

**Schletter -
Your partner
in traffic
engineering**



Traffic engineering Overview 2012

- Certified safety and quality
- Comprehensive range of services
- High production capacity
- Versatile manufacturing capability
- Short delivery times



SCHLETTER

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Traffic engineering at a glance



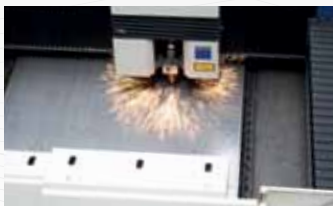
Safety & Quality

Critical to public transport: We provide high quality products and certified safety with short delivery times.



Range of Services

End-end-solutions from under one roof, from technical design engineering through to logistics.



Technology and Options

The extent of our experience and state-of-the-art machinery opens up a range of possibilities to meet your every demand - be it for a custom component or for an entire product series.



Product range

Aluminium, steel, stainless steel or carbon fibre. Tell us what you need - we can even extend our range to accommodate your requirements!

First class: Certified traffic engineering at cost-effective prices

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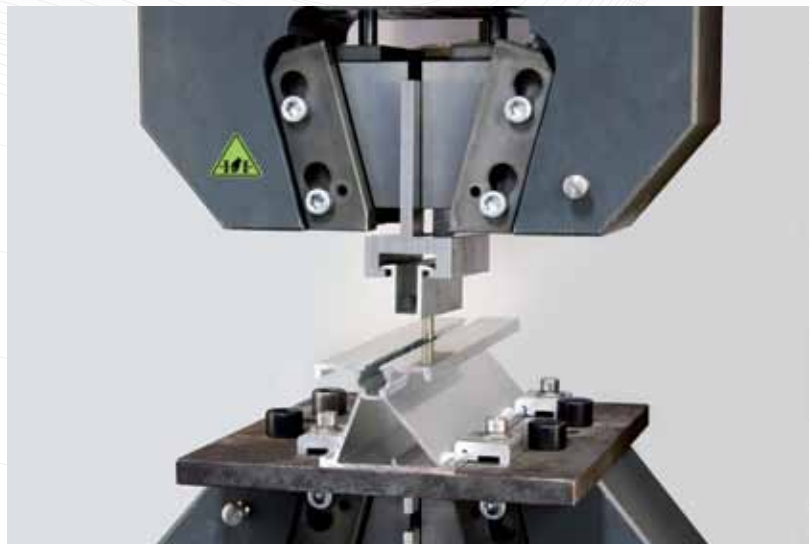
Systematic Versatility

Schletter – Your partner for end-to-end solutions
in the equipping of vehicles

First class: Certified traffic engineering at cost-effective prices

Safety and quality are as critical to public transport as the responsiveness and reliability of the respective partners. Schletter is one such partner. Equipped with a comprehensive line of state-of-the-art machinery we can manufacture precision products for our customers at cost-effective prices, from materials such as aluminium, steel and stainless steel. A seamless in-house production chain enables short delivery times and eliminates delays otherwise incurred by the outsourcing of certain stages of the manufacturing process.

Thanks to a high production capacity we can deliver quickly against an extensive volume of orders and to a certified level of quality and safety.





Selected examples of certification:

The welding of railed vehicles and vehicle parts in accordance with DIN EN 15085-2, Certification Level CL-1

Our extensive welding capability has gained us the highest in DIN 15085-2 defined grades of quality. With this accreditation, Schletter fulfils the prerequisites set by the German Federal Railway Organization.

Welding in accordance with DIN EN ISO 3834-2:2006

Having achieved the accreditation for the welding of railed vehicles and vehicle parts, we also work to a certified level of Quality Management in our welding contracts which is compliant with DIN EN ISO 3834-2 2006. This is a voluntary program and here too, Schletter has achieved the highest level of certification.



Powder coating of aluminium and steel in accordance with DB-TL 918340

The powder coating of aluminium and steel structures is undertaken in-house here at Schletter. The quality of coating fulfils the DB-TL 918340 criteria set by the Deutsche Bahn AG



Bonding in accordance with DIN 6701-2 Class A1

"Bonded connections for railed vehicles and vehicle parts with a higher level of safety requirements"? No problem! The bonding techniques deployed by Schletter comply with the maximum requirements as stipulated in DIN 6701.



Quality Management in accordance with DIN EN ISO 9001:2008

The needs of our customers continue to evolve. Through dialogue with customers, we strive to continually develop our own production- and work-procedures to enable us to respond to these needs on an ongoing basis. Our continuous improvement process has developed around this concept and has gained Schletter the ISO accreditation in Quality Management.

