

**STAHLWERK
THÜRINGEN**

**The Strong Partner of
European Railways**

Company

Stahlwerk Thüringen GmbH (SWT) in Unterwellenborn has a strong relationship to the railway theme in two respects. On the one hand, rail is our preferred and most frequently used means of transport in logistics, both internally and externally. On the other hand, we supply railway infrastructure construction companies with our steel for the erection of sustainable structures for track superstructure, railway superstructure and substructures in wagon construction.

SWT recycles steel scrap (100% usage) in the electric arc furnace and produces sectional steel and steel sleepers according to European and international standards.

With over 300 different profiles and more than 200 steel grades, we supply customers in over 60 countries. Our main customers are the building construction, civil engineering infrastructure construction sectors, mechanical engineering, plant construction and commercial vehicle construction.

Our products at a glance

European HE • IPE • UPE • UPN • HD • HP

British UB • UC • UBP • PFC

American W • C • HP • S

Steel sleeper profiles SW • HYS • UIC

Japanese H-section H

State-of-the-art technologies in the steel plant and rolling mill enable SWT to manufacture products in special grades that have the necessary approvals from European railways. SWT has been a reliable supplier for steel construction applications in the field of railway infrastructure (standard and customer-defined steel sleepers, ultrasonically tested sections for noise barriers, structural engineering and ancillary track construction) and in carrier systems in rail vehicle construction for decades.

SWT Green Steel Strategy

SWT is your partner when it comes to implement CO₂-reduced infrastructure and enables you to realize the targeted reduction of indirect CO₂ emissions already during project planning. For this goal to become reality, Stahlwerk Thüringen adopts the following approaches:

We consistently implement the **SWT Green Steel** Strategy and strive for a climate-neutral design and development of the central corporate processes. Based on the industry standard of 750 kg CO₂e/t* in the EAF route, we are already achieving **emissions of less than 330 kg CO₂e/t*** according to our EPD (ISO 14025 and EN 15804+A1).

Our **SWT Green Steel** Strategy includes three core areas:



SWT Green Energy
Substitution of fossil energy sources



SWT Green Logistics
Climate-neutral internal and external logistics



SWT Green Efficiency
Reduction of resource use

By implementing comprehensive measures, we are optimizing step by step the resource efficiency and all production and logistics processes. Our plant prioritizes transport by rail for environmental as well as economic reasons. European railways pursuing like us a consistently sustainable business policy, are given support in terms of decarbonization: SWT supplies all infrastructure projects of European railways exclusively with **SWT Stahlwerk Thüringen Green Steel®**. Orders can be placed either directly with us or indirectly via steel traders or infrastructure construction companies.

