HBIS SERBIA

PRODUCTS CATALOGUE

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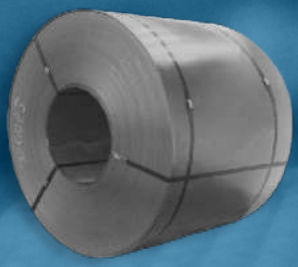
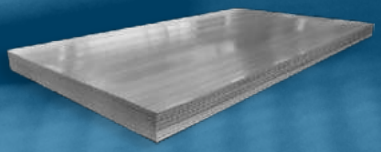
PRODUCTS

HOT ROLLED PRODUCTS





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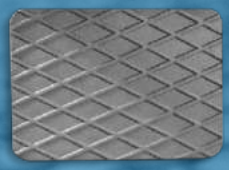
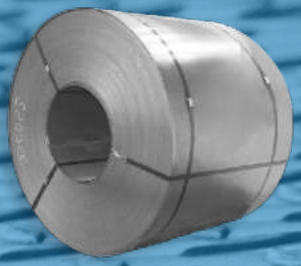
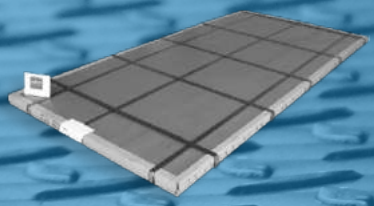
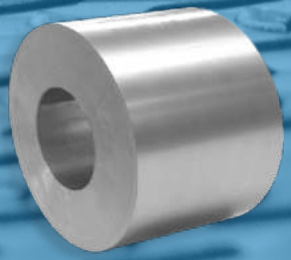


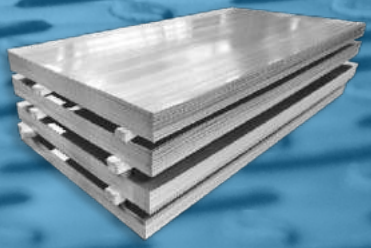
HOT ROLLED PICKLED PRODUCTS



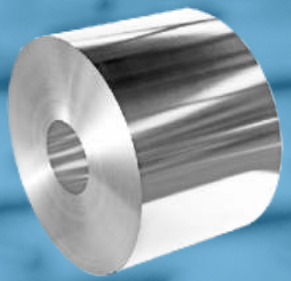


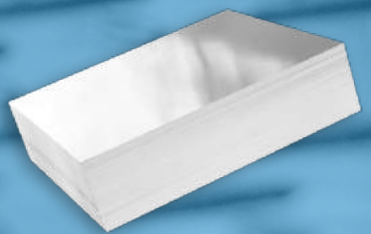
COLD ROLLED PRODUCTS





TINPLATE PRODUCTS





HBIS SERBIA

HBIS GROUP SERBIA

HBIS GROUP Serbia Iron & Steel llc Belgrade (hereinafter HBIS Serbia) is a company founded in 2016. as part of international HBIS GROUP corporation.
HBIS Serbia consists of:
· Factory in Smederevo for the production of hot and cold rolled flat steel products,
· Factory in Sabac for the production of tin plate,

The company's projected production capacity is 2.2 million tons of finished products per year and it employs around 5,000 employees.
HBIS Serbia produces the following flat-rolled steel products in coils and sheets:
· Hot-rolled products,
· Hot-rolled chequered products,
· Hot rolled pickled products,
· Cold rolled products,
· Tinplate products.

HBIS Serbia has implemented and applies, maintains, and constantly improves the quality management system.
The company possesses numerous certificates, such as :
· ISO 9001
· ISO 14001
· ISO 45001
· HACCP
· ISO/IEC 17025
· ISO 22000
· CE sign per standard En10025
· AD 2000-Merblatt W0 i PED 2014/68/EU
NORD
· Lloyd's Register
· DNV

HBIS Serbia issues the following inspection certificates for its products:
-Inspection certificate 3.1 according to EN 10204:2004 which implies that the validation of inspection results is performed by a certified internal laboratory, independent from production plants and that the presented inspection results comply with order requirements.
-Inspection certificate 2.2 by which it is declared that the products have been delivered in accordance with the requirements of the contract on the basis of the results of ”non-specific tests”.
-Inspection certificate 3.2 which is prepared by an authorized inspector, representative of the independent certification company that has been appointed according to the official rules and which confirms that the delivered products comply with the requirements of the contract, and it contains the test results (referring to the shipbuilding steel).

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HOT ROLLED PRODUCTS

HBIS SERBIA

HOT ROLLED AND PICKLED PRODUCTS

HBIS Serbia produces hot-rolled strips on semi-continuous six-stand rolling mill. On this line, hot-rolled strips can be produced in the range from 720mm to 2050mm of width and from 1.5mm to 15mm of thickness. At the end of the production line hot-rolled strips are wounded up into coils of inner diameter of 740mm (+/-30mm) and maximum outside diameter of 2000mm. The Hot rolling line can produce smooth strips with mill surface and patterned strips (pattern type: diamond or teardrop).

Hot rolled coil can be additionally processed on:
- Pickling line
- Cross-cutting line for hot rolled coils, cut in sheets and packed in bundles
- Longitudinal cutting line for hot rolled coils cut in slit strip

Hot-rolled products can be ordered according to the following parameters:

Delivery:
- Hot rolled coil
- Hot rolled sheets
- Hot rolled slit coils

Surface type:
- Mill surface (surface with no rolled-in and loosely adhered ferro - oxide powder typical for rolling on higher temperatures)
- Pickled surface (surface from which no rolled-in and loosely adhered ferro-oxide are removed by pickling in hydrochloric acid)
- Patterned surface (regular embossed pattern surface diamond or tear shaped)

Edge condition:
- Mill edge
- Cut (trim) edge

Pickled surface oiling:
- Unoiled surface
- Oiled surface

Coil inner diameter:
- 740 mm (+/- 30 mm)
- 610 mm (+/- 30 mm)

The possibility of producing a hot-rolled product with a specific delivery form, surface type, edge condition, oiling of pickled surface or inner diameter is being agreed upon during the ordering. On that occasion, requests related to quality and dimension assortment, measures and shapes with tolerance, quality certificates, end use, packing type, general delivery terms, and other requests are also being considered.

PICKLED PRODUCTS

According to the range of production possibilities, pickled products can be delivered as:

- Pickled coils
- Pickled sheets
- Pickled slit coils

Measures and shape with tolerances

Hot-rolled products are delivered in accordance with the measures and shape prescribed by the following European Standards: EN 10051/2010 - standard for hot-rolled coils and sheets with the mill or pickled surface.
Values in EN 10051/2010 are not applicable to uncropped ends of hot-rolled coils ("head" and "tail"). Maximum length (in meters) for the mentioned coil ends can be up to ***90/nominal thickness*** *(mm), provided that it does not exceed 20 meters*.
DIN 59220/1983 - standard for hot-rolled coils and sheets with patterned surface (excluding critical dimensions).
Note: flatness of patterned sheets is guaranteed according to EN 10051/2010.

The delivery of hot-rolled products with a tighter thickness tolerance is also possible according to the table:

Nominal thickness (mm)	Thickness for			
	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
≤ 2.00	± 0,12	± 0,13	± 0,15	
> 2.00 ≤ 2.50	± 0,12	± 0,13	± 0,15	± 0,16
> 2.50 ≤ 3.00	± 0,12	± 0,14	± 0,15	± 0,16
> 3.00 ≤ 4.00	± 0,12	± 0,14	± 0,15	± 0,16
> 4.00 ≤ 5.00	± 0,12	± 0,15	± 0,16	± 0,17
> 5.00 ≤ 6.00	± 0,13	± 0,15	± 0,16	± 0,17
> 6.00 ≤ 8.00	± 0,14	± 0,16	± 0,17	± 0,18
> 8.00 ≤ 10.0	± 0,15	± 0,17	± 0,18	± 0,19
> 10.0 ≤ 12.5	± 0,16	± 0,18	± 0,19	± 0,20
> 12.5 ≤ 15.0	± 0,20	± 0,22	± 0,24	± 0,26

- The possibility of guaranteeing thickness with narrowed tolerances in accordance with the table is reviewed when ordering.
- The specified values for thickness tolerance given in the table do not apply to the uncut ends of a coil with a total length of l, which is calculated by the following formula

$$l(mm) = \frac{90}{\text{nominal thickness (mm)}}$$

,as long as the result does not exceed 20 meters.

Delivery of hot-rolled products according to the ASTM standard for measures and shapes is possible, as per following: ASTM A568M-15, ASTM A635M-14. The possibility of delivery of hot-rolled products according to other global standards for measures and shape is being evaluated during the ordering. For certain assortment and critical dimensions, the possibility of flatness guarantee is being evaluated during the ordering.

Types of steel products

HBIS Serbia possesses latest equipment and technology with the controlled rolling regime that provides product quality compatible with the requirements of the recognized global standards. Providing guarantees of properties for specific purposes designates the qualitative assortment of hot-rolled products that include the following types of steel:

- **Structural steel**
- **Low-carbon steel for cold forming or for further cold rolling**
- **Commercial steel**
- **Steel for shipbuilding**
- **Steel for boilers and high pressure vessels**
- **Micro-alloyed, thermo-mechanically rolled, high yield strength steel for cold forming**
- **Pipe steel according to API 5L standards**

Each of the listed steel types has specific, usual delivery types, as well as a certain dimensional assortment.

