

## General Product Information Weldox, Hardox, Armox and Toolox



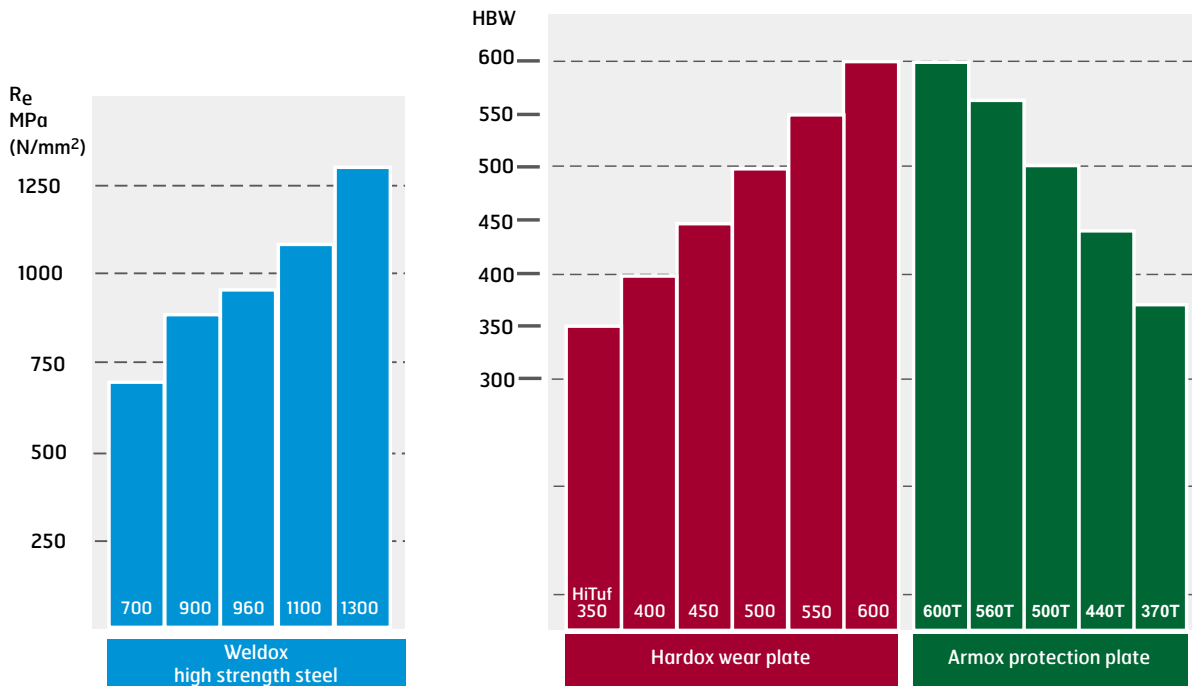


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# Production range

Hardox, Weldox, ArmoX and Toolox are registered trademarks that are owned by SSAB Technology AB.



## Minimum quantities

The minimum quantity per item for plate rolled to order is:

Thickness [mm]	Min. quantity weight
3.0 <sup>1)</sup> – 60.0	2,5 tonnes
60.1 – 80.0	3,5 tonnes
80.1 – 120.0	4 tonnes
120.1 –	5 tonnes

<sup>1)</sup> Subject to special agreement.

For more information about dimensions, contact us or visit:

[www.weldox.com](http://www.weldox.com)

[www.hardox.com](http://www.hardox.com)

[www.arroxplate.com](http://www.arroxplate.com)

[www.toolox.com](http://www.toolox.com)

# Production flow

Our steels are produced in an integrated process extending from raw materials to finished plate. This enables us to keep the entire process under close control.

The processes are optimized to suit our most complicated niched products, which also benefits our commercial steel grades. A common feature that ensures good weldability is the accurate chemical composition, including very low carbon equivalent, closely controlled contents of alloying elements, and very low contents of residual elements. The latter is due to the ore-based metallurgy.