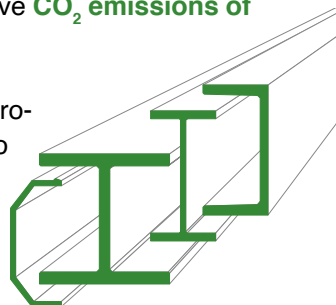


* CO₂e/t means CO₂ equivalent per tonne of section

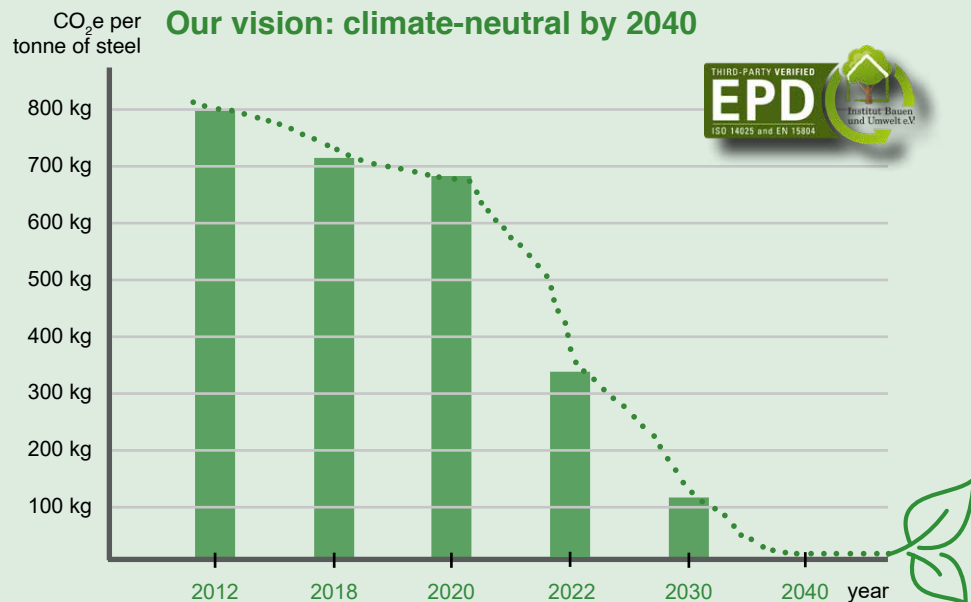
Decarbonisation

Our long-term goal is to offer our customers carbon-neutral steel products by 2040. We have succeeded on reducing CO₂ emissions in recent years and can now offer steel products under **SWT Stahlwerk Thüringen Green Steel®** which, according to the verified EPD, have **CO₂ emissions of less than 330 kg per tonne of steel**.

For each tonne of **SWT Green Steel**, we can provide the complete carbon footprint, which also includes transport to the agreed place of delivery.



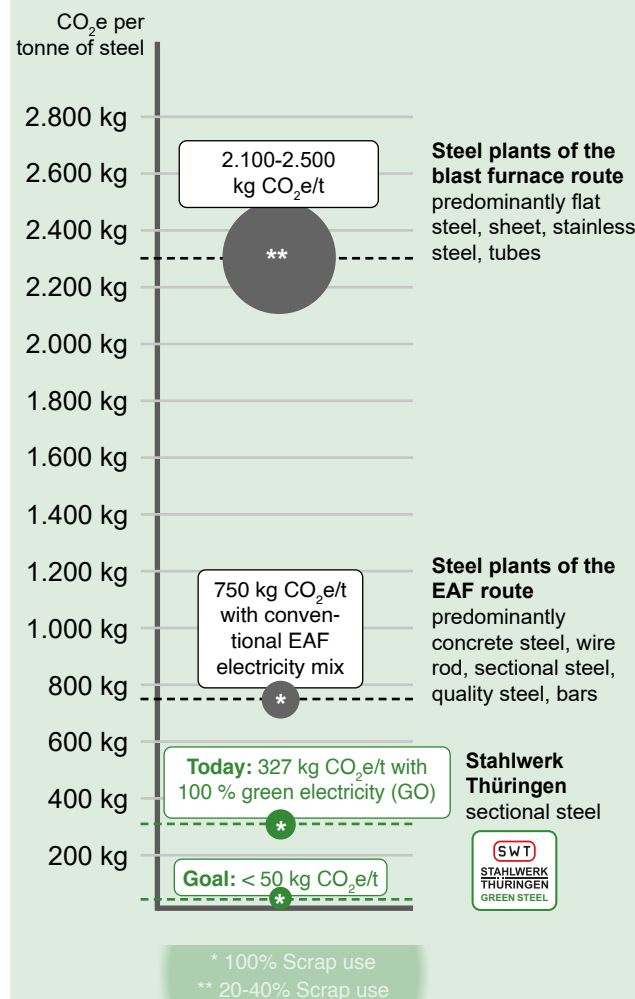
Our vision: climate-neutral by 2040



EPD according to EN 14025 and 15804+A1



SWT Green Steel in CO₂ comparison

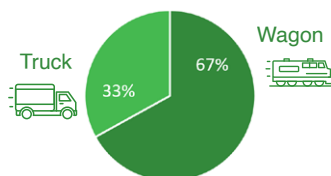


We have succeeded in taking a big step towards climate neutrality due to our management's decision to use only green electricity from Scandinavian hydropower in the entire manufacturing process from 1st January 2021. By purchasing guarantees of origin (GO energy certificates), we ensure that the amount of electricity required at SWT comes from renewable electricity generation plants that are not subsidised under the Renewable Energy Sources Act.

Every tonne of steel sleeper we produce means a significant saving in CO₂ emissions: with the hollow sleeper, we have **one seventh of CO₂ emissions** in comparison to our competitors, with the Y sleeper, our customers **save at least 50%** compared to purchasing from other manufacturers.

Going green to the customer

Our annual total transport performance amounts to more than two million tonnes. Around two thirds of the finished products can be shipped, after direct loading on wagons, using the company's own and external railway companies.



