Reinforce safely without steel.
Schöck ComBAR®.
An innovative reinforcement solution.

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 delivers an outstanding product that meets the demands of the most complex construction projects.

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

Schöck ComBAR® – steel: direct comparison

<table>
<thead>
<tr>
<th>Material properties</th>
<th>Steel rebar acc. to CSA A23.3</th>
<th>Schöck ComBAR®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimate tensile strength (MPa)</td>
<td>&gt; 500</td>
<td>≥ 1000</td>
</tr>
<tr>
<td>Specified yield strength fy (MPa)</td>
<td>&gt; 400</td>
<td>no yielding</td>
</tr>
<tr>
<td>Modulus of elasticity (MPa)</td>
<td>200,000</td>
<td>≥ 60,000</td>
</tr>
<tr>
<td>Bond strength (normal grade concrete)</td>
<td>acc. to CSA A23.3</td>
<td>fc' ≤ 50: acc. A23.3; fc' &gt; 50: 3.7 MPa</td>
</tr>
<tr>
<td>Concrete cover (mm)</td>
<td>acc. to CSA A23.3</td>
<td>rec. d_{min} * 10</td>
</tr>
<tr>
<td>Specific electrical resistance (μΩ cm)</td>
<td>1.2 x 10^5</td>
<td>&gt; 10 x 10^5</td>
</tr>
</tbody>
</table>

Stress-strain diagram

stress in MPa

- CSA G30.18-09
- Schöck ComBAR®

strain in %
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
Schöck ComBAR® is special due to a two-part manufacturing process that has been engineered to meet the demands of reinforcing bars.

1. Pultrusion:
high-strength glass fibres, bundled as densely as possible, are pulled through a closed chamber where they are impregnated with a synthetic resin.

2. Profiling:
ribs are cut into the hardened bars and given a final coating and labeling.

The result:
a reinforcing material with unique structural, physical and chemical characteristics with great bond properties.

Long lasting high-strength
Schöck ComBAR® is substantially stronger than steel with a much greater service life. The high fibre content of ComBAR® (approx. 88% by weight) and the parallel alignment of the fibres result in maximum strength of the material.

The vinyl ester resin is diffusion tight. Every glass fibre is completely encased by resin which ensures maximum durability in concrete (100 years).
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 and does not conduct electric currents. It is therefore the perfect reinforcing material for
- bridge decks
- bridge curbs
- barrier and parapet walls on bridges
- sidewalks on bridges
- sound barriers
- ballasted rail slabs
- airfields

References:
- parapet walls at Wilson’s Bridge, County of Centre Wellington, Canada
- sidewalks and parapet walls of the McHugh Street Bridge in Windsor, Canada
- PL-3 barrier walls on 400 series Highways across Ontario, Canada
- upper reinforcement bridge in Jagsthausen, Germany
- ballasted rail slab Bahnhofsplatz Bern, Switzerland
- compass rose on the airfield in Manching, Germany
- slab at verticle detection, toll station in Tain, France

Successful crash test on TL-5/PL-3 barrier wall College Station, TX, USA, reinforced with Schöck ComBAR®
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. To avoid this, steel reinforced concrete elements must not be located within the magnetic clearance contour of these coils. ComBAR® bars do not conduct electro-magnetic 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

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®.
The perfect solution for sensitive environments.
Research laboratories for nanotechnology, solid state physics and similar fields 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 affect 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 electromagnetically non-conductive and therefore ideally suited for installation in
- hospitals (MRI)
- nano-technology centres
- laboratories for solid-state physics
- industrial floors of driverless transport systems

References:
- selected interior walls of the Centre for Addiction & Mental Health in Toronto, Canada
- foundation beams in the Carré building at Twente University, Enschede, The Netherlands
- 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
- foundation block at the IBM Nanotech-Centre in Zurich, Switzerland
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
- dams

References:
- sea wall at the royal villa in Doha, Qatar
- edge reinforcement Park & Fly car park in Kelsterbach, Germany
- load 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
- precast concrete elements for coastal defense project Blackpool, UK
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.

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

References:
- Steeles West Station, Toronto, Canada
- 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
- XFEL Desy in Hamburg, Germany
- light rail tunnel Karlsruhe, 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 (factory made)

Schöck ComBAR® Clips

Schöck ComBAR® rebar spacers

The delivery program

<table>
<thead>
<tr>
<th>Type</th>
<th>Diameter</th>
<th>Standard lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight bars</td>
<td>8 mm</td>
<td>10.0 m</td>
</tr>
<tr>
<td></td>
<td>12 mm</td>
<td>10.0 m</td>
</tr>
<tr>
<td></td>
<td>16 mm</td>
<td>12.0 m</td>
</tr>
<tr>
<td></td>
<td>25 mm</td>
<td>14.0 m</td>
</tr>
<tr>
<td></td>
<td>32 mm</td>
<td>14.0 m</td>
</tr>
<tr>
<td>Bar with end head(s)</td>
<td>12 mm</td>
<td>0.16 to 3.5 m</td>
</tr>
<tr>
<td></td>
<td>16 mm</td>
<td>0.24 to 3.5 m</td>
</tr>
<tr>
<td></td>
<td>32 mm</td>
<td>0.27 to 3.5 m</td>
</tr>
<tr>
<td>Bent bars, stirrups</td>
<td>12 mm</td>
<td>0.50 to 6.0 m</td>
</tr>
<tr>
<td></td>
<td>20 mm</td>
<td>0.50 to 6.0 m</td>
</tr>
</tbody>
</table>

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 performed in accordance with Canadian and 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 details and solutions using ComBAR®. Furthermore, 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 material testing laboratory. The required quality control tests are coordinated with the client’s quality assurance program. Schöck is ISO 9001 certified.
We have the answers.
For more information, simply fill out and return to us.

Please mail to info@schoeck-canada.com or fax to 519 896 2190

I am interested in this unique reinforcement material.
I would like:

- [ ] Technical information Schöck ComBAR®
- [ ] Consultation
- [ ] Project offer/quote
- [ ] Product sample
- [ ] Product Presentation

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company

contact partner

street

telephone

e-mail

division

position

city/province/postal code

fax

internet