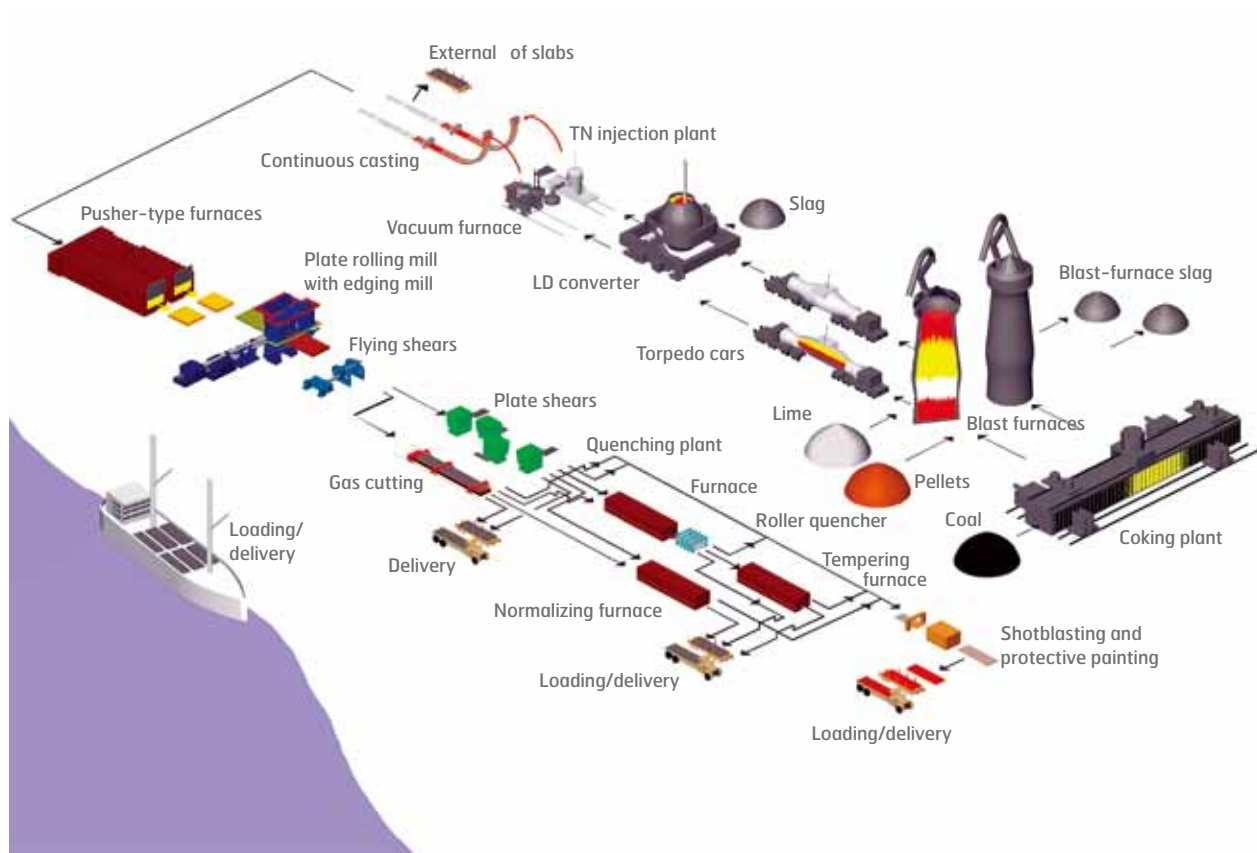
## The process

The principal raw materials are ore in the form of pellets and coke from our own coking plant. The raw materials are converted into raw iron in the blast

furnace. The raw iron is transported in 'torpedo cars' to our own steel shop, where the LD converter refines the raw iron into steel by oxygen blowing, which lowers the carbon content of the iron. It is the carbon content that is the main distinguishing feature between raw iron and steel.

The steel is then processed to achieve exactly the right composition and temperature. The steel is cast into slabs in the continuous casting plant.

The slabs are then transported to the rolling mill, where they are rolled into plate. To achieve the required properties, the plates may then be heat treated including quenching. Various post-treatment processes are then carried out, such as levelling, shotblasting, anti-corrosion painting, cutting to length and width, and marking. The plate is then ready for delivery to the customer.



# Weldox high strength steel

SSAB produces high strength steels that conform to most international and national standards. Our high strength steels are marketed under the Weldox brand name.

Weldox has been developed to provide excellent weldability, combined with high strength and toughness. The ore-based metallurgy and advanced processing in the steel shop ensures very low contents of residual elements in the steel. Weldox high strength steels have excellent bendability and machinability properties. Due to the high strength of the steel, the end products can be strong but lightweight, which allows for substantial reductions in the cost of materials, welding and transport. Good flatness and fine surface quality are also distinguishing features of Weldox plate.

Weldox high strength steel is produced in thicknesses ranging from 4 to 160 mm, and with guaranteed yield strengths between 700 MPa and up to 1300 MPa. The flexible production system enables us to deliver plate with tailored properties to suit the customer's requirements. We can supply plate in thermomechanically rolled or quenched and tempered condition. In addition, most Weldox steels can be supplied with guaranteed impact toughness at temperatures down to  $-60^{\circ}\text{C}$ .

Weldox high strength steels conform to EN 10025-6. However, Weldox 1100 and Weldox 1300 do not have any standardized equivalents.

Further information concerning the properties of the plate and the options in the standard that are employed are given in the relevant data sheets.

## Z-plate

All high strength steels with yield strengths of up to 960 MPa can be supplied with guaranteed properties in the through thickness direction, often called Z-plate. Restrictions may apply.



## SSAB Plate steels and standardized high strength steels in equivalent steel groups

SSAB Plate	Yield strength class [MPa] <sup>1)</sup>	Toughness class Charpy-V, [°C]	EN 10025 - 6	ASTM Toughness class as per ASTM A6
Weldox 700 D Weldox 700 E Weldox 700 F	700	-20 -40 -60	S 690 Q S 690 QL S 690 QLI	A 514
Weldox 900 D Weldox 900 E Weldox 900 F	900	-20 -40 -60	S 890 Q S 890 QL S 890 QLI	
Weldox 960 D Weldox 960 E	960	-20 -40	S 960 Q S 960 QL	
Weldox 1100 E Weldox 1100 F	1100	-40 -60		
Weldox 1300 E Weldox 1300 F	1300	-40 -60		

<sup>1)</sup> MPa = 1 N/mm<sup>2</sup>



# Hardox wear plate

**Hardox wear plate meets strict demands on strength, consistent quality, flatness and surface condition. The unique combination of consistently high hardness, high strength and excellent impact toughness makes Hardox wear plate a very appropriate material for a wide range of applications.**

The product has been on the market since the 1970's and is continually being developed to meet customer requirements. It is now produced in thicknesses from 3 to 130 mm and hardnesses up to 600 HBW. We can now produce extra-thin and wide plate.

