Schöck Combar®

Reinforce safely without steel.

Long lasting, high-strength and economical with glass fibres.

Schöck Combar®.

A unique reinforcement.

Unsurpassed properties

Schöck Combar® is a ribbed reinforcing bar made of corrosion resistant glass fibres that are bound by a vinyl ester resin. The high quality components and the unique manufacturing process result in an outstanding material.

Combar® is

- highly durable
- much stronger than steel
- corrosion resistant
- not magnetic or magnetisable
- not electrically or thermally conductive
- easily machinable
- significantly lighter than steel.

Certified worldwide

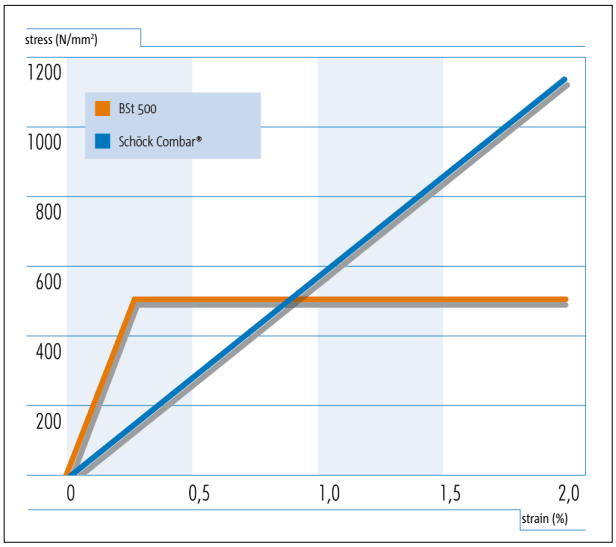
Combar® has been extensively tested according to the most important international codes and guidelines. The material has been certified in several European countries and in North America.

- Approved by DIBt (Z-1.6-238)
- Approved by KIWA (K49001/01)
- Compliance with CSA S807-10 certified
- Compliance with ACI 440.R3 certified
- Tested and recommended by IBR, Institut für Baubiologie (building biology) Rosenheim, Germany

Schöck Combar® – steel: direct comparison

material properties straight bars	reinforcing steel DIN EN ISO 15630 DIN 488	Schöck Combar® acc. to EC 2
characteristic yield strength f_{yk} (N/mm²)	500	≥ 1000
design value yield strength f_{yd} (N/mm²)	435	≥ 445
tension modulus of elasticity E (N/mm²)	200,000	60,000
design value bond strength f_{bd} (standard concrete) (N/mm²)	acc. to EC-2	≤ C40/50 acc. EC-2 > C40/50: f_{bd}= 3.7
Concrete cover c_{nom} (mm)	acc. to EC-2	d_s + 10
specific resistance (µΩcm)	1-2 x 10^{-5}	> 10^{12}