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One contact for all tasks: Our range of services

The competent dove-tailing of different tasks is critical in the production of vehicles. We therefore bring all of these together under one roof; From product design and technical engineering through to manufacturing, project management and logistics - at Schletter you have one contact for all tasks relating to the production of vehicle equipment. We can also undertake the planning and development if required. You benefit from clearly defined responsibilities and from the efficient coordination of sub-processes. With Schletter, you can be assured that the right hand always knows what the left is doing!

Technical design engineering

Our experienced and qualified design engineers take responsibility for the planning of your product. In order to meet your objectives as closely as possible, we are happy to support you in the development phase. Our scope of services includes the generation of technical drawings for assemblies, for single parts and for the production of complex components. As a matter of course, our employees in this department work to all relevant quality- and safety standards. State-of-the-art software allows us to process 2D- and 3D files in almost all common formats, e.g. STEP and IGES files.

Design

A good product serves a purpose. In close cooperation with our technical engineers our designers create products which combine aesthetics with functionality. Ultimately our innovations should look as good as they actually are. A pleasing texture and feel to the surface contributes as much to a successful product as do carefully considered ergonomics. We can, of course, provide you with a visual of your product prior to production. The product branding and graphics are generated in parallel.



Production



Logistics

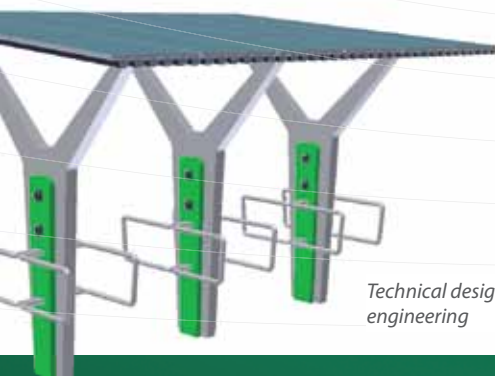
Production

Our production capability is as flexible as that of the technical design engineering. Precisely aligned workflows, motivated personnel and a well equipped production plant ensure a high level of productivity and an impressive manufacturing capacity. We extrude aluminium profiles, process the sheet metal and piping and add the final powder or liquid coating. In the final assembly we combine metal components with glass or acrylic glass inserts, wooden applications and electronics - all in house.

From Schletter you receive high-quality products in the required volume, delivered at the time you have requested. Our accreditation in Quality Management reflects this in accordance with DIN EN ISO 9001 2008. Environmental Management compliant with DIN EN ISO 14001:2004 and Energy Management in accordance with DIN EN ISO 50001 ensure ecologically compatible production.

Logistics

With a view to further improving product delivery times, we have constructed an in-house logistics center comprising 20,000m² surface area. Experienced staff retain an overview of all warehouse processes and ensure prompt delivery of shipments. Between 50 and 80 trucks are loaded each day and at peak times more than 100. On request we can also transport products by air, train or ship and we work in close cooperation with our partners to ensure the seamless preparation of products for customs clearance. Our automated warehouse contains around 8,700 storage bays for pallets, 6,700 for small parts and 6,500 cassette storage compartments. And, as we are aware that there is no time to be wasted at Goods In at your end, we pack our products ready for assembly. On request, we can transport your products in special, re-usable transport containers in which all components are packed ready to use. We are also happy to develop intelligent, disposable or reusable, product-specific packaging to your requirements.



Technical design
engineering

Systematic Versatility

Schletter – Your partner for end-to-end solutions in the equipping of vehicles



Welding



Carbon technology

Our technology, your potential

Products cut to your precise needs, in large volumes or in small batches - there are few limits thanks to our extensively equipped, high capacity production plant. Supported by decades of experience and by state-of-the-art technology, we are able to present a broad spectrum of possibilities. As well as the series products, we produce custom components and models.

Welding

Precise and diverse. In order to meet the specific needs of our customers, we deploy a whole range of different welding procedures, including MAG 135, MIG 131, WIG 141, lasering 521, spot- and stud welding. The metals we process include copper in addition to aluminium, steel and stainless steel. If a reduced heat output is required for thin sheet metal connections, we deploy the CMT process with aluminium. This will also apply for steel into the future. For the purpose of quality control, we deploy nondestructive test procedures in the same way as for tensile tests. The reliability of our welded connections is reflected in our accreditations for compliance with DIN EN 15085-2 and DIN EN ISO 3834-2 2006.