HOT-ROLLED COILS

The production possibility of specific dimension for hot-rolled coils with mill or pickled surface in range of possible dimensions is defined in tables given in the chapter "Dimensional possibilities of production". If not otherwise indicated in the table, the maximum unit specific weight of coil is 18kg/mm.
The grades are grouped according to the prescribed standard requirement for the yield strength (Re). This general division implies that the group "S235" comprises of steel with the standardized prescribed minimum yield strength Re less or equal to 235 MPa, group "S275" with the standardized prescribed minimum yield strength Re equal to 275Mpa, and group "S355" with the standardized prescribed minimum yield strength Re equal to or higher than 355Mpa.
This catalog shows which table of "Dimensional possibilities of production" is being used for each steel type. The possibility of production of hot-rolled coil of certain grade, dimensions and weight is being evaluated during the ordering. The possibility to produce a hot-rolled coil whose grade, dimensions and weight are beyond the range defined by the tables and diagrams can also be taken into consideration.

STRUCTURAL STEEL

Structural steels are supplied in grades produced according to the quality standards given in the comparative table:

EN 10025/90+A1/93	EN 10025-2/2004	EN 10025-2/2019	EN 10025-3/2019	DIN 17100/1980	ASTM
S185					
S235JR S235JRG2	S235JR	S235JR		RSt 37-2	SS GRADE 230 - ASTM A1011M-14 SS GRADE 250 TYPE 1 ASTM A1018M-15 SS GRADE 250 TYPE 2 - ASTM A1011M-14&ASTM A1018M-15
	S235JO	S235JO			
S235J2G3	S235J2	S235J2		St 37-3	
S275JR	S275JR	S275JR		St 44-2	
S275JO	S275JO	S275JO			
S275J2	S275J2	S275J2		St 44-3	
S355JR	S355JR	S355JR			HSLAS Grade 340 Class 1 HSLAS Grade 380 Class 1 ASTM A1011-14 & ASTM A1018M-15
S355JO	S355JO	S355JO			
S355J2G3 S355J2G4 S355K2G3	S355J2	S355J2		St 52-3	
			S355N		
			S355NL		

If normalized steel is required when ordering, that request should be emphasized due to evaluating the possibilities of production and any additional testing. The similarity of grades given in the comparative table is conditional. It is mandatory to use the original standards for quality for a more detailed and accurate quality comparison.

NON-ALLOY STRUCTURAL STEEL

Chemical composititon of steel according to EN10025-2/2019

Quality	C max	Mn max	Si max[1]	P max	S max	Al min	N max	CEV max[2]	Other[3]
S235JR	0,17	1,40		0,035	0,035		0,0120	0,35	
S235J0	0,17	1,40		0,030	0,030	0,020	0,0120	0,35	
S235J2	0,17	1,40		0,025	0,025	0,020		0,35	
S275JR	0,21	1,50		0,035	0,035	0,020	0,0120	0,40 (1)	
S275J0	0,18	1,50		0,030	0,030	0,020	0,0120	0,40 (1)	
S275J2	0,18	1,50		0,025	0,025	0,020		0,40 (1)	
S355JR	0,24	1,60	0,55	0,035	0,035	0,020	0,0120	0,45 (1)	
S355J0	0,20	1,60	0,55	0,030	0,030	0,020	0,0120	0,45 (1)	
S355J2	0,20	1,60	0,55	0,025	0,025	0,020		0,45 (1)	

1) The suitability of steel for applying a coating of zinc (Zn) by a hot process, based on the chemical analysis of the heat, is divided into three categories:

Category	Si	Si + 2.5P
	[mas. %]	[mas. %]
A	$\leq$ 0.030	$\leq$ 0.090
B	$0.14 \leq Si \leq 0.25$	
D	$0.25 \leq Si \leq 0.35$	

2) When S275 and S355 grade products are manufactured with controlled Si content, e.g. suitable for hot Zn coating, then the maximum carbon equivalent (CEV) in the chemical composition table should be increased as follows:
- for Si content ≤0.04 %, the maximum CEV value should be increased by 0.02
- for Si content ≤0.25 %, the maximum value of CEV should be increased by 0.01

3) If, in accordance with the contract, other elements are added to steel, they must be reported in the inspection document

Chemical composititon of steel for quality S185 according to EN10025/90+A1/93

Quality	C max	Mn max	Si max (1)	P max	S max	Al min	N max	CEV max	Other
S185	-	-	-	-	-	-	-	-	-

1) The content of Si depends on suitability for hot-dip zinc-coating
Al-killed steel has a minimum Al content of 0.020%.

Tension properties at room temperature for quality according to EN10025-2/2019

Quality	R_{eH} min	Rm min t <3.0 mm	Rm min 3.0≤ t ≤ 100 mm	A_{80} min t ≤ 1.0 mm	A_{80} min 1.0<t ≤ 1.5 mm	A_{80} min 1.5<t ≤ 2.0 mm	A_{80} min 2.0<t ≤ 2.5 mm	A_{80} min 2.5<t ≤ 3.0 mm	$A_{5.65\sqrt{S_0}}$ min 3.0<t ≤ 40 mm	Tension tests
S235JR	235	360 - 510	360 - 510	15	16	17	18	19	24	
S235J0	235	360 - 510	360 - 510	15	16	17	18	19	24	
S235J2	235	360 - 510	360 - 510	15	16	17	18	19	24	
S275JR	275	430 - 580	410 - 560	13	14	15	16	17	21	
S275J0	275	430 - 580	410 - 560	13	14	15	16	17	21	Transvesal
S275J2	275	430 - 580	410 - 560	13	14	15	16	17	21	
S355JR	355	510 - 680	470 - 630	12	13	14	15	16	20	
S355J0	355	510 - 680	470 - 630	12	13	14	15	16	20	
S355J2	355	510 - 680	470 - 630	12	13	14	15	16	20	
S355K2	355	510 - 680	470 - 630	12	13	14	15	16	20	

t : normal thickness

Impact properties Kv2 for steel quality

Quality	$KV_{2\ avg}$ min [J] [2, 3]	Temperatura [°C]	Impact tests
S235JR	27[1,2]	20	
S235J0	27	0	
S235J2	27	-20	
S275JR	27	20	
S275JR	27[1,2]	20	
S275J0	27	0	Longitudinal
S275J2	27	-20	
S355JR	27[1,2]	20	
S355J0	27	0	
S355J2	27	-20	
S355K2	40	-20	

1) Impact properties of JR quality products in thicknesses ≥6.00 mm is tested and guaranteed, only when specified when ordering the material.
2) For JR quality products with a nominal thickness ≥6.00 mm, which are subject to the AD 2000-Merkblatt W0/W1 certificate, testing and guaranteeing the impact properties value of KV2: min.27J at 20 oC is mandatory$_2$: min.27J na 20 °C

The delivery condition of hot-rolled flat products can be in +AR (rolled), +N (normalized rolled) or +M (thermomechanically rolled) condition.

Mechanical properties for grade S185 according to EN10025/90+A1/93

Quality	R_{eH} min	Rm min t <3.0 mm	Rm min 3.0≤ t ≤ 100 mm	A_{80} min 1.0<t ≤ 1.5 mm	A_{80} min 1.5<t ≤ 2.0 mm	A_{80} min 2.0<t ≤ 2.5 mm	A_{80} min 2.5<t ≤ 3.0 mm	$A_{5.65\sqrt{S_0}}$ min 3.0<t ≤ 3.0 mm
S185	185	310-540	290-510	9	10	11	12	16

Dimensional possibilities of structural steel production

Structural steels are delivered as hot rolled coils with mill or pickled surface in a dimension range given in the tables of dimensional possibilities. For the grades containing the mark S185 or S235 in their name, use the table of “S235” group, for the grades containing the mark S275 in their name, use the table of “S275” group, and for the grades containing the mark as S355 in their name, use the table of “S355” group. The table with dimensional possibilities is given in the attachment, and the possibility of production of hot-rolled coils with specific dimensions and weights is being evaluated during ordering.