We achieve CO₂ reductions through a high share of rail transport, which has fewer or zero greenhouse gas emissions. This was made possible by concluding a cooperation agreement with Deutsche Bahn (and with other logistics service providers under negotiation).



Since 2021, we have been using the DB-eco+ and DB-eco tariffs for transports in Germany, to Sweden, Denmark, the Netherlands, Belgium and Switzerland thus saving more than 8.000 tonnes of CO₂.

Stahlwerk Thüringen was the first German steel plant to commission DB Cargo with CO₂ free transports.



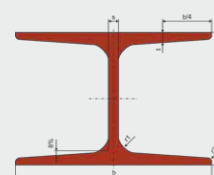
Steel Sleeper Sections

The steel sleeper has a long tradition in railway construction. It is one of the most durable and low-maintenance constructions in modern track construction, both in the area of gravel superstructure and in rail fastening. The average service life is 60 to 80 years, which is considerably longer than for concrete sleepers. Compared to wooden sleepers, steel sleepers have the advantage that they do not have to be impregnated with environmentally harmful agents.

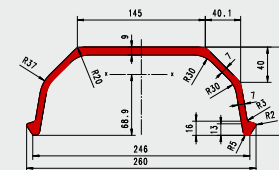
When comparing costs between wooden, concrete and steel sleeper sections, the following shall also be included in addition to the sleeper price: steel sleeper sections have lower costs in terms of land acquisition and material purchase (smaller amount of gravel required). The use of steel sleepers can result in lower costs if retaining and hard shoulder walls are omitted. The costs for the excavation of the foundation and the tunnel redevelopment are smaller. Steel sleeper sections have longer maintenance intervals. There are no disposal costs, as steel sleeper sections can be recycled completely and as often as desired without any quality loss. They **even generate income** for the scrap price thus making the material particularly economical.

Stahlwerk Thüringen is a specialist in the production of Y- and hollow sleepers and offers tailor-made solutions according to individual customer requirements.

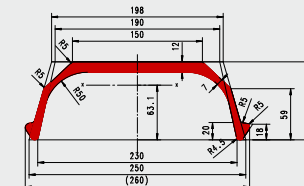
HYS



SW 82



UIC 28



Our products

... hollow sleepers for track superstructures

Stahlwerk Thüringen produces hollow sleepers according to DIN 5904:1995 and tailor-made according to customer specification. The hollow sleeper proved its worth, especially for sidings and secondary tracks and on mountain tracks with steep inclines, narrow curve radii and tunnel areas.

Advantages:

- Compact, isolatable track design
- Long service life, almost maintenance-free
- High longitudinal and lateral displacement resistance of the track
- Optimised sinking
- Can be used for all rail profiles
- Points drive bearing mountable left/right

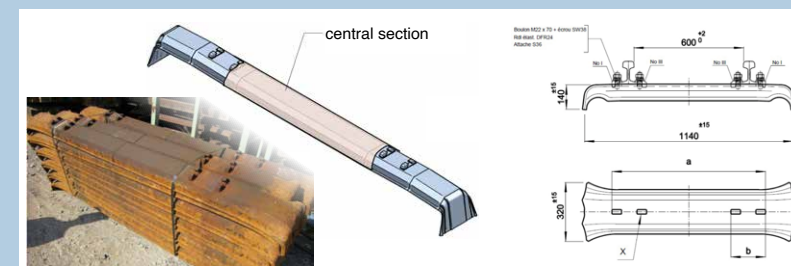
The hollow sleepers offer high positional stability even at very high angles of inclination: by cranking one side for a longer time, the sleeper anchors itself firmly in the subsoil. In the entrance and exit areas of tunnels, specific installation conditions due to water ingress and damp and wet areas require a sleeper robust against environmental influences. Geometry adaptations of the sleeper shape (e.g. thicker covers) and injection of corrosion-inhibiting alloys and even the use of weathering steels are effective measures that increase the service life of the hollow sleeper under demanding environmental conditions.



Le p'tit Train de Saint-Trojan An example of hollow sleeper reuse*

The tourist resort of Saint-Trojan has high expectations of ecological management: taking into consideration an optimal circular economy, financially advantageous action is taken with minimal material input. After much deliberation, a 6km section of the narrow-gauge railway line (width 60cm) was renovated with steel sleepers.