Carbon technology

Every gram counts in vehicle construction. Carbon fibre pipes carry only a fifth of the weight of stainless steel pipes. By implementing a new production procedure, Schletter is able to further extend the already versatile area of application of this material. We manufacture three-dimensional bent pipes - without seams and at the most competitive of prices.

Pipe lasering

In one simple step: Using lasering techniques we can produce round or square pipes with almost any perforation design, in lengths of up to six metres. Precise, cost-efficient and quick. Recesses, notches or even patterns - the possibilities are almost endless. To add to the numerous areas of application, lasering is ideally suited to the efficient production of precisely measured tubular frames and customized mortise and tenon joints.



Product register
Cover plate
Waste containers
Reconditioning
Battery container
Batteries
Fastenings
Cantilever (for seat mount)
Ceiling panels
Ventilation rear
Flange
Drivers' cabs (equipment)
Windows
Luggage racks
Mounts for cupboards
Handrails in alu, steel
Stainless steel and Carbon-fiber-reinforced polymer (CFRP)
Mounts and brackets
Cable ducts and brackets
Flaps
Air-conditioning ducts
Consoles
Perforated metal sheets
Ventilation grilles
Alu profiles from our in-house extrusion plant incl. processing and coating
Pipe processing using
Pipe lasering
Stiffening plate
Side panels
Seat frames
Separation walls for driver's cab
Separation walls for passenger cab
Steps/grating
Manual doors
Cladding
Water containers of stainless steel and copper

List subject to modification

Sheet metal processing

High-tech for sheet metal. From the various lasering techniques - some of which can also be used for copper and brass, through to the combined lasering/nibbling machine with automated tool change, through to the automated canting centers - Schletter draws on the entire range of current high-technology for the processing of sheet metal. Our production plant also comprises a whole line of small bending benches, deburring and grinding machines, spot welding devices, bolt presses, countersunk screw-cutting lathes and threading machines, to name but a few.

Bonding technology

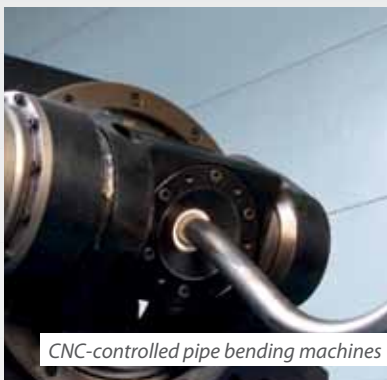
Early in the technical design phase, our competent European Adhesive Engineers (EAE) are available to provide consulting relating to the pre-treatment of the various materials, primers and adhesives, for thin-film bonding (for high load transfers) or for thick film bonding. They also monitor the individual stages of the bonding process. You have access to modern laboratory facilities which comprise a traction pressure testing machine, a climate chamber and a salt spray testing chamber as well as a number of other material-testing facilities. This enables us to carry out specific tests to ensure maximal quality.

CNC-controlled pipe bending machines

Bending pipes to almost any requirements, three-dimensionally and in one work step is the speciality of our free-form bending machines. An adjustable bending head forms pipes to almost any conceivable design, as accurate as it is quick. Possible bending radii from 100 mm to 16,000 mm. Using laser measurements, we can ensure precision processing of the pipes and can, on request, gauge patterns for automatic reproduction. We also have a two-dimensionally-operational mandrel bending machine.

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CNC-controlled pipe bending machines



Powder-coating plant



Aluminium extrusion plant

Powder coating plant

Metal in all RAL and NCS colors or with a graffiti-resistant coating - our highly productive plant adds a protective surface to your product as well as providing the desired visual appearance. We can provide automatic or manual coating, depending on the type of component. Designated hooks can be prepared in our in-house stripping plant, thus avoiding waiting times otherwise incurred by outsourcing this process.

Aluminium extrusion plant

Under 3,300 tonnes of pressure, sections of aluminium of up to 18m in length can be formed in our extrusion plant, to almost any profile design. Our speciality lies in hollow profiles. Elements such as the basic components of our luggage racks are also extruded here. Irrespective of quantity, we also produce custom products quickly and at cost-effective prices. We also undertake the subsequent processing of the products such as milling, bending, rolling, coating and wet paint finishing.