The high hardness and wear resistance of Hardox plate greatly extend the useful life of the end product. Due to its high strength, the products made can be simpler and lighter, but can carry higher payloads. Moreover, Hardox plate has a good resistance against impact also at low temperatures. Its good weldability and machinability properties simplify production and repair work. Higher payloads, lower maintenance costs, good availability and a longer service life combine to provide better overall economy.

Hardox HiTuf is a wear resistance plate with extremely high toughness to provide an excellent crack tolerance. Hardox HiTuf has a hardness of 350 HBW and is intended for heavy section structural wear parts where extra high demands are applied on the combination of wear and crack resistance.

Hardox 400 has a typical hardness of 400 HBW. Excellent weldability, impact strength and bendability are distinctive features of Hardox 400.

Hardox 450 is a wear-resistant plate with a typical hardness of 450 HBW. The characteristic feature of the steel grade is the unique combination of toughness and hardness and also the fact that, in spite of its hardness, it is as fabrication-friendly as Hardox 400.

Hardox 500 is a wear plate that can withstand hard wear and has a typical hardness of 500 HBW. It is well suited for applications in which it is exposed to heavy wear by hard minerals and other abrasive materials.

Hardox 550 is a wear plate with a hardness of 550 HBW and toughness equal to Hardox 500. It is intended specially for heavy wear applications and targeted toward users and producers of wear parts using 12% manganese steel castings or 500 Brinell wear plates. The additional

50 Brinell you gain in hardness, when upgrading from 500 HBW steels, will increase wear life but not at the expense of crack integrity.

Hardox 600 is the world's hardest wear plate with a hardness of 600 HBW. It is intended specifically for extreme wear conditions and is mainly intended to replace cast steels, chromium-alloyed white cast iron, and hard facing. In spite of its extremely high hardness, it can be machined, welded and cut. For its hardness, the steel also has uniquely high impact strength.

Further information on the properties of Hardox plate is available from the appropriate data sheet.





# Armox protection plate

Armox protection plate was previously used mainly in military applications, but its use is now expanding to civilian products.

Armox 370T (280 – 330 HBW or 380 – 430 HBW) and Armox 440T (420 – 480 HBW) are products that combine good ballistic properties with excellent toughness. They are suitable as protection plate for applications involving the risk of explosion, such as various types of vehicles and storage premises.

Armox 500T has excellent ballistic properties combined with high hardness (480 – 540 HBW) and strength. In spite of this, the steel is easy to machine and work. Typical applications include armouring of bank counters, security vehicles, VIP vehicles, burglarproof storage premises, and so on.

Armox 560T (530 – 590 HBW) and Armox 600T (570 – 640 HBW) are our latest products intended for applications in which an even higher standard of protection is required. Typical applications include armouring of VIP vehicles and security doors.

Further information on the properties of the plate is available from the relevant data sheets.



## Technical specification of Armox 500T protection plate

Hardness		480 - 540 HBW			
Protection class	Weapon ammunition	Weight [g]	Muzzle velocity [m/s]	Distance [m]	Recommended plate thickness [mm]
FB 3	.357 Magnum FJ/CB/SC	10.2	430	5	3.0
FB 4	.357 Magnum FJ/CB/SC	10.2	430	5	3.0
	.44 Magnum FJ/FN/SC	15.6	440	5	3.0
FB 5	M16 A2	4.0	950	10	6.0
	5.56 x 45 FJ/PB/SCPI (SS109)				
FB 6	M16 A2, FN FAL	4.0	950	10	6.0
	5.56 x 45 FJ/PB/SCPI (SS109)				
	7.62 x 51 FJ/PB/SC (NATO Ball)	9.5	830	10	6.0
FB 7	FN FAL	9.8	820	10	14.5
	7.62 x 51 FJ/PB HC1 (NATO AP)				
Unclassified	AK 47, G3, M16A2	8.0	720	10	4.0
	7.62 x 39 Ball Type (M43)				
	7.62 x 51 FJ/PB/SC (NATO Ball)	9.5	800	10	5.5
	5.56 x 45 Ball SS92/M193	3.56	970	10	10.0
	7.62 x 39 API	7.65	740	10	13.0

# Toolox prehardened tool steel

Toolox prehardened tool steels represent a unique and special concept for producing forming tools and machine components. Toolox is a modern prehardened tool steel based on many years of experience at SSAB in the development and production of Hardox wear plates and Weldox high strength steels.

The fundamental idea behind Toolox is to deliver a steel that is hardened and ready for use, with tested and guaranteed physical properties. Due to the high metallurgical purity, the freedom from slag achieved corresponds to ESR remelted material. Every plate is uniquely produced, and each individual plate is tested for hardness, toughness and homogeneity.

Toolox is directly machinable and requires no further hardening and remachining. The fact that the material is fully prehardened means that it has low residual stresses and guaranteed stable properties. The hardness of the steel creates unique conditions for precision and surface finish.

Toolox allows for a new and modern toolmaking process. The greatest benefits are shorter production times, and more uniform and stable material properties. In addition, the steel enables a number of risky processes to be eliminated, such as hardening, with the associated risk of damage. Due to its pure metallurgy and hardening, Toolox has unique toughness and fatigue properties, which greatly increases the lifespan of the tool or machine component.