Steel sleepers corrode after a long period of use at their ends and fastenings, but remain in perfect condition in the central part. This central section of 1270mm length is ideal for the 60cm wide rail network of "Le p'tit Train de Saint-Trojan" and was reused for this purpose.



The decision to use steel sleepers was based, among others, on following considerations:

Steel sleepers have only one third of the weight of concrete sleepers, which reduces the energy consumption of vehicles at the construction site and reduces the carbon footprint of the rail network. In this specific case, there is even a negative CO₂ balance. The reused steel sleepers have a long service life of at least 50 years.

The use of steel sleepers contributes to delaying the ecological sand crisis: sand

and gravel are overused in the production of concrete, which has already severely depleted their deposits.

In contrast, steel has the advantage of being endlessly recyclable without any loss of quality.

Steel sleepers are excellent for applications in dry, wooded environments. In case of fire, steel behaves better than wood and even helps to fight the fire spreading: along the route, combustible materials are removed, thus creating a fire boundary and a reduced risk of fire spread.

* Source of data: TrackNet Group Switzerland

Sustainability

deeply rooted at Stahlwerk Thüringen



Our products

... Y-sleeper for track superstructure

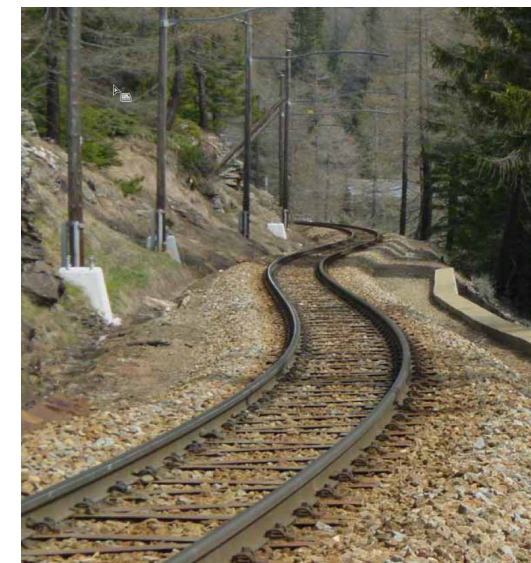
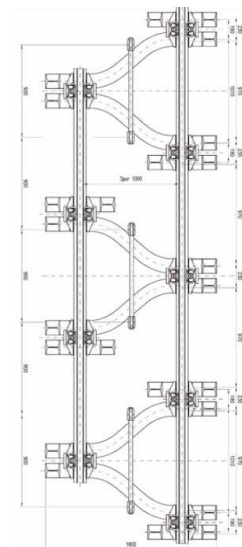
The increasing demands on rail systems (higher speeds and denser train sequences caused by growing traffic volumes) have a drastic effect on the requirements for the track superstructure. The modern Y-steel sleeper combines the advantages of steel with a sleeper design that sets high standards in track technology. The product was given its name from the shape of the sleeper ground plan, an upsilon.

The Y-sleeper is used because of the following advantages:

- High frame stiffness and high transverse displacement resistance, this allows continuous welding of the rails even in the tightest radii
- Low height: sleeper height < 100mm
- Sleeper requirement approx. half the number of units compared to the concrete sleeper
- Savings in track width, gravel quantity and transport weight
- Smooth running behaviour and long service life
- Extension of maintenance intervals and low maintenance costs

The track width plays an economically significant role in the mountains and in the lowlands in the built-up area with expensive land acquisition. The sleeper height can strongly influence the costs for existing tunnels, underpasses or overpasses: with concrete sleeper track, a sufficiently strong foundation layer has to be installed – when using the Y-steel sleeper, this is not necessary in every case.

Y steel sleepers are the ideal choice for winding routes with small radii and also for mountainous terrain with extremely high gradients.



Our products

... for railway superstructure

There are varied uses for steel in railway construction. Our steel sections are used in the following applications, among others:

- Upright profiles for noise barriers (including ultrasonically tested steel profiles)
- Poles and posts for signalling and overhead lines
- Slope stabilisation walls (posts, infill with steel profiles)
- Modular office buildings
- Bridges and pedestrian bridge constructions
- Hall and steel constructions
- Lightweight constructions through the use of special and higher grades
- Platform canopies

Stahlwerk Thüringen supplies grades in accordance with the Deutsche Bahn standard DBS 918002-2, especially for the use of steel profiles in noise barriers and bridge structures. This DB standard is based on EN 10025 with special additional requirements applicable for deliveries to Deutsche Bahn AG.