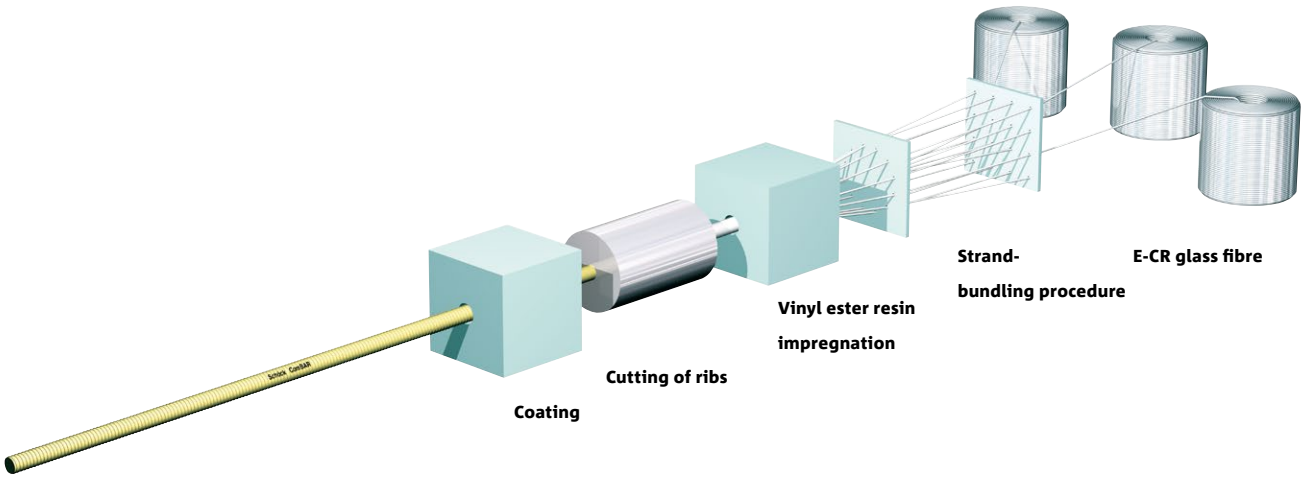
Stress-strain diagram



For decades, steel rebar has been commonly used as the reinforcement in concrete construction. Despite its strength, steel is not the ideal solution for reinforcement especially in corrosive and electromagnetically sensitive environments. In these cases, our innovative product, Schöck Combar® presents advanced possibilities and unique solutions.

The manufacturing process

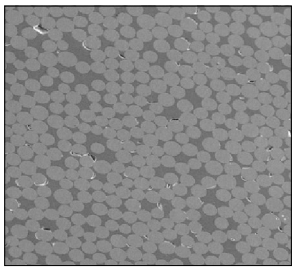
The feature which makes Schöck Combar® special is a two-part manufacturing process optimised to meet the requirements of reinforcing bars. In step one, the pultrusion, high-strength glass fibres, bundled as densly as possible, are pulled through a closed chamber where they are impregnated with a synthetic resin. In the second step, the profiling, the ribs are cut into the hardened bars. The bars are then given a final coating. The result: a reinforcing material with unique structural, physical and chemical characteristics.

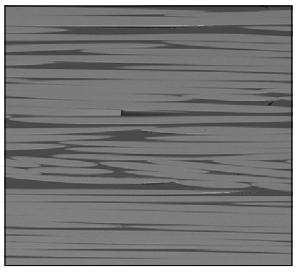


Long lasting high-strength

The high fibre content of Combar® (approx. 88 % by weight) and the parallel alignment of the fibres result in maximum strength and stiffness of the material.

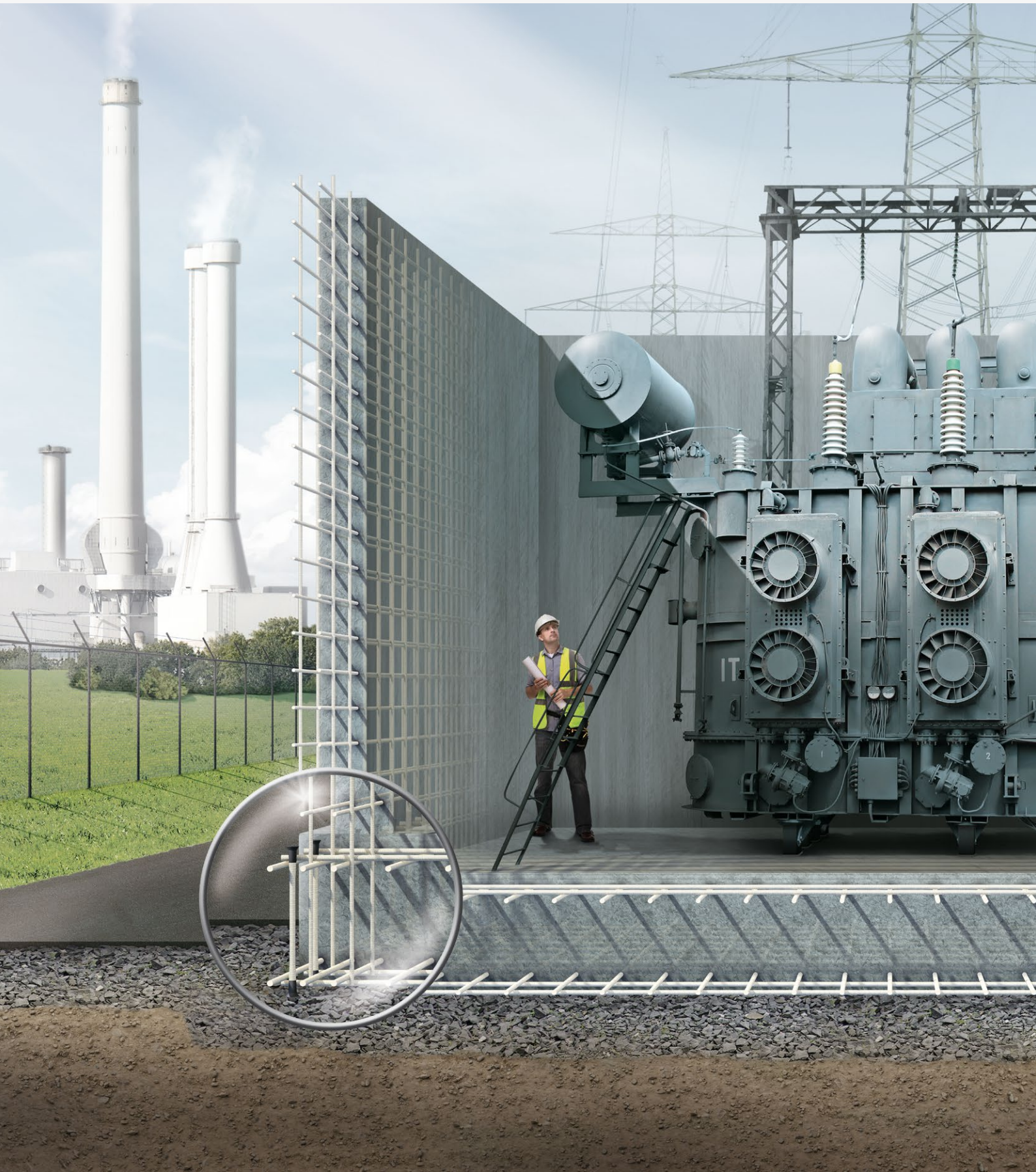
The vinyl ester resin is diffusion tight. Every glass fibre is completely surrounded by resin. This means maximum durability in concrete (up to 100 years).