Excellent properties for processes such as etching, polishing and coating are also a distinctive feature of Toolox. As a result, Toolox offers very flexible opportunities in applications for which it is used. Typical applications include plastic moulds, edge-pressing tools, wear strips, plate pressing tools, etc.

Toolox is available in two hardnesses: Toolox 33 with a hardness of 300 HBW and Toolox 44 with a hardness of 45 HRC – the world's hardest fully prehardened tool steel with the same hardness all the way through.

As an option, Toolox can also be nitrided and surfaced with an even harder coating for surface hardnesses between 60 and 65 HRC. This increases further the intervals between tool service, which improves the overall economy.

For further information on the range of sizes, tolerances, surface finishes, testing and other properties unique to Toolox, visit [www.toolox.com](http://www.toolox.com)



# Quality management system

Unless otherwise agreed, delivery and inspection are subject to the technical provisions of EN 10 021.

## Quality management system in accordance with EN ISO 9001:2008

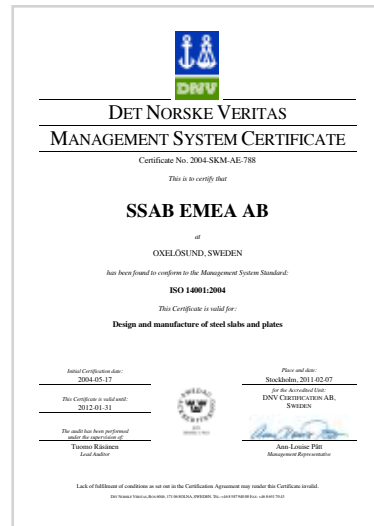
The quality management system at SSAB is based on EN ISO 9001:2008 and is described in our "Operational Manual for Quality and Environment". The system is certified by an accredited inspection body, and it is also certified in accordance with AQAP 2110:3.



## CE marking

We conform to the requirements for CE marking according to the provisions of the EU Construction Products Directive (89/106/EEC).

The approval, which has been issued by TÜV-NORD, applies to products made to EN 10025-1 and -6, and also covers Weldox 700, Weldox 900 and Weldox 960.



# Tolerances and surface condition

SSAB was first in the world to introduce a comprehensive precision guarantee on the thickness of heavy plate – AccuRollTech™. This high precision is made possible by the new four-high rolling mill, which is designed for very high precision products.

Unless otherwise specified in the material standard or otherwise agreed, plate is delivered with surface condition in accordance with EN 10 163-2, Class A, Sub-class 1, with SSAB flatness tolerances closer than EN 10 029, Class N (steel type L), with length and width tolerances to EN 10 029, and with thickness tolerances to AccuRollTech™ that conforms to the provisions of EN 10 029.

Extracts from SSAB flatness tolerances, width and length tolerances according to EN 10 029 adapted to SSAB dimensional range and thickness tolerances in accordance with AccuRollTech are given in the following tables.

## Length and width tolerances

Nominal length [mm]	Tolerances [mm]	
	Max.	Min.
– (4000)	+20	0
4000 – (6000)	+30	0
6000 – (8000)	+40	0
8000 – (10000)	+50	0
10000 – (15000)	+75	0
15000 – 18000	+100	0

Nominal thickness [mm]	Width tolerances [mm]	
	Max.	Min.
–(40)	+20	0
40 – (150)	+25	0
150 –	+30	0

For plate thickness up to and including 20 mm, plasma cutting enables us to offer closer tolerances on length and width than those tabulated above.

## Thickness tolerances

The thickness tolerances to AccuRollTech™ are closer than those specified in EN 10 029, except for thicknesses  $\geq 80$  mm, for which the tolerance range is the same.

In AccuRollTech™, there is requirements on maximum thickness variation within one plate. The tolerances are applicable to plate in as-rolled or heat treated condition. Unless otherwise agreed, tolerance class A for AccuRollTech™.

## AccuRollTech™

Nominal thickness [mm]	Tolerance class A [mm]		Max. thickness variation within one plate [mm]
	Min.	Max.	
– 4.9	–0.3	+0.4	0.5
5.0 – 7.9	–0.3	+0.5	0.6
8.0 – 14.9	–0.4	+0.6	0.7
15.0 – 24.9	–0.5	+0.7	0.8
25.0 – 39.9	–0.7	+0.8	1.0
40.0 – 79.9	–0.9	+1.5	1.1
80.0 –	–1.0	+2.2	1.2

Tolerance class B, C or some other requirement within the above tolerance range for each thickness interval can be supplied.

Class B: Constant minimum tolerance of –0.3 mm

Class C: Constant minimum tolerance of 0 mm

Subject to special agreement, plate with Extra-Close tolerances can be supplied.

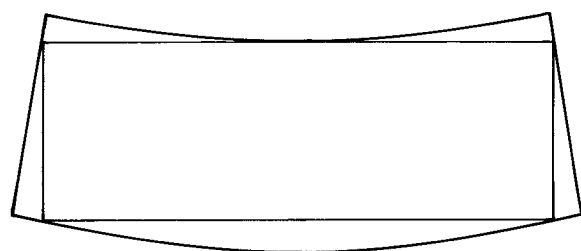
## AccuRollTech™ Extra Close

Nominal thickness [mm]	Tolerance class A [mm]		Max. thickness variation within one plate [mm]
	Min.	Max.	
– 8.0	–0.2	+0.3	0.4
8.1 – 16.0	–0.2	+0.4	0.5
16.1 – 20.0	–0.3	+0.5	0.7
20.1 – 25.0	–0.3	+0.8	0.8

Other tolerance classes within the above tolerance range for each thickness interval can be supplied. If tolerances to AccuRollTech™ Extra Close are specified, only surface requirements in accordance with EN 10 163-2 Class B, Subclass 3 are applied.

