

SSAB Weathering

SAVES WEIGHT AND MAINTENANCE COSTS



SSAB

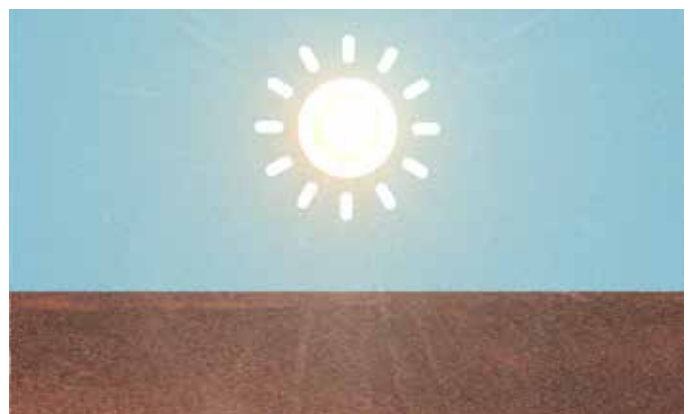


A PERFECT MATCH

Rail transport is a perfect match for SSAB Weathering steel. Railway vehicles in SSAB Weathering steel are strong, hardwearing, take higher payloads and are relatively light compared to vehicles made from conventional steel. Add the corrosion-resistant properties and the rolling stock will have exceptionally long service life with low maintenance costs.

SSAB Weathering is a high-strength, low alloy, easily weldable structural steel with exceptional corrosion resistance. The chemical composition allows the steel to form a protective layer of patina without any change in its mechanical characteristics. The patina shields the steel against further corrosion, saves on maintenance and makes the final product more environmentally friendly.

Railway rolling stock is exposed to extreme conditions that can vary within a few hours of travel, be it rain, sun, wind or snow. This changing weather is ideal for weathering steels, since they require alternating wet and dry conditions to start the oxidation process that creates the unique layer of protective patina.



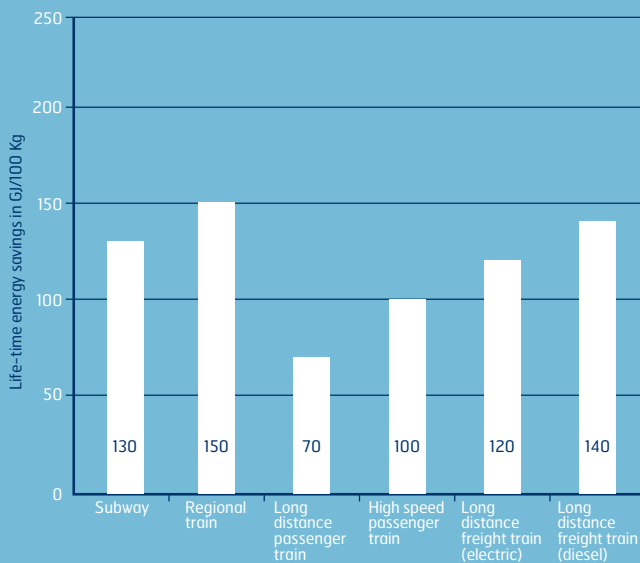
STRONGER AND SAFER



Thanks to the high strength-to-weight ratio, SSAB Weathering steel and other SSAB products such as DOCOL improve safety. Strong and light structures such as chassis made of SSAB's products are stable and resist deformation in the event of a crash.

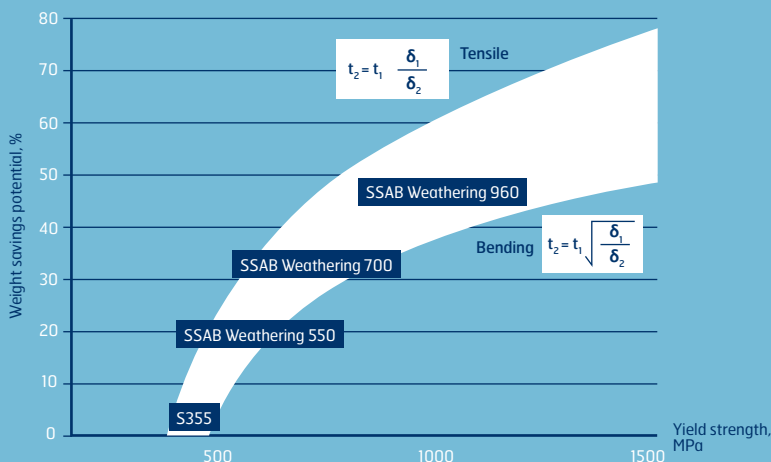
Freight wagons in SSAB Weathering high-strength steel are dent resistant during loading and unloading, which results in high durability – and a more attractive appearance.

LIFE-TIME PRIMARY ENERGY SAVINGS (GJ/100 KG)



Source: Energy savings by light-weighting - IFEU: 2003.