WELDABLE FINE-GRAINED STRUCTURAL STEELS IN A NORMALIZED ROLLED CONDITION

Weldable fine-grained structural steels in normalized rolled condition are delivered in the qualities and thicknesses given in the following table:

Quality	Standard	Thickness	Delivery Condition
S355N	EN 1025-3/2019	4.50-15.00	N
S355NL		4.50-15.00	

Chemical composition of steel according to EN10025-3/2019

Quality	S355N	S355NL
C $_{max}$	0.20	0.18
Mn $_{min}$	0.90	0.90
Mn $_{max}$	1.65	1.65
Si $_{max}$ [1)]	0.50	0.50
P $_{max}$	0.0300	0.0250
S $_{max}$	0.0250	0.0200
Al $_{min}$	0.020	0.020
N $_{max}$	0.0150	0.0150
Cu $_{max}$	0.55	0.55
Nb $_{max}$	0.050	0.050
Ti $_{max}$	0.050	0.050
V $_{max}$	0.120	0.120
Cr $_{max}$	0.30	0.30
Ni $_{max}$	0.50	0.50
Mo $_{max}$	0.10	0.10
Cev [(2)]	0.43	0.43

1) The suitability of steel for applying a coating of zinc (Zn) by a hot process, based on the chemical analysis of the heat, is divided into three categories:

Category	Si	Si + 2.5P
	[mas. %]	[mas. %]
A	≤ 0.030	≤ 0.090
B	0.14 ≤ *Si* ≤ 0.25	
D	0.25 ≤ *Si* ≤ 0.35	

2) When the S275 and S355 grade products are produced with a controlled Si content, e.g. suitable for hot Zn coating, then the maximum carbon equivalent (CEV) in the chemical composition table should be increased as follows:
- for Si content ≤0.04 %, the maximum value of CEV should be increased by 0.02
- for Si content ≤0.25 %, the maximum value of CEV should be increased by 0.01

Mechanical properties of steel according to EN10025-3/2019

Quality	S355N	S355NL
$R_{eH\ min}$	355	355
$R_{m\ min}$	470	470
$R_{m\ max}$	630	630
$A_{5.65}\int_{So\ min}$	22	22
Tensile tests	Transversal	Transversal
$KV_{2\ avg.\ min}$	40	27
$Kv_{2\ ind.\ min}$	28	19
Temperature	-20	-50
Impact tests	Longitudinally	Longitudinally

LOW-CARBON STEELS FOR COLD FORMING OR FURTHER COLD ROLLING

Low-carbon steels for cold forming or further cold rolling are delivered in the grades produced according to the quality standards given in the comparative table of grades:

Standard	EN 10111	DIN 1614 T1	DIN 1614 T2	JIS G 3132/87	BS 1449/1993
Quality	DD 11	St 22	StW22	SPHT 1 SPHT 2	HR4
	DD 12	RRSt 23			
	DD 13	St 24	StW 24		

The similarity of grades given in the comparative table is conditional. It is necessary to use adequate quality standards for a more detailed comparison. During the ordering, it should be emphasized whether end use is cold forming or further cold rolling, in order to evaluate the possibility of guaranteeing the end use, i.e. in order to determine the appropriate quality.

Chemical composition of steel according to EN10111/2008

Quality	C max	Mn max	P max	S max
DD11	0.12	0.60	0.045	0.045
DD12	0.10	0.45	0.035	0.035
DD13	0.08	0.40	0.030	0.030

Mechanical properties of steel according to EN1011/2008

Quality	R_{eL} $1,50 \leq t < 2.00$	R_{eL} $2.00 \leq t \leq 11.00$	Rm max	A min $1,5 \leq t < 2.0$	A min $2,0 \leq t < 3.0$	A min $3.0 \leq t \leq 11.0$
DD11	170-360	170-340	440	23	24	28
DD12	170-340	170-320	420	25	26	30
DD13	170-330	170-310	400	28	29	33

t : nominal thickness(mm)
Tensile properties are tested and guaranteed on a test taken transverse to the direction of rolling

Dimensional possibilities of production of low-carbon steel for cold forming or further cold rolling

Low-carbon steels for cold forming or further cold rolling are delivered as hot-rolled coils with mill or pickled surface in the dimension range given in the table marked as “S235”. The table with dimensional possibilities is given in the text below, and the possibility to produce hot-rolled coils with specific dimensions and weights is being evaluated during the ordering.

COMMERCIAL STEELS

Structural steels are delivered in grades produced according to quality standards given in the comparative table:

Quality	Standard
A 283 C	ASTM A 283/2000
SAE 1006	ASTM A 568/03
SC Type A	ASTM A1008M-15
SC Type B	ASTM A 1011M-14
SC Type B	ASTM A 1018M-15
CS Type B - 1006	ASTM A 1011M-14
CS Type B - 1008	ASTM A 1011M-14

STEELS FOR SHIPBUILDING

Steels for shipbuilding are delivered in the grades produced according to the standards given in the comparative table of grades:

Quality	Standard	Thickness (mm)	Delivery condition
A	Lloyd's Register / 2023	≥ 3.0 ≤ 15.0	AR
DH 32	Lloyd's Register / 2023	≥ 8.0 ≤ 12.0	M
DH 36	Lloyd's Register / 2023	≥ 8.0 ≤ 12.0	M
NV A	DNV / 2023	≥ 3.0 ≤ 15.0	AR

The similarity of grades given in the comparative table is conditional. It is necessary to use adequate quality standards for a more detailed comparison.

Chemical composition of steel according to Lloyd's Register/2023 and DNV/2023

Standard	Lloyd's Register/2023			DNV/2023
Chemical composition	Quality			
	A	DH 32	DH 36	NV A
C min	0.00	0.00	0.00	
C max	0.21	0.18	0.18	0.21
Mn min	0.53	0.90	0.90	0.525
Mn max		1.60	1.60	
Si max	0.50	0.05	0.05	0.50
P max	0.0350	0.035	0.0350	0.035
S max	0.0350	0.035	0.0350	0.035
Al min		0.020	0.020	
Nb min		0.020	0.020	
Nb max		0.050	0.050	
Ti min		0.000	0.000	
Ti max		0.020	0.020	
V min		0.000	0.000	
V max		0.010	0.010	
Cu max		0.350	0.350	0.30
Ni max		0.400	0.400	0.40
Cr max		0.200	0.200	0.20
Mo max		0.080	0.080	0.08
CEV max		0.360	0.380	
Pcm max				
(C+1/6 Mn) max	0.40			0.40
(Nb+Ti+V) max		0.120	0.120	

Mechanical properties of steel according to Lloyd's Register/2023 i DNV/2023

	Lloyd's Register/2023		DNV/2023	
	A	DH 32	DH 36	NV A
ReH min	235	315	355	235
Rm min	400	440	490	400
Rm max	520	570	630	520
A 5.65ÖSo min	22	22	21	22
Tensile properties	Transversal	Transversal	Transversal	Transversal
KV2 min	27	31	34	27
Temperature	20	-20	-20	20
Impact test	Longitudinal	Longitudinal	Longitudinal	
KV2 Mandatory	NO	YES	YES	NO
Bending	27	+	+	
Bending Test Specimen		Transversal	Transversal	Transversal
Delivery Conditions	AR | N | NR | TM	TM	TM	AR | N | NR | TM

Dimensional possibilities of production of shipbuilding steel

Shipbuilding steel of normal strength of Grade **A** as per Lloyd's Register/2023 and grade **NV A** as per DNV standard, are produced as hot-rolled coils with a rolling surface in the dimensional ranges given in the "S275" group diagram.
High-strength shipbuilding steel of grades DH 32 and DH 36 according to the Lloyd's Register/2023 standard
is supplied as hot-rolled coils with a rolling surface in the dimensional ranges given on the "S355" group diagram. The diagrams are clear, and the possibility of producing a hot-rolled coil of certain dimensions and weights is evaluated during the ordering.

STEEL FOR PRESSURE VESSELS

Pressure vessel steel is delivered in grades produced according to the quality standards given in the comparative table.

Quality	Standard	Thickness	Steel
P265GH	EN 10028-2/2017	≥3.0 < 6.0	Carbon Normalized Rolled
P265GH	EN 10028-2/2017	≥6.0 < 12.0	Microalloyed Normalized Rolled
P295GH[1)]	EN 10028-2/2017	≥4.5 < 6.0	Carbon Normalized Rolled

1) The possibility of production is evaluated when ordering.

Chemical composition of steel quality according to EN 10028-2/2017

Quality	*C max*	Mn min t <6.0 mm	Mn min t ≥6.0 mm	Mn max	Si max	P max	S max	Al min	N max	Nb max	Ti max	V max	Other
P265GH	0.200	0.60	0.80	1.40	0.40	0.0250	0.0100	0.020	0.0120	0.030	0.030	0.020	
P295GH	0.200	0.70	0.90	1.50	0.40	0.0250	0.0100	0.020	0.0120	0.030	0.030	0.020	

1) Cu: max.0,30 %; Ni: max.0,30 %; Cr: max.0,30 %; Mo: max.0,08 %; (Cu+Ni+Cr+Mo): max.0,70 %; Al/N: min.2

Mechanical properties of steel quality according to EN 10028-2/2017

Quality	R_{eH} min	Rm min	A min	min $R_{p0.2}$ at 300 °C	min KV_2	Temperature	Tensile Tests	Toughness tests	Delivery Condition
P265GH	265	410-530	22	173	27	-20	Transversal	Transversal	N
P295GH	295	460-580	21	192	27	-20	Transversal	Transversal	N

For qualities according to EN 10028-2/2017, the inspection certificate AD 2000-Merkblatt W0/W1 is mandatory.
HBIS Serbia has the following certificates for these materials:
- Products for pressure vessels in accordance with AD 2000-Merkblatt W0 i
- Manufacturer of materials according to the directive for pressure vessels in accordance with the Directive 2014/68/EU Annex I, Section 4.3.

STEEL FOR WELDED GAS

Steel for welded gas cylinders is delivered in the grades produced according to the quality standards given in the comparative table:

Quality	Standard	Thickness	Steel
P265NB	EN 10120/2008	≥2.0 ≤3.0	Carbon Normalized Rolled
P310NB	EN 10120/2008	≥2.0 ≤4.0	Carbon Normalized Rolled

*Production possibility is evaluated during the ordering.