## Edge camber and out-of-squareness

It must be possible to inscribe a rectangle with the dimensions of the plate ordered within the plate supplied.

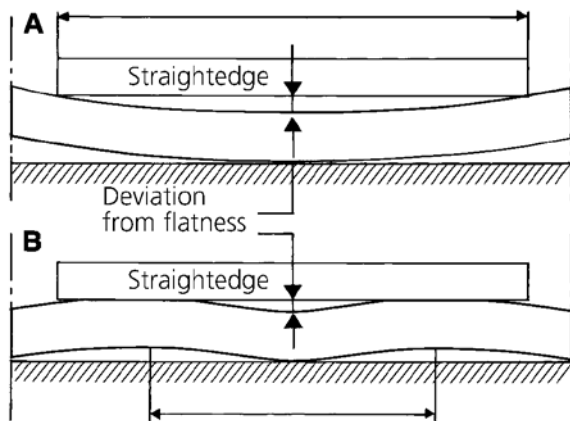


## Flatness tolerances

In addition to hot levelling, our equipment also allows for cold levelling of the plate.

To determine the flatness deviation, the plate is measured automatic with laser. The measurement conforms with manual procedure according to EN 10 029.

The plate is measured at least 25 mm from the long side of the plate and at least 200 mm from its short side (100 mm for plate to tolerance class S). The vertical height is rounded off to the nearest whole mm.



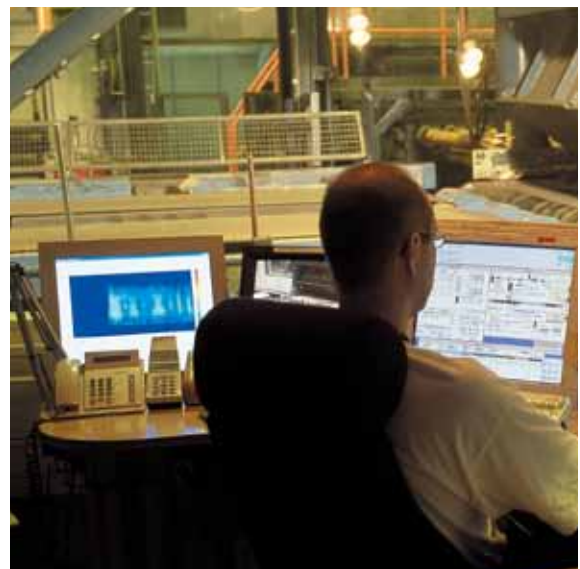
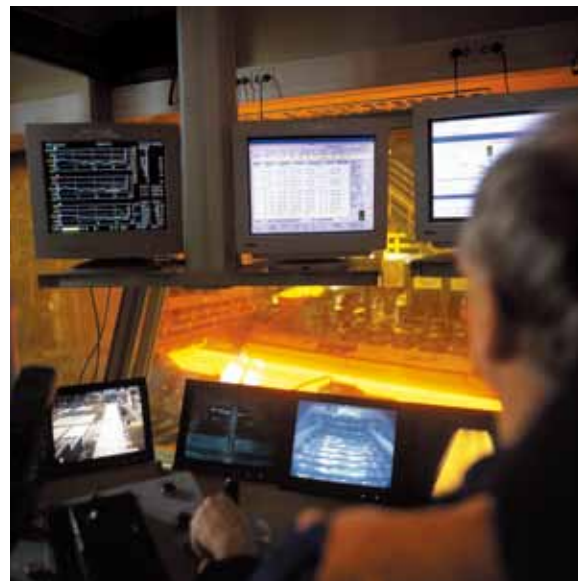
The maximum permissible vertical heights for each tolerance class, thickness and measurement length are specified in the table below. Tolerance class S is applied only subject to special agreement.

## SSAB flatness tolerances

Nominal thickness [mm]	Normal tolerance class N		Special tolerance, class S	
	Measurement length [mm]			
	1000	2000	1000	2000
3.0* – 4.9	7	11	**3	**8
5.0 – 7.9	5	10	3	8
8.0 – 14.9	5	9	3	6
15.0 – 24.9	5	8	3	6
25.0 – 39.9	5	7	3	6
40.0 – 155.0	4	7	3	6

\* Restricted flatness tolerances apply to 3 - 4 mm thick plate. Further information is available from SSAB.

\*\* Subject to special agreement.



# Testing

Unless otherwise agreed, inspection and testing are carried out and the results are reported as specified in the relevant material standard or in our data sheets. When placing the order, always specify whether the material is to be subjected to special inspection, the scope of such inspection, and also the type of inspection document required.