WEIGHT SAVINGS POTENTIAL WITH SSAB WEATHERING STEEL



LESS WEIGHT SAVES ENERGY

The benefits of lighter structures

- ▶ Increased payload and/or cargo volume with the same axle weight
- ▶ Higher passenger capacity thanks to longer bodies or double deck design
- ▶ Faster acceleration and deceleration reduces travelling time
- ▶ Energy savings from reduced vehicle weight
- ▶ Energy savings in traffic with frequent accelerating and braking
- ▶ Reduced rail wear

ROLLING STOCK THAT LASTS LONGER

Regional passenger trains

As passenger trains start and stop frequently, a lighter vehicle saves energy during the entire lifecycle.



Trams

High-strength SSAB Weathering steel can replace basic stainless steel grades such as 1.4003 as it is more cost-effective and easier to weld and bend.



Freight wagons

Wagons with high-strength and weather-resistant steel take more payload, have good dent resistance and low maintenance costs as there is no need to paint.



Timber wagons

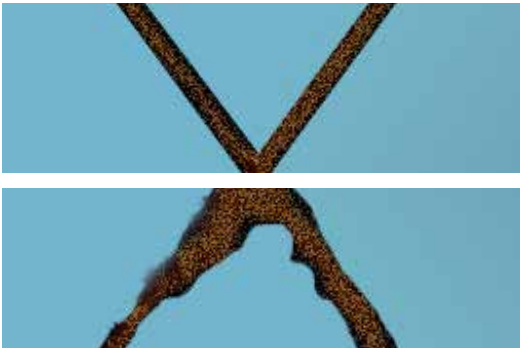
SSAB Weathering steel delivers hassle-free use over the life-cycle of the wagon. High-strength steel can increase the load capacity. In case of paint damage, the patination process protects the steel.



Ready for the workshop

SSAB Weathering steel has excellent properties for forming, machining and welding. The SSAB Weathering portfolio includes a wide range of grades with mechanical properties and dimensional tolerances that generally exceed the standards

given by EN 10025-5 and ASTM grades. Fatigue and stiffness are always important to consider when upgrading from mild steel to high-strength steel. We at SSAB are happy to work together with our customers to provide solutions and recommendations for optimal design.



LOWER LIFETIME COSTS

The corrosion resistance of SSAB Weathering steel in freight transport reduces both the start-up and the long-time maintenance costs. Unlike conventional steel, weathering steel does not need painting. The patina surface protects the steel. This means there are no initial painting or repainting costs during the products active life.

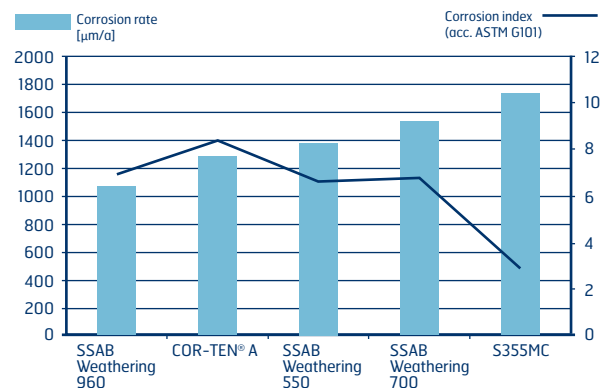
To paint or not to paint – You decide

Most steel constructions give you no choice but to paint to avoid corrosion. SSAB Weathering gives you more options. It can be left unpainted and the patina protects the steel. If you prefer to paint, you can rely on good paint adhesion thanks to the steel's surface texture.

SSAB Weathering steel also has a self-healing effect that minimizes corrosion that creeps under the paint. Additionally, porous expanding rust is not an issue in SSAB Weathering steel structures – as is the case for carbon steel. All in all, these factors double the useful life of paint on weathering steel compared to carbon steel. As well as saving costs, this also means that painted structures look better for longer.

Low environmental footprint

SSAB Weathering steel has a smaller environmental footprint than conventional steel. Lighter rail vehicles save energy during many years of operation. Emissions and pollution from painting and stripping (pre-repainting) can be completely avoided if wagons and containers are left unpainted.



Customer support

SSAB Tech Support has a high local presence worldwide and can visit customers at short notice to solve urgent problems or initiate longer-term co-development projects. Our dedicated support team has broad and deep technical knowledge and many years of experience. We can answer general customer questions about design, application, welding and forming.