Chemical composition of steel according to EN 10120/2008

Quality	C max	Mn min	Si max	P max	S max	Al min	N max	Nb max	Ti max
P265NB	0.190	0.400	0.250	0.0250	0.0150	0.020	0.0090	0.050	0.030
P310NB	0.200	0.700	0.500	0.0250	0.0150	0.020	0.0090	0.050	0.030

Mechanical properties of steel according to EN 10120/2008

Quality	R_{eH} min	Rm	A_{80} min t <3.0	$A_{5.65\sqrt{S_o}}$ min 3.0≤ t <5.0	Tensile properties tests	Delivery condition
P265NB	265	410-500	24	32	Transversal	N
P310NB	310	460-550	21	28	Transversal	N

t : nominal thickness [mm].

Dimensional possibilities of production of steel for boilers and pressure vessels

Boiler and pressure vessel steel is delivered in coils with a rolled or pickled surface in dimensional ranges given in the “S235”, “S275” or “S355” group tables.

The table with dimensional possibilities is given below, and the possibility of production of hot-rolled coils with specific dimensions and weight is evaluated during the ordering.

MICRO-ALLOYED, THERMOMECHANICALLY ROLLED, HIGH YIELD STRENGTH STEELS FOR COLD FORMING

Micro-alloyed, thermo-mechanically rolled, high yield strength steel for cold forming is delivered in the grades and thicknesses produced by quality standards given in the following table.

Quality	Standard	Thickness(mm)
S315MC	EN 10149-2/2013	≥2.0 ≤5.7
S355MC		≥2.5 ≤15.0
S420MC		≥2,5 ≤12.0
S460MC		≥6.0 ≤12.0
S500MC		6.000

Chemical composition of steel according to EN 10149-2/2013

Quality	C max	Mn max	Si max[1)]	P max	S max[2)]	Al min	Nb max	V max	Ti max	Other
S315MC	0.12	1.30	0.50	0.0250	0.0200	0.015	0.090	0.0200	0.0150	
S355MC	0.12	1.50	0.50	0.0250	0.0200	0.015	0.090	0.0200	0.0150	
S420MC	0.12	1.60	0.50	0.0250	0.0150	0.015	0.090	0.0200	0.0150	
S460MC	0.12	1.60	0.50	0.0250	0.0150	0.015	0.090	0.0200	0.0150	
S500MC	0.12	1.70	0.50	0.0250	0.0150	0.015	0.090	0.0200	0.0150	

1) For qualities of steel suitable for coating of zink (Zn) by a hot process, the content of Si is agreed at the time of ordering.The suitability of steel for applying a layer of zinc (Zn) by the hot process, based on the chemical analysis of the heats, is divided into three categories, as defined by the following table.

Category	Si	Si + 2.5P
	[mas. %]	[mas. %]
A	≤ 0.03	≤ 0.09
B	$0.14 \leq Si \leq 0.25$	
D	$0.25 \leq Si \leq 0.35$	

2) If it is agreed during ordering, Si content shall be max 0,0100%

3) (Si+2.5P): max.0,09 %; (Nb+V+T): max.0,22 %

Mechanical properties of steel according to EN 10149-2/2013

Quality	R_{eH} min	R_m	A 80 min t< 3.0 mm	A 5.65 √So min t≥3.0 mm	Min. Mandrel diameter for bending by 180o	KV_2 1)	Tensile Tests	Bending tests	Delivery Condition
S315MC	315	390-510	20	24	0 x t		Longitudinal	Transversal	M
S355MC	355	430-550	19	23	0.5 x t		Longitudinal	Transversal	M
S420MC	420	480-620	16	19	0.5 x t		Longitudinal	Transversal	M
S460MC	460	520-670	14	17	1 x t		Longitudinal	Transversal	M
S500MC	500	550-700	12	14	1 x t		Longitudinal	Transversal	M

t: nominal thickess [mm]

1) If agreed at the time of ordering, the impact energy must be verified for products with nominal thickness ≥6.00 mm.
In that case, the minimum guaranteed absorbed energy shall be 40J at -20 oC

Dimensional possibilities of production of microalloyed thermomechanically rolled, high yield strength steels for cold forming

Micro-alloyed, thermomechanically rolled, high yield strength steel for cold forming is delivered as hot-rolled coils with mill or pickled surface, in the dimension ranges given in the table table of the group micro-alloyed hot-rolled coils "S355"
The table with dimensional possibilities is given below, and the possibility of production of hot-rolled coils with specific dimensions and weight is being evaluated during the ordering.

STEEL FOR GAS PIPE-LINES ACCORDING TO API 5L STANDARD

Steel for gas pipe-lines, according to the API 5L standard, is supplied in two basic levels of standard technical requirements. These are expressed as two product specification leves (PSL 1 and PSL 2). Due to specific requirements, the possibility of producing pipe steel is evaluated during the ordering.
Level PSL 1 provides a standard quality level for pipes.
Level PSL 2 has additional binding requirements for chemical composition, strength and impact properties.
The chemical composition of PSL 1 and PSL 2 pipe grades according to API 5L/2018 is given in the tables below.

Quality	Standard	Thickness (mm)	Steel	Delivery Condition
BN PSL2	API 5L/2018	3.00-15.00	Normalized rolled C-Mn steel	N
BN PSL2		5.70-9.70		
X42M PSL2		3.00-13.69		
X52M PSL2		3.70-11.69	Thermomechanically rolled microalloyed	M
X60M PSL2		5.70-13.69		
X70M PSL2		10.90-15.00		

Steel for pipes as per API 5L standard is delivered in coils with a rolling edge and surface in the dimensional ranges given in the "S355 (Microalloyed)" group tables.The table with dimensional possibilities is given below, and the possibility of producing hot-rolled coils of certain dimensions and weights is evaluated during the ordering.

Chemical composition of steel for gas pipelines according to API 5L/2018

Quality	C max	Mn max	Si max	P max	S max	Nb max	Ti max	V max	Cu max	Ni max	Cr max	Mo max	B max	Σ (Nb+V) max	Σ (Nb+Ti+V) max	CEV max	Pcm max
BM PSL2	0.16	1.50	0.45	0.0250	0.0150	0.050	0.040	0.050	0.50	0.30	0.30	0.15	0.001		0	0.43	0.25
BN PSL2	0.18	1.50	0.40	0.0250	0.0150		0.040		0.50	0.30	0.30	0.15	0.001	0.06		0.43	0.25
X42 PSL1	0.19	1.65		0.0300	0.0300									0.06	0.15		
X42M PSL2	0.15	1.65	0.45	0.0250	0.0150	0.050	0.040	0.050	0.50	0.30	0.30	0.15	0.001		0	0.43	0.25
X52 PSL1	0.21	1.65		0.0300	0.0300									0.06	0.15		
X52M PSL2	0.17	1.65	0.45	0.0250	0.0150				0.50	0.30	0.30	0.15	0.001		0.15	0.43	0.25
X60 PSL1	0.19	1.75		0.0300	0.0300									0.06	0.15		
X60M PSL2	0.12	1.60	0.45	0.0250	0.0150				0.50	0.50	0.50	0.50	0.001		0.15	0.43	0.25
X70 PSL1	0.19	2.00		0.0300	0.0300									0.06	0.15		
X70M PSL2	0.12	1.70	0.45	0.0250	0.0150				0.50	0.50	0.50	0.50	0.001		0.15	0.43	0.25

$$CEV = C + \frac{Mn}{6} + \frac{(Cr+Mo+V)}{5} + \frac{(Ni+Cu)}{15} \; ; \; Pcm = C + \frac{Si}{30} + \frac{Mn}{20} + \frac{Cu}{20} + \frac{Ni}{60} + \frac{Cr}{20} + \frac{Mo}{15} + \frac{V}{10} + 5B$$

Tensile properties at room temperature of gas pipeline steel quality according to API 5L/2018

Quality	Rt 0.5 min [MPa]	Rt 0.5 max [MPa]	Rm min [MPa]	Rm max [MPa]	Nom.Thickness(mm) [mm]	A50x12.5 min [%]	Tensile Tests
BM PSL2	245	450	415	655	15.00		Longitudinally
BN PSL2	245	450	415	655	15.00		Longitudinally
X42 PSL1	290		415		15.00		Longitudinally
X42M PSL2	290	495	415	655	15.00		Longitudinally
X52 PSL1	360		460		15.00		Longitudinally
X52M PSL2	360	530	460	760	15.00		Longitudinally
X60 PSL1	415		520		15.00		Longitudinally
X60M PSL2	415	565	520	760	15.00		Longitudinally
X70 PSL1	485		570		15.00		Longitudinally
X70M PSL2	485	635	570	760	15.00		Longitudinally

$$A_{50x12.5} = 1940 \cdot \left[\frac{(H_{nom.} \cdot 12.5)^{0.2}}{\min.R_m^{0.9}} \right]$$

Impact properties of KV2 steel for gas pipelines quality according to API

Quality	Kv2 avg. OD ≥508 [J]	Kv2 avg. 508<OD≤762 [J]	Kv2 avg. 762<OD≤914 [J]	Kv2 avg. 914<OD≤1219 [J]	Kv2 avg. 1219<OD≤1422 [J]	Kv2 avg. 1422<OD≤2134 [J]	T (°C) [°C]	Impact Tests
BM PSL2	27	27	40	40	40	40	0	Transversal
BN PSL2	27	27	40	40	40	40	0	Transversal
X42 PSL1								Transversal
X42M PSL2	27	27	40	40	40	40	0	Transversal
X52 PSL1								Transversal
X52M PSL2	27	27	40	40	40	40	0	Transversal
X60 PSL1								Transversal
X60M PSL2	27	27	40	40	40	40	0	Transversal
X70 PSL1								Transversal
X70M PSL2	27	27	40	40	54	68	0	Transversal

OD : Outside diameter of the pipe [mm]

Unless otherwise agreed, the mechanical properties of hot-rolled coils for pipe production must be agreed at the time of ordering.The possibility of producing steel for pipes is, due to specific reasons, being evaluated during the ordering.