## Mechanical testing

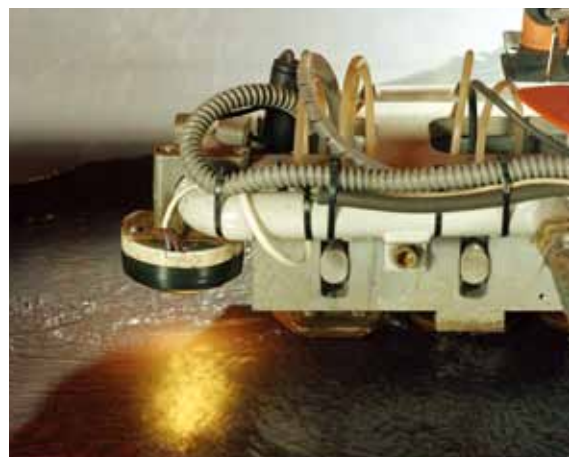
Tensile testing in accordance with EN 10 002-1  
 Impact testing in accordance with EN 10 045-1  
 Hardness testing in accordance with EN ISO 6506-1, 6508-1  
 Tensile testing in the thickness direction in accordance with EN 10 164



## Ultrasonic testing

Ultrasonic testing is used for indicating cracks, inclusions, porosity and similar discontinuities.

Unless otherwise agreed, plate is delivered in class E<sub>1</sub>, S<sub>1</sub> in accordance with EN 10 160:1999. Ultrasonic testing is carried out for a test certificate if ordered an order in accordance with EN 10 160, SEL 072, ASTM 435, ASTM 578 or other agreed standard. For plate thicknesses in excess of 100 mm and requirements stricter than those corresponding to E<sub>0</sub>, S<sub>0</sub>, testing for test certificate is carried out only after special agreement.



## Surface testing <sup>1)</sup>

As per EN 10 160	Distance between parallel scanning-lines [mm]	Min. defect area to register [mm <sup>2</sup> ]	Max. permissible defect area [mm <sup>2</sup> ]	Max. number of local defects [defects/m <sup>2</sup> ]
–	100	1000	10000	1
S <sub>0</sub>	100	1000	5000	20
S <sub>1</sub>	100	100	1000	15
S <sub>2</sub>	50	50	100	10
S <sub>3</sub>	50	20	50	10

## Edge zone testing <sup>1)</sup>

As per EN 10 160	Edge zone width <sup>2)</sup> [mm]	Min. defect lengths to register [mm]	Max. permissible defect length [mm]	Max. permissible defect area [mm <sup>2</sup> ]	Max. number of defects per m length
E <sub>0</sub>	50 – 100	50	100	2000	6
E <sub>1</sub>	50 – 100	25	50	1000	5
E <sub>2</sub>	50 – 100	20	40	500	4
E <sub>3</sub>	50 – 100	15	30	100	3
E <sub>4</sub>	50 – 100	10	20	50	2

<sup>1)</sup> Testing can be ordered and carried out either as total testing, e.g. E<sub>1</sub>, S<sub>1</sub> or E<sub>2</sub>, S<sub>2</sub>, or as edge or surface testing individually, e.g. E<sub>1</sub>, S<sub>1</sub>.

<sup>2)</sup> The width of the edge zone on edge scanning varies with the plate thickness.

# Distribution of inspection documents

SSAB has developed a certificate system that electronically produces, distributes and records all types of inspection documents. Each document covers one plate. The documents are delivered in the form of PDF files or, in exceptional cases, by mail. Type 3.2 inspection reports are also delivered electronically. Subject to special agreement, the purchaser himself can download his documents. The new certificate system offers excellent opportunities for simple and rational handling of inspection documents.

## Inspection documents

Unless otherwise agreed, certificates are issued in English in accordance with SS-EN 10204:2004.

The certificates include the particulars specified in the material standard, which usually includes:

- Name of manufacturer
- Clear reference to the purchase agreement and delivery batch
- Material designation in accordance with the purchase agreement.
- Description of article
- Nominal dimensions
- Quantity
- Results of inspection (although not type 2.1 certificate below)
- Date of issue

## The following types of inspection documents are applicable:

### Declaration of compliance with the order 2.1

The manufacturer certifies that the products supplied conform to the requirements of the order, without specifying test results. The certificate may consist of the dispatch specification.

### Test report 2.2

Document in which the manufacturer certifies that the products supplied are in compliance with the requirements of the order and in which he supplies test results based on non-specific inspection and testing.



## The following types are available:

### Inspection certificate 3.1

The inspection certificate declares that the products delivered conform to the requirements of the purchase agreement.

The results of testing are shown on the products that will be delivered or on inspection batches comprising part of the products delivered.

The document is validated by an inspection representative who is authorized by the manufacturer and who is independent of the production department.

### Inspection certificate 3.2

The inspection certificate declares that the products delivered conform to the requirements of the purchase agreement.

The results of testing are shown on the products that will be delivered or on inspection batches comprising part of the products delivered.

Document issued both by the inspection representative authorized by the manufacturer and either by an inspection representative authorized by the customer or by an inspector appointed in accordance with official regulations.

# Marking

All plate is clearly marked on delivery. The OX mark, the steel grade and the plate identity are stamped, unless the relevant standard specifies no stamping or after special agreement. For plate thicknesses of 5 mm or below and if stamping is not carried out for any other reason, stamping is replaced by marking with white paint or with a dark ink jet<sup>1)</sup>.

The plate identity is specified by two digit groups

5 or 6 digits, representing the heat number, + 6 digits that represent the plate serial number. These two groups of digits give every plate a unique identity.

Example of plate identity: 12345-123456 or 012345-123456.

If required or if so decided by us, the location of the stamped marking can be shown by two white-paint dots.