For questions requiring more specialized expertise we cooperate closely with SSAB's specialist groups at the Knowledge Service Center. Tech Support is the first contact for customers looking for technical support from SSAB. Please contact techsupport@ssab.com

PRODUCT PORTFOLIO

SSAB WEATHERING – GUARANTEED PROPERTIES FOR OPTIMIZED RESULTS

Steel grade	Delivery condition	Yield strength	Tensile strength		Elongation		Impact toughness		Inner bending radius at 90° both transverse and longitudinal			Dimensions ¹													
												Re [MPa]		Rm [MPa]	A ₉₀ (%) t < 3 [mm]	A ₅ (%) t ≥ 3 [mm]	Temp. [°C]	Charpy V [J]	t ≤ 3 [mm]	3 < t ≤ 6 [mm]	t > 6 [mm]	Thickness [mm]		Width [mm]	
												min	max									min	max	min	max

SSAB WEATHERING – HIGH-STRENGTH GRADES

SSAB Weathering 550	Hot rolled strip	550	600	-	-	14	-20	40	1,0	1,0	1,5	3,00	10,00	870	1640
SSAB Weathering 700	Hot rolled strip	700	750	-	-	12	-20	40	-	2,0	2,0	3,00	6,10	870	1550
	Cold rolled strip	700	800	-	5	-	-	-	2,0	-	-	0,98	2,10	735	1500
SSAB Weathering 960	Hot rolled strip	960	1000	-	5	7	-40	27	-	3,5	3,5	2,50	8,00	870	1860

SSAB WEATHERING – 355 MPa AND COR-TEN® GRADES

SSAB Weathering 355	Hot rolled strip	355	510	680	16	20	-20	40	1,0	1,0	2,0	2,0	12,0	800	1860
	Hot rolled plate	355	470	630	-	20	-20	40	-	2,0	3,0	5,0	60,0	1000	3300
	Cold rolled strip	355	490	680	14	-	-	-	0,5	-	-	0,5	2,1	600	1500
COR-TEN® A	Hot rolled strip	345	485	-	20 ³	20 ³	-	-	2,0	2,0	3,0	2,0	12,0	800	1860
	Hot rolled plate	345	485	-	-	16 ⁴	-	-	-	2,0	3,0	6,0	12,0	1000	3300
	Cold rolled strip	310	450	-	22	-	-	-	0,5	-	-	0,5	3,0	1000	1500
COR-TEN® B	Hot rolled strip	345	485	-	19 ³	19 ³	-	-	2,0	2,0	3,0	2,0	15,0	800	1860
	Hot rolled plate	345	485	-	-	16 ⁴	-	-	-	2,0	3,0	5,0	40,0	1000	3300
COR-TEN® B-D	Hot rolled strip	345	485	-	19 ³	19 ³	-20	27	2,0	2,0	3,0	2,0	15,0	800	1860
	Hot rolled plate	345	485	-	-	16 ⁴	-20	27	-	2,0	3,0	5,0	40,0	1000	3300

SSAB WEATHERING – TUBES AND SECTIONS

Steel grade	Shape	Yield strength	Tensile strength		Elongation		Impact toughness		Wall thickness		Outside Ø		Width x height		Length ⁵						
									Re [MPa]	Rm [MPa]	A ₉₀ (%) t < 3 [mm]	A ₅ (%) t ≥ 3 [mm]	Temp. [°C]	Charpy V [J]		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
SSAB Weathering Tube 355WH	Circular	355	470	630	-	20	-20	27	2,0	12,5	26,9	323,9	-	-	12						
	Square	355	470	630	-	20	-20	27	2,0	12,5	-	-	25 x 25	300 x 300	12						
	Rectangular	355	470	630	-	20	-20	27	2,0	12,5	-	-	40 x 20	400 x 200	12						
SSAB Weathering Tube 500WH	Circular	500	580	760	-	15	-20	40	2,0	12,5	33,7	323,9	-	-	12						
	Square	500	580	760	-	15	-20	40	2,0	12,5	-	-	30 x 30	300 x 300	12						
	Rectangular	500	580	760	-	15	-20	40	2,0	12,5	-	-	50 x 30	400 x 200	12						

1) For detailed dimensions by grade, please contact your closest SSAB representative

2) Maximum width depending on thickness

3) A₅₀

4) A₂₀₀

5) Higher length possible on some dimensions. Please contact us for details

We also manufacture weathering steel grades as per EN 10025-5 & the ASTM standards ASTM A 588, ASTM A 606, ASTM A 871. Please contact us for more information. SSAB Weathering steel grades are delivered from stock locations or directly from the mill. Smaller quantities for testing are also available. As with all qualified materials and components, there are recommendations for the use of SSAB Weathering steel in transport applications. You can find detailed information about properties and best practices on the datasheet for each grade.

OTHER PRODUCT OFFERINGS FROM SSAB FOR RAIL TRANSPORT

STRENX®
PERFORMANCE STEEL

HARDOX®
WEAR PLATE

DOCOL®
THE AUTOMOTIVE STEEL

SSAB Domex

OPTIMIZE YOUR BUSINESS CONTACT SSAB

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SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. SSAB is listed on Nasdaq Stockholm and has a secondary listing on Nasdaq Helsinki. www.ssab.com. Join us also on social media: Facebook, Instagram, LinkedIn, Twitter and YouTube.

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