Dimensional production possibilities

The qualities are sorted in groups according to the requirement of the standard for the yield strength (Re), so the general division implies that:

- the "S235" group includes steel of minimum yield strength prescribed by the standard Re ≤ 235 Mpa;
- for the group "S275" the minimum yield strength prescribed by the standard is Re=275 MPa and
- for the group "S355" standard prescribed minimum yield limit Re=355 Mpa.

The table with dimensional possibilities is given below, and the possibility of production of hot-rolled coils with specific dimensions and weight is evaluated during the ordering.

The possibility of production of hot-rolled coils whose quality, dimension and weight is outside the range defined by the tables and diagrams can also be taken into consideration.

The tables for dimensional possibilities have the following general notes:

	Standard production - Max coil weight 18 Kg/mm
I	Standard production - Max coil weight 10.5 Kg/mm
I - III	Standard production - Max coil weight 15.5 Kg/mm
	Non-standard production - evaluation is needed before contracting

Additional notes typical for specific groups are below the tables.

Hot-rolled coils “S235”

Thickness (mm)		Width (mm)																												
od	do	720	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950	2000	2050
1.50	1.74	I	I	I	I	I	I	I	I	I	I	I	I																
1.75	1.99	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I														
2.00	2.24													I-III	I	I	I	I	I										
2.25	2.49															I-III	I	I	I										
2.50	2.99																I-III	I-III	I										
3.00	3.49																	I-III	I-III										
3.50	3.99																					I-III	I-III						
4.00	4.49																							I-III	I-III				
4.50	4.99																										I-III	I-III	
5.00	5.49																												
5.50	5.99																												
6.00	15.00																												

Hot-rolled pickled & oiled coils “S235”

Thickness (mm)	Width (mm)																	
	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
1.50 - 1.74	I	I	I	I	I	I	I	I	I	I	I	I					
1.75 - 1.99	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III	I-III				
2.00 - 2.00													I-III	I	I	I	I
2.01 - 2.24														I	I	I	I
2.25 - 2.49															I-III	I	I
2.50 - 2.99																I-III	I-III
3.00 - 3.49																	I-III
3.50 - 3.99																	
4.00 - 4.49																	
4.50 - 5.00																	
5.01- 6.00																	

Pickled hot-rolled coils in thickness of ≥5.00 ≤6.00mm in a width of 1500mm can only be produced in a limited quantity max.1000t per month

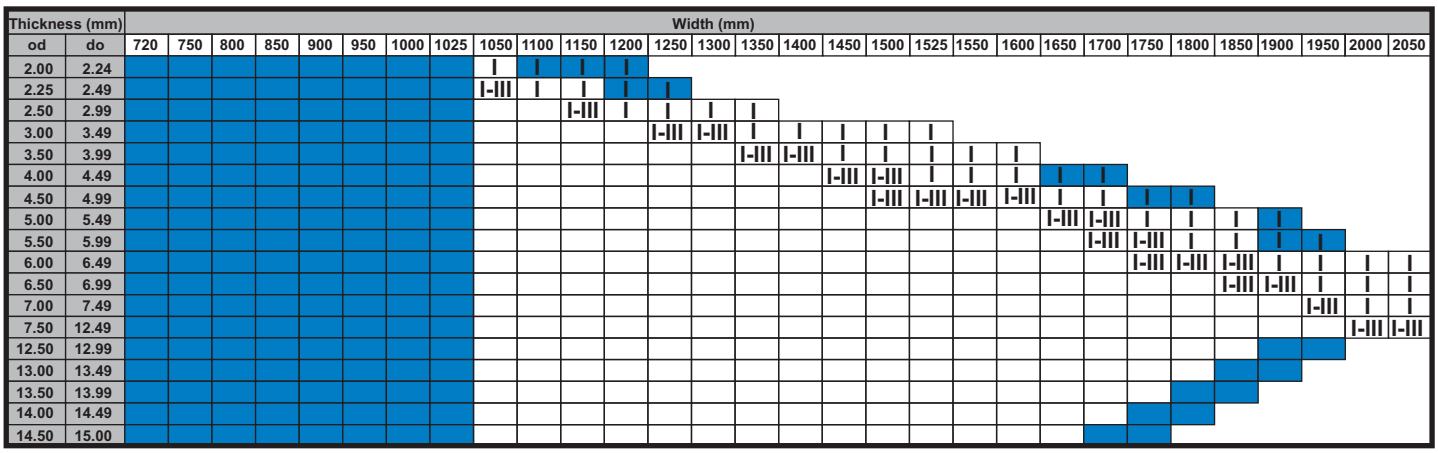
Hot-rolled coils “S275”

Thickness (mm)		Width (mm)																												
od	do	720	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950	2000	2050
1.75	1.99	I	I	I	I	I	I	I	I	I	I	I	I																
2.00	2.24									I-III	I-III	I	I	I	I	I													
2.25	2.49												I-III	I-III	I	I	I	I	I										
2.50	2.99														I-III	I-III	I-III	I	I	I	I								
3.00	3.49																I-III	I-III	I	I	I	I	I	I					
3.50	3.99																		I-III	I-III	I	I	I	I	I	I	I		
4.00	4.49																					I-III	I-III	I	I	I	I	I	I
4.50	4.99																								I-III	I-III	I	I	I
5.00	5.49																										I-III	I-III	I
5.50	5.99																											I-III	I-III
6.00	15.00																												

Hot-rolled pickled & oiled coils “S275”

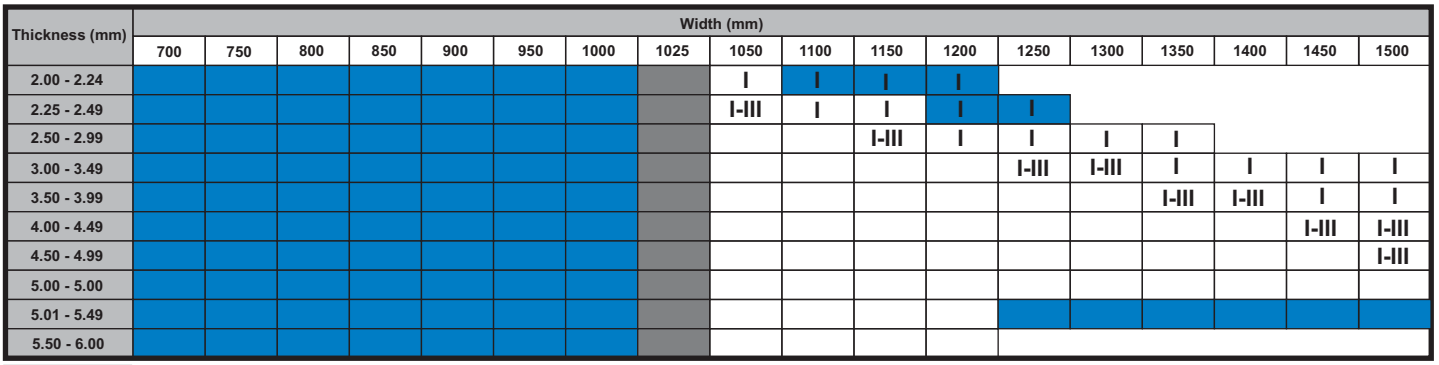
Thickness (mm)	Width (mm)																	
	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
1.75 - 1.99	I	I	I	I	I	I	I	I	I	I	I	I					
2.00 - 2.00									I-III	I-III	I	I	I	I	I		
2.01 - 2.24									I-III	I-III	I	I	I	I	I		
2.25 - 2.49												I-III	I-III	I	I	I	I
2.50 - 2.99														I-III	I-III	I-III	I
3.00 - 3.49																I-III	I-III
3.50 - 3.99																	
4.00 - 4.49																	
4.50 - 5.00																	
5.01- 6.00																	

Micro-alloyed hot-rolled coils “S355”



* Production of hot-rolled strips less than 1025mm wide is not a standard practice

Micro-alloyed hot-rolled pickled & oiled coils “S355”



for HRC P&O with trimmed edges minimum width is 1000mm

SHEETS MADE BY CUTTING HOT-ROLLED COILS

Hot-rolled coils are cut into sheets on cross-cutting lines and packed in bundles. The production possibilities for sheets with mill or pickled surface are defined by general tables which include dimensions of sheets cut in the Hot Strip Mill cross-cutting line and Cold Rolling Mill cross-cutting line.

