related to high-speed travel because fairings allow energy and power savings of up to 10 % on high-speed trains.

In addition, the optimisation of aerodynamics is extremely important. These and other measures can be applied to regional trains and similar means of transport, securing the future of mobility from an energy-related point of view.

Intercar barrier

The intercar barrier from HÜBNER combines passenger safety with harmonious design.

The side cover of flexible folding partitions closes the gaps on both sides between the individual cars of the train and covers the coupling. Passengers are optimally protected against a fall when passing between train cars.
QUICK-CHANGE WINDOW SYSTEMS

Damage to windows through vandalism is on the rise. Scratched panes, broken glass or graffiti detract from the appearance of a vehicle both inside and out. HÜBNER’s quick-change window systems significantly reduce maintenance downtime and maximise the availability of your vehicles.

Enhanced profitability

Maintenance time in the workshop to replace windows causes annual losses that run into the millions. Quick-change window systems greatly reduce the downtime required for the repair of damaged bonded panes. This makes it possible to reduce maintenance costs and increase vehicle profitability.

Complete systems from a single source

From commuter to long-distance trains, HÜBNER provides a rapid replacement solution for damaged panes. HÜBNER provides complete system solutions for:

- Windscreens
- Hopper windows
- Fixed windows
- Sliding windows
- Driver side windows
- Destination display windows
- Door glazing
- Special-purpose applications

System benefits

HÜBNER’s quick-change window systems offer a range of great advantages:

- No lengthy stays in the workshop
- Significantly reduced cost per window replacement
- Increased vehicle availability
- Minimised life-cycle costs
- Attractive design
- Simple window replacement from outside the vehicle
- No need to remove interior fixtures and fittings
- No complex cutting of bonded seams
- Minimal replacement time per window
RUBBER SYSTEMS

Place your trust in nearly 70 years of experience in developing rubber products for rail systems. Whether simple or complex, our engineers will devise customised solutions to meet your individual requirements.

High-quality raw materials and superb craftsmanship provide the foundations for a long service life in railway applications.

Knowledge & experience

Our knowledge is founded in the company’s own in-house chemical technology research and development. Over 400 different formulae serve the specific needs of the railway vehicle industry. HÜBNER products comply with international fire standards and all other known safety requirements. From early stages, we use finite element analysis to simulate the loads exerted on profiles and moulds.

HÜBNER engineers a variety of rubber products to best fit your needs. Consistent with HÜBNER’s high standards, they all possess extraordinary levels of chemical and thermal resistance and provide outstanding mechanical stability.

Rubber profiles & frames

HÜBNER rubber profiles are produced using punched-out and cut-out sections, moulded-on parts, shape-moulded corners and pre-heated radial connections. They are used for:

- Windows: profile frames to accommodate window panes or hatch sealing
- Doors: single- or multi-component sealing including finger protection profiles with electrical connecting block and internally mounted portal frames
- Damping elements or elastic bearings to absorb harmful or irritating vibration

Moulded rubber parts

We design and manufacture moulded rubber products weighing from 10 g to 5,000 g for virtually all applications. Our manufacturing process is best geared for custom projects with small- to medium-sized lots.

Rubber-metal compounds

Whether using steel, aluminium, brass or other metals, our high-performance metal pre-treatment equipment guarantees the perfect combination of metal and rubber. These can be used for:

- Stoppers
- Rails
- Buffers
- Discs

▲ Finger protection profiles for doors

Moulded rubber parts

We design and manufacture moulded rubber products weighing from 10 g to 5,000 g for virtually all applications. Our manufacturing process is best geared for custom projects with small- to medium-sized lots.

Rubber-metal compounds

Whether using steel, aluminium, brass or other metals, our high-performance metal pre-treatment equipment guarantees the perfect combination of metal and rubber. These can be used for:

- Stoppers
- Rails
- Buffers
- Discs
POLYURETHANE INTERIORS

HÜBNER’s fire-resistant moulded polyurethane foam parts offer many advantages. They are pleasing to the touch, long-lasting, and elastic to ensure a high level of protection. Our durable and flexible designs are tailored perfectly to meet your requirements for interior components.

Interior

With our creative design approach, we have successfully developed interior parts that are both lightweight and impact-resistant. HÜBNER’s interior solutions for railway vehicles meet highest design and functional standards. Comparable with injection-moulded parts, they fulfill intricate and precise requirements with long-lasting durability.

Certified fire protection

Due to the increasing use of electronic devices, carpeting and furniture in railway vehicles, the risk for fire has grown substantially. To combat this risk, HÜBNER has taken the lead in developing fire-resistant polyurethane products. Our products meet, or surpass, all national and international fire safety requirements for any railway application and are in use around the world.