Stamping is always carried out at right angles to the direction of rolling. Marking with paint may be carried out in the direction of rolling. On plate that is not stamped, the direction of rolling is therefore shown by a painted arrow. A painted arrow can also be shown on stamped plates.

The customer's mark, plate dimensions of length, width and thickness, and the serial number of the plate, the batch number, and the in-house pile number are painted on the plate as required by means of white paint or with a dark ink jet<sup>1)</sup>.

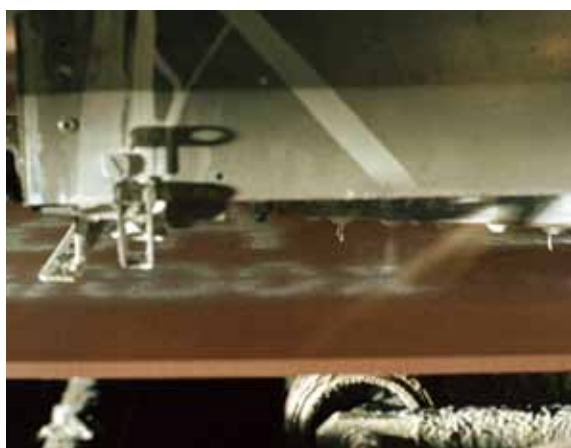
Stamping and marking with paint are carried out by machine or manually. When done by machine, all marking with paint is carried out by dot-matrix printing, and stamping is carried out by means of rounded stamps.

## Brand marking

In order to eliminate the risk of material mix-ups at the destination, our plate is marked as follows, unless otherwise agreed: Painted plate is normally marked in a number of rows over the whole of the plate surface. Unless otherwise agreed, a simplified steel grade designation and SSAB are painted. The plate identity number can also be marked in rows over the plate surface.

Note that the complete steel grade designation in accordance with the standard/data sheet or specification is stamped or is included in the paint marking.

<sup>1)</sup>Ink jet marking is in the course of development.





# Anti-corrosion painting

Unprotected steel plate will corrode. SSAB can therefore provide the plate with effective anti-corrosion treatment known as shop primer. This protects the plate while it is in transit.

Different primer types and different protective action times can be chosen. Our alternatives provide protection against corrosion for 3 or 6 months. If better welding or laser-cutting properties are required, a thinner coat and thus a shorter protection time can be specified.

The primer types we use have been tested by various institutes to ensure good working conditions for the end user. If good ventilation is provided, the hygienic limit values will not be exceeded in conjunction with welding, cutting or grinding.

Regardless of the anti-corrosion treatment specified, the appearance and cleanliness of the steel surface before treatment are decisive to the effectiveness of the anti-corrosion treatment. We shot-blast the plate which is then immediately anti-corrosion painted. The primers used are mainly of low-zinc silicate type.

The plate we keep in stock is painted with low-zinc silicate primer, since this:

- \* Provides a good substrate for the next coat of paint
- \* Need not be removed before normal welding

In order to provide visual distinction, our steel grades are painted in different colours:

- \* Hardox – red
- \* Weldox - grey
- \* ArmoX - grey

Before selecting the final paint system, we recommend that the relevant paint supplier should be consulted. As a general rule, a low-zinc silicate primer is usable in all normal paint systems.

## Shopperprimers

Typ	Colour	Protection time	Remarks
Low zinc	red, grey	3 months	Improved cutting properties and weldability
Low zinc	red, grey	6 months	
Ceramic	red, grey	6 months	High temperatures

Other primer types are available subject to special agreement.  
Degree of blasting SA 2.5 as per ISO 8501-1.

## Dimensions of shot blast/painted plate

Thickness:	3 – 102 mm
Length:	2000 – 14500 mm
Width:	1000 – 3350 mm



# Logistics

In our General pallet rules, we want to guide the work of pallet makeup and what options are available.

The aim for the rules is to build the pallets in such a way that handling damage will be avoided to the greatest extent possible, and that we can create cost-effective and manageable volumes.

In deliveries in which SSAB EMEA in Oxelösund is responsible for loading, the goods are always secured in accordance with the laws and regulations in force at that time. In order to regulate who will be paying for freight and insurance, we apply the following delivery conditions: DDP as per Incoterms 2010. FCA, CIF, CIF landed, and FOB.

## Concepts

Pallet	A form of packaging. The pallets are separated with timber spacers measuring 63 x 90 mm or 90 x 90 mm.
Stack	Part-load on a pallet. Separated from other stacks by timber spacers measuring 32 x 32 mm.
Pallet label	Secured to the top plate on a pallet, with information on the pallet number in legible text, bar code, painted colour code, quantity, weight, and the identity of the top plate.
Colour	Painted colour coding on the short and/or coding long side of the plate for delivery by sea.
Short plate	Plate <6100 mm long.

## General pallet rules

- The maximum pallet weight is 12 tonnes.
- Short and long plates are never loaded on the same pallet.
- Thick and thin plates are never loaded on the same pallet.
- Painted and unpainted plates are never loaded on the same pallet.
- The widest plate is always at the bottom on the pallet.
- Graduated width loading (widest plate on the pallet, gradually diminishing to the narrowest at the top) is employed for plate thicknesses <30.1 mm.
- Random length loading (plates of different lengths are loaded in random order) is employed.

- Some thin plate may be strapped.
- Magnetic pallet label as shown in the picture.