The tables with dimensional possibilities are given below, and the possibility of production of hot-rolled sheets with specific quality, dimensions and weights is agreed upon during the ordering and is related to the dimensional possibilities of the hot-rolled coil production. Flatness of the sheets with critical assortment dimensions is agreed upon during the ordering.

Hot Strip Mill cross-cutting line cuts the sheets of the following dimensions:

Surface	Dimensions (mm)	
Mill	Thickness	3 - 15
	Width	800* - 2050
	Length	2000 - 12000
Pickled unoiled	Thickness	3 - 6
	Width	800** - 1500
	Length	2000 - 12000

* minimum width of micro-alloyed steel is 1025mm
** for trimmed edges the minimum width of micro-alloyed steel is 1000mm

Cold Rolling Mill cross-cutting lines cut the sheets of the following dimensions:

		Steel groups		
Surface		S235	S275	S355
Pickled & oiled	Thickness	1.50 - 4.00 mm*	1.75 - 4.00 mm**	2.00 - 3.00 mm
	Width	700 - 1500 mm	700 - 1500 mm	1000 - 1500 mm
	Lenght	1 - 4m	1 - 4m	1 - 4m

* / ** non-standard production
* for sheets with thickness of 3.01 - 4.00 mm and width ≥ 1300 ≤ 1500 mm evaluation is needed when contracting
** for sheets with thickness of 3.01 – 4.00 mm and width ≥ 1300 ≤ 1500 mm evaluation is needed when contracting

Dimensional Possibilities of the Cutting Line – Outside Processor

Input			
Product type	Hot Rolled Coils	P & O Hot Rolled Coils	Cold Rolled Coils
Grade acc.to Standard	EN 10025-2/2019	EN 10025-2/2019	EN 10130/2006
	EN 10111/2008	EN 10111/2008	
	EN 10149-2/2013	EN 10149-2/2013	
	EN 10028-2/2017	EN 10028-2/2017	
Tensile Strength [Mpa]	max. 630	max. 630	max. 630
min.Thickness [mm]	1.50	1.50	0.50
max.Thickness [mm]	12.00	6.00	3.00
min.Width [mm]	500	500	500
max.Width [mm]	2050	2050	2050
Tolerances on dimensions and shape	EN 10051/2010	EN 10051/2010	EN 10131/2006
Surface Condition	Unoiled	Oiled/Unoiled	Oiled/Unoiled
Surface Quality	EN 10163-2,Class B, SubClass 3	EN 10163-2,Class B, SubClass 3	AM
max.Weight [t]	25	25	25
min. Inside diameter [mm]	500	500	500
max. Outside diameter [mm]	850	850	850
	Output		
min.Length [mm]	500	500	500
max.Length [mm]	12000	12000	12000
max.Weight [t]	5	5	5
max.Bundle Height [mm]	500	500	500

HOT ROLLED SLIT COILS

Hot rolled coils are slit into strips on the longitudinal cutting lines and are delivered packed individually or in bundles. Production possibilities for slit coils with mill or pickled surface are defined by general tables, which include slit strips cut on the Hot Strip Mill longitudinal cutting line or Cold Rolling Mill longitudinal cutting line.
The tables of dimensional possibilities are given below, and the possibility of production of slit strips with a specific quality, dimensions and weights is agreed upon during the ordering and is related to a hot-rolled coil dimensional production possibilities.

Longitudinal cutting line in the Hot Strip Mill cuts the slit strips of the following dimensions:

Steel group	Slit hot rolled coil		Slit hot-rolled patterned coil	
	Thikness (mm)	Width (mm)	Thickess (mm)	Width (mm)
S355	2.00 - 3.00	52 - 700		
S275	1.80 - 4.50	52 - 700		
S235	1.50 - 7.00	52 - 700	3.00 - 6.00	52 - 700
DD11	1.50 - 7.00	52 - 700		

Mill surface, edge condition R, not oiled

The longitudinal cutting line of the Hot Strip Mill can trim edges of hot rolled coils. The possibility of trimming hot-rolled coils of a certain quality, dimensions and weight is agreed upon when ordering and is related to the dimensional possibilities of hot-rolled coil production and the possibilities of the longitudinal cutting line of the Hot Rolling Mill.

Longitudinal cutting line in Cold Rolling Mill cuts slit strips of the following dimensions:

Surface	Dimensions	Steel goup	
		S235	S275
Pickled	Thickness (mm)	1.50 - 3.80	1.75 - 3.80
	Width (mm)	200 - 700	200 - 700

HOT-ROLLED COILS AND SHEETS OF PATTERNED SURFACES

Patterned surface hot-rolled coils and sheets are produced in qualities S185, S235JR, S275JR according to EN10025 and CS TYPE B according to ASTM A1018M-15. Dimensional possibilities of hot-rolled coil production are given in the tables. The production possibility of hot-rolled coil with a specific quality, dimensions and weights is agreed upon during the ordering.

S185, S235JR

Thickness (mm)		Width (mm)																	
from	to	720	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550
3.00	7.99																		
8.00	10.00																		

Pattern height 0.8 - 2.0mm
Unit specific weight of coil max. 15,5 Kg/mm.
Unit specific weight of coil over 15,5 Kg-mm acceptable for thickness 4 - 8mm and width 720 - 1250mm.

S275JR

Thickness (mm)		Width (mm)																	
from	to	720	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550
3.00	6.00																		

Pattern height 0.8 - 2.0 mm
Unit specific weight of coil max. 15,5 Kg/mm. Mechanical properties for informational purposes only

CS TYPE B according to ASTM A1011M-14, ASTM A1018M-15

Thickness (mm)		Width (mm)																	
from	to	720	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550
1.00	7.99																		
8.00	10.00																		

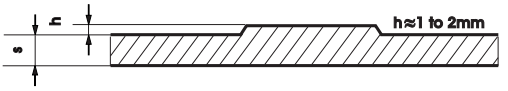
Thickness tolerance according to ASTM A786M-15; Pattern height min 0,5mm
Non-standard production must be subject to review during contracting
Mechanical properties for informational purposes only

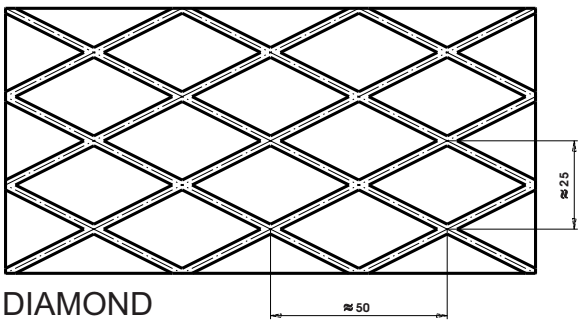
Hot-rolled sheets with patterned surface are produced on the Hot Strip Mill cross-cutting line in the dimensional assortment given in the table. The table with dimensional possibilities is given below and a production possibility of hot-rolled patterned sheets packed in bundles with specific quality, dimensions and weights is agreed upon during the ordering and is related to dimensional possibilities of a hot-rolled coil production.
Flatness of the sheets with critical assortment dimensions is agreed upon during the ordering.

Surface	Dimensions	
Patterned	Thickness	3 - 10* mm
	Width	800 - 1550 mm
	Lenght	2 - 12m

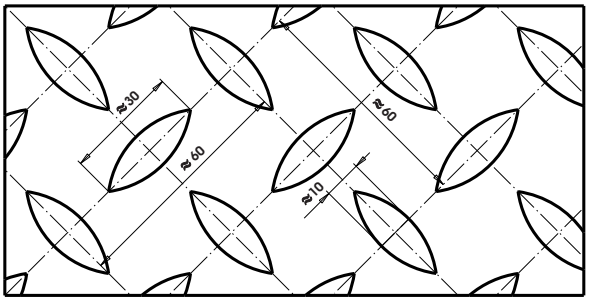
*maximum thickness for S275JR is 6mm

Hot-rolled patterned coils and sheets can be delivered with trimmed edge for steel grade S235JR, thickness 3 - 6 mm and width 950 -1520 mm.





DIAMOND



TEARDROP

COLD-ROLLED PRODUCTS

HBIS SERBIA

COLD-ROLLED PRODUCTS

HBIS Serbia produces cold-rolled products at a highly automated five-stand Tandem mill, which enables cold rolling with maximum reduction of 92%, with the strip shape and profile compatible with the requirements of recognized global standards.
HBIS Serbia possesses technology with the controlled cold rolling, annealing and tempering regime, compatible with the mentioned requirements.
The production process of cold-rolled products starts at an automated five-stand Tandem mill, where through the cold rolling process, pickled hot-rolled strip is transformed into cold-rolled strip with a thickness of 0.17mm to 3.0mm and a width of 700mm to 1500mm.