Cross section


Longitudinal section

Schöck Combar®.

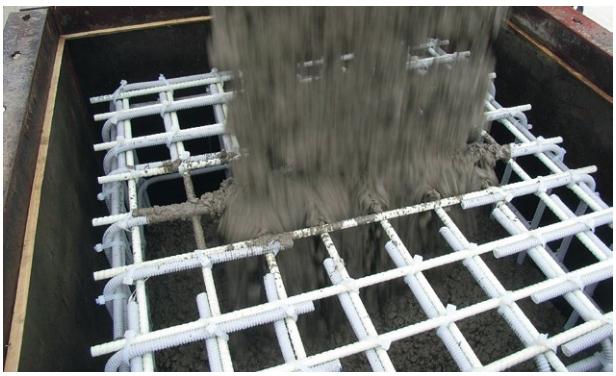
More compact transformer buildings.



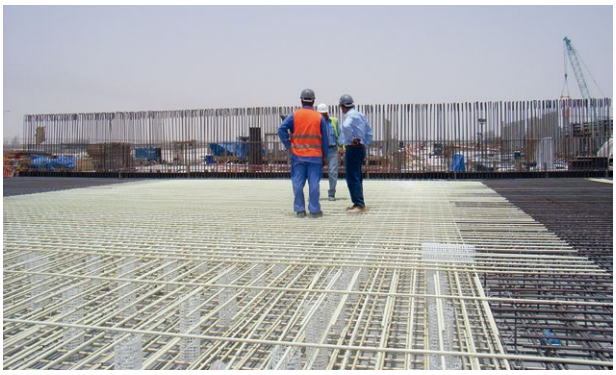
Transformers and reactors in power plants, switchyards and industrial facilities (steel mills, aluminum smelters etc.) operate with high electric currents. Inductive currents are generated within the reinforcing steel if it is located too close to these coils. This can result in the heating up of the rebars and a loss of their strength. Combar® bars do not conduct electrical currents. Therefore, Combar® reinforced foundations, walls and ceilings can be built near transformer coils and reactors. As a result, enclosures for these coils can be much smaller without hindering the performance of these machines. This significantly reduces construction and operating costs.