## Options

- Strapping with steel straps round both the pallet and the stack. 6099 mm maximum plate length.
- Stack weights as agreed.
- Pallet weights as agreed.
- Special colour coding.
- Delivery codes outside the standard.
- Other requirements on dimensional separation.

## Optional marking

- On the top plate on a pallet or stack. Up to 3 lines with 21 characters (manuell marking)\* stack, up to 3 lines.
- Edge label attached on the thickness surface of the short side as shown in the picture. Available in three variants with different information about the plate. Edge label possible above 8 mm thickness.

\* Carried out free of charge, if required.



# Information materials and technical support services

Our steel development work is accompanied by extensive testing. The results of these tests and other experience are documented in our brochures and other information materials.

## About SSAB

- From iron ore to steel plate

## Product information

- Hardox A Part of Your Success
- Weldom The Art of Engineering
- Armox - The steel you want between you and risk
- Toolox - A better concept

## Workshop recommendations

- Welding
- Machining
- Bending/shearing
- Cutting

## Technical support service

Our application engineers have accumulated a vast stock of expertise and experience of design and manufacture of products for which heavy plate is used.

We shall be pleased to provide you with additional information concerning our products.

## Hardox/Weldom Centre

At our Hardox/Weldom Centre, we arrange courses for our employees and customers on the subjects of how Hardox and Weldom plate should be used in design and production. Lectures are interspersed with practical exercises in which the trainees themselves can gain knowledge of how easy the plate is to use.

## Home pages

- [www.ssab.com](http://www.ssab.com)
- [www.hardox.com](http://www.hardox.com)
- [www.weldom.com](http://www.weldom.com)
- [www.armoxplate.com](http://www.armoxplate.com)
- [www.toolox.com](http://www.toolox.com)

Our home pages give further information on our products. The data sheets and brochures published on the Internet are always the latest updated versions. In addition, there is a list of the dates of issue of all brochures and data sheets.



# SSAB around the world

## NORWAY

Oslo

## DENMARK

Brøndby  
Fredericia

## FINLAND

Helsinki

## ESTONIA

Saue

## UNITED KINGDOM

Birmingham

## NETHERLANDS

Beuningen

## RUSSIA

Moscow  
St Petersburg  
Novosibirsk  
Yekaterinburg

## POLAND

Warsawa  
Kórnik

## CZECH REPUBLIC

Ostrava

## SLOVAKIA

Trnava

## SLOVENIA

Dobrava

## SERBIA AND MOTENEGRO

Belgrade

## ROMANIA

Bucurest

## ISRAEL

Tel-Aviv

## SAUDI ARABIA

Riyadh  
Jeddah

## SWEDEN

Oxelösund

## GERMANY

Berlin  
Bielefeld  
Dillingen  
Düsseldorf  
Duisburg  
Gerichshain  
Hamburg  
Krefeld  
Leipzig  
München  
Neuffen

## HUNGARY

Sopron

## AUSTRIA

Ebreichsdorf  
Rosenbach

## SWITZERLAND

Zürich

## BELGIUM

Antwerpen  
Hoeselt

## FRANCE

Lyon  
Duran  
Paris  
Le Vieil Evreux

## GREECE

Thessaloniki

## ITALY

Parma

## PORTUGAL

Lisbon

## SPAIN

Pesajes  
Madrid  
Barcelona

## TURKEY

Istanbul  
Ankara  
Mersin

## SOUTH AFRICA

Johannesburg  
Wilgepark  
Richards Bay  
Durban  
Witbank

## USA

Atlanta  
Minneapolis/St.Paul  
Philadelphia  
Pittsburgh  
Washougal  
Salt Lake City  
Texas

## CANADA

Delta  
Grindrod  
Delson

## MEXICO

Monterrey  
Mexico City

## CHILE

Santiago

## PERU

Lima

## BRAZIL

São Paolo

## ARGENTINA

Buenos Aires

## MOROCCO

Casablanca

## INDIA

Madras

## IRAN

Teheran

## LEBANON

Beirut

## PAKISTAN

Islamabad

## KAZAKHSTAN

Almaty

## UKRAINE

Donetsk

## UNITED ARAB EMIRATS

Hamriyah





**CHINA**

Beijing  
Shanghai  
Kunshan  
Chengdu  
Guangzhou  
Changsha  
Shenyang  
Xi'an

**KOREA**

Seoul  
Pusan

**JAPAN**

Tokyo  
Kobe

**MALAYSIA**

Selangor

**SINGAPORE**

**TAIWAN**

Taipei

**THAILAND**

Bangkok

**PHILIPPINES**

Manila

**INDONESIA**

Jakarta  
Surabaya

**AUSTRALIA**

Perth  
Brisbane  
Melbourne



A series of horizontal lines for writing, spaced evenly down the page. There are 25 lines in total, starting from the top and ending near the bottom. Each line is a thin, dark grey or black horizontal stroke.



SSAB is a global leader in value added, high strength steel. SSAB offers products developed in close cooperation with its customers to reach a stronger, lighter and more sustainable world.

SSAB employs over 9 200 people in over 45 countries around the world and operates production facilities in Sweden and the US. SSAB is listed on the NASDAQ OMX Nordic Exchange, Stockholm.

For more information, contact us or visit [www.ssab.com](http://www.ssab.com)

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The SSAB logo consists of the letters 'SSAB' in a bold, blue, sans-serif font. The 'S' and 'A' are connected, and the 'B' has a distinctive shape with a vertical bar on its right side.