Noise barrier



Signalling and overhead line poles



Hall construction



Pedestrian bridge and office building with steel construction



Steel construction for bridges has a long tradition:
"Ziemesal" bridge, year of construction 1895



Lightweight construction

Our products

... for wagon construction substructures

We manufacture steel sections for frame and supporting structures:

- Locomotives
- Wagon construction
- Mobile rail vehicles

To meet the high requirements, we offer steel grades normalizing rolled. Our customers in Europe and overseas prefer steel grade S355J2+N. Regardless of this, SWT manufactures sections with adaptation of the geometry (reinforcements, tolerance restrictions e.g. $\frac{1}{2}$ tolerance or $\frac{1}{4}$ tolerance) and in steel grades according to the specifications of the railways (e.g. DB standard 918002-1).

We pay special attention to the surface finish. The underframes are finished with a special coating where any material unevenness and repair may be visible.



The most commonly used profiles are:

- UPE 120 to 300
- IPE 120 and 140
- UPN 100 to 240

Stahlwerk Thüringen offers the following performance features and advantages as a supplier:

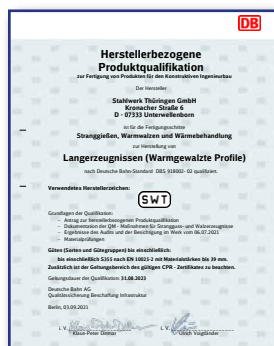
- Very good surface (according to DIN EN 10163-3:2004, class C, subgroup 3, DB standard)
- Optimized profile shape, among others UPE channels and lightweight profiles IPEA and IPEAA
- Reliably high availability of the assortment
- Short lengths < 12 m available from the plant with a good price-performance ratio



Product Quality

Quality – the basis of sustainable development

Among others, Stahlwerk Thüringen GmbH has the required manufacturer-related product qualification (HPQ). The certificate is confirmed via an approval procedure by Deutsche Bahn and regularly monitored within the scope of audits. The HPQ certificate is the necessary prerequisite for the use of the supplied steel products in the scope of structural engineering according to Ril 804, railway bridge construction of Deutsche Bahn AG. This also applies in particular to noise barriers in the railway area.



Stahlwerk Thüringen created its own Environmental Product Declaration (EPD) in accordance with ISO 14025 and EN 15804+A1 for the first time in 2021, the revised version of which was verified and published by the "Institut für Bauen und Umwelt e.V." (IBU) in November 2022. The value of **327 kg CO₂e/t of steel** determined on this occasion for module A1 to A3 is the basis for our new product line **SWT Stahlwerk Thüringen Green Steel®**. Any IBU-verified EPD is now mutually recognized by many countries: France, Great Britain, Italy, Spain, Denmark, Norway, Sweden and North America. An EPD contains

other life cycle assessment-based indicators in addition to the Global Warming Potential, that describe the contribution to the resource use and the impact on people and ecosystems. On the basis of a standardized observation, steel can be compared with other building materials such as wood and concrete. Architects and investors can thus select the right building materials for sustainable and environmentally friendly structures.

The DQS certified our integrated management system.



Based on an efficient quality management system, we strive for high product quality in all phases of the production process. For this purpose, the material properties are tested at several points in the production process. Our materials testing laboratory is accredited according to DIN EN ISO/IEC 17025 and is equipped with modern testing technology and machines.



With our certification based on the BES 6001 sustainability standard, we demonstrate in particular a responsible procurement policy, the implementation of management requirements in the supply chain and the sustainable development of all corporate processes.

Our integrated management system is certified by DQS. SWT holds product approvals from numerous national and international certification bodies, such as DNV, Lloyd's Register EMEA, Bureau Veritas, American Bureau of Shipping and Deutsche Bahn AG.



Contact



**STAHLWERK
THÜRINGEN**



Stahlwerk Thüringen GmbH

Kronacher Straße 6 • 07333 Unterwellenborn

Tel. 03671 4550 0 • Fax 03671 4550 7107

info@stahlwerk-thueringen.de • www.stahlwerk-thueringen.de