DELIVERY FORM:

- Cold-rolled coils
- Cold-rolled sheets
- Cold-rolled slitted strip in coils
- Cold-rolled non-annealed coils - Full hard

APPLICATION:

- Low-carbon steel products for cold forming
- Structural steel products
- Low-carbon steel products for enameling
- Steel products for further processing (Full hard)
- Micro-alloyed steels with high yield strength for cold forming

Cold-rolled coils (CRC):

- Strip thickness: 0.35 - 3.00mm
- Strip width: 700 - 1500mm

Width and thickness are interdependent

Inside diameter of coil:

- For thickness: 0.35 - 0.49mm and width ≤1350mm, D=508/610mm
- For thickness: 0.50 - 3.00mm and width ≤ 1500mm, D=508/610mm - has to be agreed upon
- Condition of strip edge: U i R; (U - cut before cold rolling, R - cut after cold rolling)
- Weight 5 - 20t ; For condition of edge R, max. weight is 15t
- Oiled: uniformly oiled surface / unoiled

Cold-rolled sheet (CRSH):

- Strip thickness: 0.35 - 3.00mm
- Strip width: 700 - 1500mm

Width and thickness are interdependent

- Length of sheet: 1000 - 4000mm
- Bundle weight: 2 - 6t
- Oiled: uniformly oiled surface / unoiled

Cold-rolled slit strip in coils (CRCS):

- Strip thickness: 0.35 - 3.00mm
- Strip width: 200 - 700mm
Width and thickness are interdependent
- Inside diameter of coil: D = 508/ 610/ 750mm
- A strip of a width 600 - 700mm is produced by slitting
- Oiled: uniformly oiled surface / unoiled

Cold-rolled non-annealed coils (FULL HARD):

- Strip thickness: 0.35 - 3.00mm
- Strip width: 700 - 1500mm
Width and thickness are interdependent
- Inside diameter of coil: D = 420/508/750
- Weight: max. 20t, min. weight as agreed

Cold-rolled strip for tin mill - black plate (BP):

- Strip thickness:
- 0.17 - 0.49mm for SR material (single reduction in cold condition - single reduced)
- 0.14 - 0.39mm for DR material (double reduction in cold condition - double reduced)
- Strip width: 700 - 1050mm
- Inside diameter of coil: D = 420/508mm
- Outside diameter: max 1800mm
- Weight: max 18t, min. weight as per agreement

Depending on the extent and method of processing in the Cold Rolling Mill, the cold-rolled products ordering can be made according to:

DELIVERY TYPE:

- Cold-rolled coils
- Cold-rolled sheets
- Cold-rolled slit strip in coils

SURFACE QUALITY

Standard	Surface quality	
	normal	special
EN10130/2006	A	B
DIN1623T1/T2/T3/83	O3	O5
ASTM A568M-03	C2	C1

SURFACE FINISH PROCESSING (ROUGHNESS)

Surface finish marking	Mark (EN 10120/2006)	Roughness - Ra (μm)
Bright	b *	≤ 0.4
Semi bright	g	≤ 0.9
Normal (matte)	m	$0.6 < Ra \leq 1.9$
Rough	r *	$Ra > 1.6$ μm

* Bright (b) and rough (r) finishing surfaces are the subject of evaluation during the ordering.
Note: Steel for enameling is produced only with m (matte) finishing surface.

Edge condition:

- mill edge
- cut (trim) edge

Inside diameter:

- 508mm
- 610mm

Oiling of surface with anticorrosive oil:

- oiled
- unoiled

** For trimmed edges the oil amount per strip surface unit can be guaranteed:
a) =max. 1 gr/m2, or b)=0.7 - 1.2 gr/m2, or c)=1.0 - 1.8 gr/m2.

Other oil amount values per strip surface unit are subject to evaluation during the ordering.

Production of cold rolled product with specific delivery form, surface quality, finishing surface processing (roughness), edge condition, inside diameter and surface oiling are being agreed during the ordering. Other requests related to quality and dimension assortment, measures and shapes with tolerances, quality certificates, packing type and general delivery terms are being agreed during the ordering.

STEEL QUALITY

HBIS Serbia has a technology with controlled parameters of the cold rolling process, annealing and tempering, which provides product quality in accordance with the requirements of recognized Technical Standards for products.
Guarantees for properties for specific purposes are primarily determined by the qualitative assortment of cold-rolled products, which includes the following types of steel:

- **Low-carbon steel for cold forming**
- **Structural steel**
- **Low-carbon steel for enameling**
- **Steel for further processing (Full hard)**
- **Micro-alloyed steels with high yield strength for cold forming**

The following comparative tables show the cold-rolled qualities that HBIS Serbia can produce. Quality similarities given in comparing tables are conditional.
For a more detailed comparison of quality similarities, the use of appropriate quality standards is mandatory. The possibility of steel production with features prescribed by internal standards are evaluated during the ordering.

LOW-CARBON STEEL FOR COLD FORMING

Low-carbon steel for cold forming is delivered in grades produced according to the quality standards given in the comparative quality table.

Quality standard	EN 10130/2006	DIN 1623 T1/1983	JIS G 3141/90	ASTM
Quality	DCO1	St 12	SPCC-SD	SAE 1008 ASTM A568/2003 CS Type B ASTM A1008M
	DCO3	RRSt 13		
	DCO4	St 14	SPCEN-SD	SAE 1006 ASTM A568/2003 CS Type A ASTM A1008M
	DCO5			
Standards for strip dimension and shape: EN 10131/2006, DIN 1541/1975, ASTM A568M-03, ASTM A568M-15				

* Mentioned steel grade requires evaluation during ordering.

Chemical composition of steel for qualities according to EN10130/2006

EN 10130/2006: Cold-rolled steel for cold forming				
Quality	C max	Mn max	P max	S max
DC01	0.12	0.60	0.045	0.045
DC03	0.10	0.45	0.035	0.035
DC04	0.08	0.4	0.03	0.030
DC05	0.06	0.35	0.025	0.025

Mechanical properties for qualities according to EN10130/2006

EN 10130/2006: Cold-rolled steel for cold forming											
Quality	Rp0.2 max h≤0.50mm	Rp0.2 max 0.50<h≤ 0.70mm	Rp0.2max h>0.70mm	Rm min	Rm max	A80 min h≤0.50 mm	A80 min 0.50<h≤ 0.70mm	A80min h>0.70 mm	r90 min 0.50≤h≤ 2.00 mm	r90 min h>2.0mm	n90 min h≥0.50 mm
DC01	320	300	280	270	410	24	26	28			
DC03	280	260	240	270	370	30	32	34	1.3	1.1	
DC04	250	230	210	270	350	34	36	38	1.6	1.4	0.18
DC05	220	200	180	270	330	36	38	40	1.9	1.7	0.2

h nominal thickness (mm)

STRUCTURAL STEEL FOR COLD FORMING

Cold forming structural steel is delivered in grades produced according to the quality standards given in the comparative table of grades.

Quality standard	DIN 1623 T2 / 1986	INTERNI STANDARD
Quality		MOT 315
	St 37 - 2G	
	St 37 - 3G	MOT 355
Standard for strip dimension and shape		
EN 10131 / 2006		

Chemical composition of steel in qualities MOT 355 and MOT 315 according to INTERNAL STANDARD

INTERAL STANDARD													
Quality	C - min	C - max	Si - min	Si - max	Mn min	Mn max	P - max	S - max	Al - min	Al - max	N - max	Cu max	Si + 2,5 P - max
MOT 355	0.000	0.145	0.00	0.03	0.00	0.70	0.0250	0.0250	0.020		0.0120		0.090
MOT 315	0.06	0.12	0.00	0.03	0.35	0.60	0.0250	0.0250	0.020	0.060		0.100	

Mechanical properties of steel in qualities MOT 355 and MOT 315 according to INTERNAL STANDARD

INTERNAL STANDARD						
Quality	Rp 0,2 min	Rm - min	A_{80} min	Tensile Test Direction	Bending Test	Bending Test Direction
MOT 355	215	355	24	90	+	90
MOT 315	200	315	28	90		

LOW - CARBON STEEL FOR ENAMELING

Low-carbon steel for enamelling is delivered in grades produced according to the quality standards given in the comparative table of grades.

Quality standard	EN 10209 / 2013	EN 10209 / 1987	DIN 1623 T3 / 1987
Quality	DC01EK	DC01EK	EK 2
	DC04EK	DC04EK	
Standard for strip dimension and shape			
EN 10131 / 2006 i DIN 1541 / 1975			

Mechanical properties of steel for enameling

EN 10209 / 2013: Cold rolled low-carbon steel for enameling									
Quality	C max	Rp 0.2 max h≤0.50 mm	Rp 0.2 max 0.50<h ≤0.70 mm	Rp 0.2 max h>0.70 mm	R_m min	R_m max	A80 min h≤0.50 mm	A80 min 0.50 mm<h≤0.70	A80 min h>0.70 mm
DC01EK	0.08	310	290	270	270	390	26	28	30
DC04EK	0.08	260	240	220	270	350	32	34	36

STEEL FOR FURTHER PROCESSING (FULL HARD)

Cold-rolled steel can be supplied in a non-annealed form as Full hard. Products in that quality are subject to mandatory evaluation at the time of ordering and have the characteristics prescribed by internal quality standards.

HIGH YIELD STRENGTH MICRO-ALLOYED STEELS FOR COLD FORMING

High-yield strength microalloy steel for cold forming is supplied in grades produced according to the quality standards given in the comparative table of grades.