Machining and eroding techniques

CNC-controlled high-speed cutting: 22 CAM programmed processing centers chip metal to the precise CAD specifications, in accordance with 2D, 2.5D and 3D drawings. Our vertical machining centers with six-station pallet pool and 70 tools are designed particularly for the cost-efficient production of series products. Attractive prices are offered even on our small-range products. Our 5-Axe simultaneous milling techniques contribute greatly to an almost unlimited diversity of design. We process pieces of up to 6,000 x 900 x 900 mm in size. With our turning machines we can produce parts turned from bar stock, with up to 65 mm diameter x 400 mm length and chuck parts with up to 250 mm by 1,000 mm. Our metal processing techniques include machining and electrical discharge machining (EDM).

Energy Storage Systems

Our partner in the battery technology sector



A bundle of energy

Storage technology from ecc Repenning GmbH

Schletter delivers both the battery container and its content. Batteries themselves are produced by our subsidiary ecc Repenning GmbH. Using special procedures, the company manufactures storage cells based on Lithium technology and which have set an industry benchmark in the areas of power density and stability. Our lithium-titanate batteries remain stable for more than 15,000 charging cycles. High charging and discharging currents are the distinguishing properties of our lithium-iron phosphate storage units along with a power density of approx. 700 W/kg. These batteries also have a substantially higher service life than the conventional lithium ion accumulator, generally achieving more than 3,000 cycles. The ecc storage unit can be dimensioned to numerous very different types of application.

The cells in storage modules can be switched to larger units and can therefore be used as smaller or larger storage units, depending on the respective requirements. Intelligent, electronic battery management contributes to the durability of the storage unit by preventing over-charging and discharging and which balances the charging status of the individual cells.

ecc ensures quality of products by monitoring the production of all relevant sizes, in terms of layer thickness, porosity of separator, conductivity, chemical constitution and purity of the implemented materials. The individual ecc cells are tested in advance and thus are not encased in a black box, but rather in a transparent housing; ecc likes to show the world what is inside their products!.

ecc
REPENNING GMBH

Systematic Versatility

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Interior cladding

Diversity in design and materials: Our product range

From aluminium handrails to copper containers and welded assemblies through to interior cladding e.g. of aluminium, we can produce almost any metal product you require. We also work with materials such as glass or carbon fibre - the latter being a material of particular interest due to its light weight. Tell us what you need - we can even extend our range to accommodate your requirements! To date our line includes:



Copper containers

Interior cladding

An all-rounder is required to meet a production request for interior cladding for train carriages as the production of the individual assembly components requires a whole line of different work processes. Our extensive manufacturing plant enables us to combine numerous and diverse production processes. This includes, for example, interior metal cladding for carriage entrance areas and ceiling panels with integrated illumination systems, air-conditioning and cable conduits; tailored, of course, to individual specification.

Copper containers

Practical and hygienic: As well as quality aluminium and steel products, we also manufacture fresh-water containers of copper. Unlike plastic or steel, copper helps prevent the formation of germs in water.



Welding assemblies

Welding assemblies

Singular in versatility: Components can be combined to create complete welded assemblies specific to your requirements. High-tech equipment and qualified personnel ensure precision-welded seams in accordance with DIN 15085; Certification Level CL1.

Luggage racks

In the production of luggage racks, it often makes sense to combine metal with other materials such as glass. Schletter manufactures the metal structures and adds glass panes, lighting systems, speakers or reservation display plates. Schletter places great value on the aesthetics of these products as well as on functionality. We can produce aluminium components with a wood design, as an example. Our luggage racks can be produced as modular systems to facilitate installation and can be cut to individual specifications.

Handrails and balustrading

Know-how and technology: We produce handrails and balustrading of aluminium, steel and stainless steel in particular, in any conceivable design. Glass-paned separation walls are also included in our range. Our pipe lasering- and bending machines are deployed in the manufacturing of these products, as is our power coating plant and notably, of course, a great many years' experience.



Luggage racks



Handrails and balustrading

References

Partner to distinguished customers

References

Opportunities should be exploited. Our customers show us how. Back in 1988, Schletter successfully closed its first deal with the rail industry. Since then the company has established itself as a major player in the sector. A number of reputable manufacturers have leveraged from our versatility and from the broad range of services Schletter has to offer (see following list for a few examples):

Stadler

Customer: Stadler

Produced: Hand rails
Separating walls
Ceilings
Air ducts



Alstom

Customer: Alstom

Produced: Hand rails
Luggage racks
Separating walls



Siemens AG

Customer: Siemens AG

Produced: Ceiling panels
Hand rails
Luggage shelves
Luggage racks





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Our members of staff are available from Monday to Friday from 7am to 5pm to provide comprehensive and competent consulting in the planning of your plant and to answer questions relating to logistics and order processing.

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