Individual solutions

On request, our engineers will devise moulded parts to your specifications. Their wide-ranging experience in the automotive and medical technology industries have contributed to the development of some unique design ideas in the railway industry.
POLYURETHANE EXTERIORS

As traffic levels increase, so too does the risk of accidents – particularly in the vicinity of tram stops and pedestrian crossings. HÜBNER offers safety elements that provide active passenger protection and brings many years of experience to bear in the development of new features and products. The various elements and complete systems combine the best of active passenger protection and modern vehicle design.

PUR front bumpers – active passenger protection

PUR front bumpers from HÜBNER provide dual benefits: They protect both the vehicle and pedestrians at the same time. Special PUR foam systems can significantly reduce injuries to persons as they absorb the energy of an impact. This has been proven using HIC testing procedures known from the automotive industry.

The HIC (Head Injury Criterion) value specifies the impact energy that a person is subject to on impact. Values up to 850 are associated with high chances of survival and minimal or even no injuries at all; values above 1,300 typically result in serious injuries. The new PUR front bumpers from HÜBNER have an impressive HIC value of 600 – in sharp contrast to traditional body paneling parts with values well over 1,300.

In addition, the material does not splinter on impact. Glass fiber reinforced materials on the other hand can result in severe injuries to pedestrians through flying splinters. PUR foam technology is thus far superior to traditional body paneling materials in this respect as well.

Economical modernisation

After many years of operation, trams are not so technically up to date. However, high-cost acquisition of new vehicles needn’t take place if the out-of-date features are more superficial and the vehicle is continuing to provide reliable service.

The economical alternative: HÜBNER has also developed new bumper elements and front aprons with pedestrian protection for older tram models. A pleasant side effect: the older tram vehicles shine with a fresh design, fulfill new technical standards and space is made for other technical enhancements, for example new headlight systems.
RAMPs & LIFTS

HÜBNER’s ramps and lift systems provide convenient and easy access to public transport vehicles for people with limited mobility. The manual ramps for trams from HÜBNER TRANSPORTATION GmbH meet the highest safety and quality standards in the industry.

HÜBNER TRANSPORTATION GmbH is committed to maintaining its position as an innovative leader by continuously developing new and improved electric ramps and lift systems for rail applications.

Freedom from barriers

HÜBNER delivers tailor-made solutions for almost every type of vehicle with shapes and colours to match your vehicle design perfectly. Our extensive experience with manual ramp systems for buses is now being applied to railway vehicles too.

The manual ramps are available in various sizes. They are highly impact- and scratch-resistant and can be integrated quickly and easily into any vehicle design. Our manual ramps are lightweight. Furthermore, our plastic ramps are also electrically insulating. For retrofitting vehicles we recommend our folding ramp, which can be stowed away on a wall fixture to save space.

Future & technology

As well as the tried-and-tested manual ramps already available for use on trams, HÜBNER TRANSPORTATION GmbH is expanding its product range to include new entry solutions for diverse rail applications.

<table>
<thead>
<tr>
<th>Light &amp; weight-bearing capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HK modular</strong></td>
</tr>
<tr>
<td>Weight of complete module: 28.5 kg</td>
</tr>
<tr>
<td>Weight-bearing capacity: 350 kg</td>
</tr>
<tr>
<td>Tread plate size: L ≥ 800 mm</td>
</tr>
</tbody>
</table>

| **HK light** |
| Weight of complete module: 12.5 kg |
| Weight-bearing capacity: 350 kg (with variations depending on model type) |
| Tread plate size: L 905/1105 mm × W 930 mm |

| **Folding ramp** |
| Weight of complete module: 11 kg |
| Weight-bearing capacity: 300 kg |
| L: 800 mm |

Retrofitting solution
SERVICE PORTFOLIO

Benefit from our broad spectrum of services for your railway vehicles. HÜBNER not only offers you first-class products but also guarantees safe, reliable operations for many years after your purchase.

Advice
From early engineering to the serial production stage, our staff will be there for you. Even after final delivery, our team will be glad to assist you with any issue, whether it is from the management of spare parts or from conducting repairs and individual training courses. Our goal is to achieve high levels of vehicle availability and reliability for many years to come.

Spare parts
Nothing is better than a brand new part. And never more so than with spare parts, which play a key role in the operation and safety of your vehicles. Our vast experiences in design, development and service are built into high quality products to ensure consistency in operation and utilisation.

Repairs
Whether it is on-site maintenance or workshop repairs, we offer value-added choices and solutions for your vehicle components. HÜBNER also provides product refurbishment services to update your technology to the latest standards.

Training
Trained personnel are important in order to be able to react swiftly and appropriately. Why not make use of our intensive, practically oriented training? The expertise that HÜBNER passes on will improve your employees’ product knowledge in a targeted fashion.

- HÜBNER training at our training centre in Kassel (for 5 or more participants)
- On-site training and exchanges of experience among operators

To find out more, visit www.hubner-service.com