Schöck Combar® does not conduct electric currents. It is, therefore, ideally suited for installations in

- enclosures and foundations of transformers and reactors
- switchyards
- steel mills
- aluminum smelters
- industrial facilities



Transformer foundation Peiner Träger Ltd., Peine, Germany



Floor slab in rectifier area Qatar Aluminum, Qatar

References:

- dividing wall between transformers Isar-Amper distribution station in Munich, Germany
- transformer foundation in transformer cavern in Kaprun, Austria
- foundation at reactive power compensation plant Swiss Steel Inc. in Emmenbrücke, Switzerland
- foundation in switchyard chemical plant Marl, Germany
- reinforcement around high voltage cable ducts in ceiling slab Mannheim power station, Germany
- transformer foundation in Hamneset, Norway

Schöck Combar®.

In the core of special buildings.

Research laboratories for nanotechnology, solid state physics and similar fi elds of research are highly sensitive environments. This is also true for scanning electron microscopy, magnetic spin tomography and magnet resonance tomography. Due to its conductivity, reinforcing steel can aff ect the functionality and precision of these devices. The installation of Schöck Combar® creates a completely non-metallic and non-magnetic research environment.

Schöck Combar® is non-magnetic and therefore ideally suited for installation in

- hospitals (MRI)
- nano-technology centers
- laboratories for solid-state physics
- industrial floors of driverless transport systems

Foundation block at the IBM Nanotech-Center in Zurich, Switzerland

References:

- floor slab Quantum Nano Center in Waterloo, Canada
- foundation beams in the Carré building at Twente University, Enschede, The Netherlands
- selected interior walls of the Centre for Addiction & Mental Health in Toronto, Canada
- foundation (sections) under a microscopy laboratory at TU Berlin, Germany
- foundation of NMR device at the Institute for Plant Genetics in Gatersleben, Germany
- floor slab (section) and foundation blocks at CeNTech II Münster, Germany

Max-Planck Institute for Solid State Research in Stuttgart, Germany

Schöck Combar®.

Lasts a lifetime.

The most frequent cause of damage in reinforced concrete buildings is the corrosion of the steel reinforcement. This is especially true of facade components, buildings in coastal areas, bridges and parking garages exposed to de-icing salts, as well as swimming pools, waste water treatment plants and many other industrial facilities. As Schöck Combar® does not rust, the risk of corrosion damage is eliminated resulting in the significant reduction in repair and maintenance costs. Also, the service life of the building is greatly extended – an important contribution to sustainable construction.

As it is corrosion resistant and resistant to acids and bases, Schöck Combar® is ideal for the installation in aggressive environments, such as

- shoreline reinforcements and quay walls
- facade elements
- parking garages (even without coatings)
- industrial floors
- swimming pools
- waste water treatment plants
- harbours and channels
- dams

Precast concrete elements for coastal defense project Blackpool, UK

References:

- sea wall at the royal villa in Doha, Qatar
- parking deck with “Hoesch Additiv Decke®” in Buchholz, Germany
- edge reinforcement Park & Fly car park in Kelsterbach, Germany
- road distribution slab at the Forum Steglitz in Berlin, Germany
- renovation of the swimming pool at the TU Darmstadt, Germany
- repair of industrial floor Coca-Cola Inc. Osnabrück, Germany

Facade pilasters Guthirt School in Zug, Switzerland

Schöck Combar®.

Long lasting, high-strength and economical.

Infrastructures often have to be repaired or replaced because the steel reinforcement within them has corroded destroying the concrete microstructure. This particularly applies to bridges exposed to de-icing salts. When Schöck Combar® is installed, corrosion problems are eliminated. New high speed rail links and streetcar lines are usually built using ballasted rail slabs. The continuous rails serve as an electrical medium for the signal transmission. The reinforcing steel in the rail slabs must be intricately grounded to allow the undisturbed transmission of these signals. When Schöck Combar® is installed, these grounding measures are unnecessary as the bar does not conduct electric currents. It may even be installed in close proximity to the induction coils used to operate rail switches.

Combar® does not corrode is not magnetisable and does not conduct electric currents. It is therefore the perfect reinforcing material for

- bridge decks
- bridge caps
- barrier walls on bridges
- sound barriers
- ballasted rail slabs
- airfields

Floor slab railway depot Basel, Switzerland

References:

- bridge deck Weightman Bridge, City of Niagara Falls, Canada
- bridge cap and barrier walls of the McHugh Street-Bridge in Windsor, Canada
- upper reinforcement bridge in Jagsthausen, Germany
- ballasted rail slab Bahnhofsplatz Bern, Switzerland
- compass rose on the airfield in Manching, Germany
- gare de Péage in Tain, France
- airfield at airport Zürich, Switzerland

Successful crash test on TL-5/Pl-3 barrier wall College Station, TX, USA

Schöck Combar®.

Faster and safer penetrations.

Inner city tunnels for subways, sewers and other infrastructure facilities are usually built using a tunnel boring machine (TBM). Steel reinforcement presents a problem as the TBM cannot drill through the steel reinforced shaft walls. When the walls have to be opened up manually, the soil behind these walls has to be stabilized. The installation of Schöck Combar® in the penetration area of the TBM makes all these measures unnecessary. The TBM drives and cuts directly through the head wall. Construction time and costs are greatly reduced and job site safety is also significantly improved.

Because it is easily machined Combar® is ideally suited for components which need to be cut or drilled through such as

- soft-eyes in shaft walls at tunnelling projects
- diaphragm walls
- drilled pile walls
- form-work anchors
- temporary concrete buildings

North-south line Amsterdam, The Netherlands

Light rail tunnel Karlsruhe, Germany

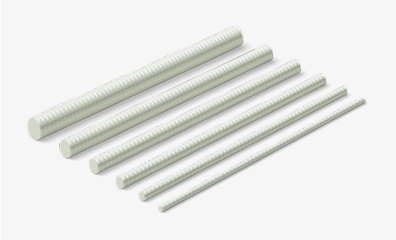
References:

- Vienna valley collector WSK-E Vienna, Austria
- Durban Habour Crossing, South Africa
- baggage tunnel at Terminal 5 Heathrow Airport London, England
- Liefkenshoek tunnel in Antwerp, Belgium
- Toronto subway extension TYSSE, Canada
- XFEL Desy in Hamburg, Germany
- air-scan-link in Danzig, Poland
- subway U5 in Berlin, Germany

Product line and delivery program.

Service.

The product line

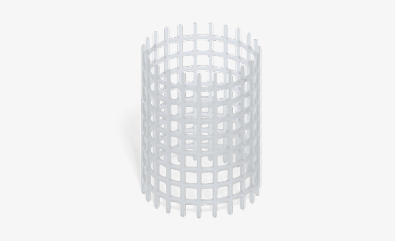


The classic straight Schöck Combar®-bar

The straight reinforcing bar with bar end head

Bent bars for use as a constructive reinforcement

Schöck Combar® clips



Schöck Combar® rebar spacers

The delivery program

Type	Diameter	Standard lengths
Straight bars	8 mm	10.0 m
	12 mm	10.0 m
	16 mm	11.8 m
	20 mm	11.8 m
	25 mm	14.0 m
	32 mm	14.0 m
Bars with end head(s)	12 mm	0.16 to 3.5 m
	16 mm	0.24 to 3.5 m
	25 mm	0.27 to 3.5 m
Bent bars, stirrups	12 mm	0.50 to 6.0 m
	16 mm	0,50 to 6,0 m
	20 mm	0.50 to 6.0 m

Additional lengths available on request.

Using Combar®, Schöck develops innovative and economical solutions for difficult reinforcing tasks. This is achieved in close cooperation with the entire design team consisting of architects, civil engineers and structural engineers as well as other experts on the part of the client. The scope of services is tailored to fit the special needs, of every project.

Structural design and rebar drawings
Upon the client's request, Schöck designs the concrete elements reinforced with Schöck Combar®. The design is carried out in accordance with international standards and guidelines. Schöck is also happy to deliver rebar and construction drawings showing connection and other technical details.

Special technical solutions
Schöck concentrates on the creation of economic standard technical solutions using Combar®.
The experienced engineers in the technical department develop innovative project-specific reinforcing solutions on a daily basis.

Installation support
Schöck accompanies the proper installation of the reinforcement and instructs the personnel on site in the correct handling of the material.

Quality assurance
Schöck has its own materials testing laboratory. The required quality control tests are coordinated with the client's quality assurance program. Schöck is ISO 9001 certified.

Subject to technical modifications
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Schöck Bauteile GmbH
Vimbucher Straße 2
76534 Baden-Baden
Germany
Tel.: +49 (0)7223 967-567
Fax: +49 (0)7223 967-251
combar@schoeck.com
www.schoeck.com

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