Quality standard	EN 10268/2006
Quality	HC260LA*
	HC300LA*

*Non-standard quality - evaluation is necessary when ordering

Chemical composition of steel in qualities according to EN10268/2006

Quality	C_{max}	Si_{max}	Mn_{max}	P_{max}	S_{max}	Al_{min}	Ti_{max}	Nb_{max}	$(Nb+Ti+V+B)_{max}$
HC260LA	0.1	0.5	0.60	0.0250	0.0250	0.015	0.150	-	0.22
HC300LA	0.1	0.5	1.00	0.0250	0.0250	0.015	0.150	0.090	0.22

Mechanical properties for qualities according to EN 10268/2006

Quality	$R_{p0.2}$ min	$R_{p0.2}$ max	R_m min	R_m max	A_{80} $0.50 \leq h \leq 0.70mm$ min	A_{80} $h > 0.7mm$ min	Tensile Test
HC260LA	260	330	350	430	24	26	90
HC300LA	300	380	380	480	21	23	90

Note: Steel contains one or more alloy elements Nb, Ti and V in order to achieve tensile strength level needed.

DELIVERY TYPES, DIMENSIONS AND WEIGHTS

Cold-rolled steel products are delivered in the dimensions and weight ranges given in the tables below. The tables show common delivery types for this type of steel. Dimension and weight requirements outside the table ranges can also be taken into consideration. The possibility of production of a coil or sheet with specific quality, dimensions and weight is agreed upon during the ordering.

COLD-ROLLED STRIP IN COILS

Cold-rolled strips in coils are delivered in the dimensions and weight ranges given in the table below.

	Low-carbon steel for cold forming		Structual steel	Low-carbon steel for enameling
Thickness (mm)	0.35 - 0.49	0.50 - 3.00	0.50 - 2.50	0.50 - 2.50
Width (mm)	700 - 1350	700 - 1500	700 - 1500	700 - 1500
Weight	5 - 20t	5 - 20t	5 - 20t	5 - 20t

* Given thickness range is approximate and depends on the width.The weight depends on the dimensions and edge condition

COLD-ROLLED SHEETS

Cold rolled sheets are delivered in the dimensions and weight range given in the table below.

	Low-carbon steel for cold forming		Structual steel	Low-carbon steel for enameling
Thickness (mm)	0.35 - 0.49	0.50 - 3.00	0.50 - 2.50	0.50 - 2.50
Width (mm)	700 - 1250	700 - 1500	700 - 1500	700 - 1500
Width (mm)	1000 - 4000	1000 - 4000	1000 - 4000	1000 - 4000
Weight	2 - 6t	2 - 6t	2 - 6t	2 - 6t

*Given thickness range is approximate and depends on the width. The weight depends on the dimensions.

COLD-ROLLED SLIT STRIP IN COILS

Cold-rolled slit strip in coils is delivered in the dimensions and weight range given in the table below.

	Low-carbon steel for cold forming	Structual steel	Low-carbon steel for enameling
Thickness (mm)	0.35 - 3.00	0.50 - 2.50	0.50 - 2.50
Width (mm)	200 - 700	200 - 700	200 - 700

*The given thickness range is approximate and depends on the width. The weight depends on the dimensions and packing type and is agreed upon during the ordering.

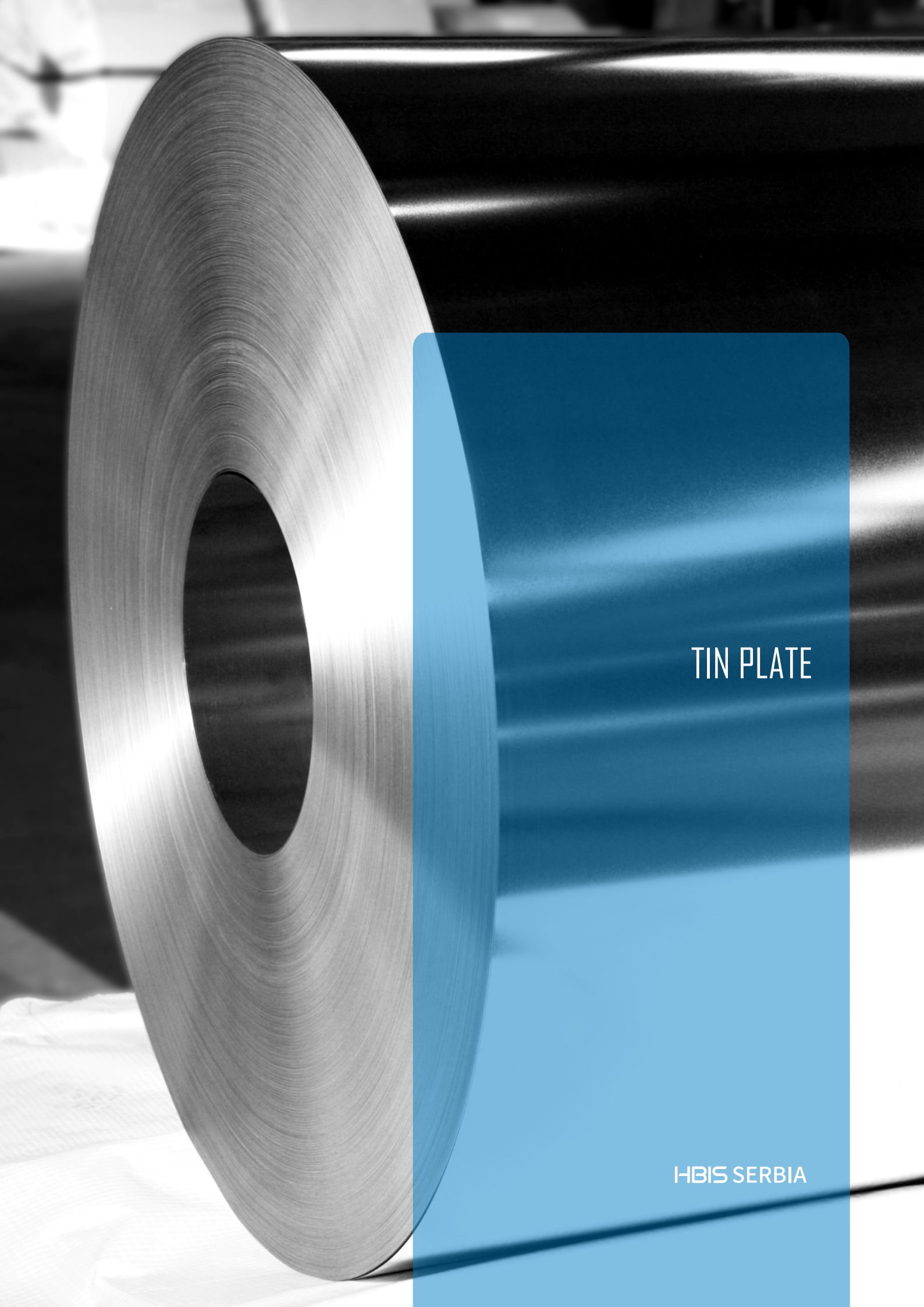
COLD-ROLLED NON-ANNEALED STRIP IN COILS - FULL HARD

Cold-rolled non-annealed strip for further processing (Full hard) is delivered in the dimensions and weight range given in the table below. The possibility of Full hard (steel product for galvanizing) production is determined according to similarity of chemical composition with low-carbon and structural steel products.

	Low-carbon steel		Structural steel
Thickness (mm)	0.35 - 0.49	0.50 - 3.00	0.50 - 2.50
Width (mm)	700 - 1250	700 - 1500	700 - 1500
Weight	5 - 20t	5 - 20t	5 - 20t

*The given thickness range is approximate and depends on the width. The weight depends on the dimensions.

Full hard is delivered without anticorrosive oiling and with the remains of rolling oil on the surface.



TIN PLATE

HBIS SERBIA

TIN PLATE

HBIS Serbia – the branch Tin Plate Mill in Šabac, on its ETL and TSL production lines and through the processes of edge trimming, tinning, cutting and packaging produces the final product tin plate, which is used in the form of a coil or a sheet for further processing and final application by end users. Tin plates produced in HBIS Serbia, have different applications depending on the chemical composition, mechanical properties, dimensions, tin coating and passivation. Tin plate is used in the packaging industry for tin can production, and its further application is found in various areas: food industry, chemical industry, pharmaceutical and other types of industries.

TIN PLATE - COIL

SINGLE REDUCED (SR)
For materials annealed under annealing bell (BA):
Thickness: 0.17 - 0.49mm
Width: 685 - 955mm
For continuous annealed materials (CA):
Thickness: 0.17 - 0.49mm
Width: 700 - 976mm

DOUBLE REDUCED (DR)
For materials annealed under annealing bell (BA): Thickness: 0.14 - 0.26mm
Width: 700 - 950mm
For continuous annealed materials (CA):
Thickness: 0.14 - 0.39mm*
Width: 700 - 975mm

* Maximum thickness depends on the steel quality

TIN PLATE - SHEETS

SINGLE REDUCED (SR)
For materials annealed under annealing bell (BA): Thickness: 0.17 - 0.49mm
Width: 685 - 955mm
For continuous annealed materials (CA):
Thickness: 0.17 - 0.49mm
Width: 700 - 976mm

DOUBLE REDUCED (DR)
For materials annealed under annealing bell (BA): Thickness: 0.14 - 0.26mm
Width: 700 - 950mm
For continuous annealed materials (CA):
Thickness: 0.13* - 0.39mm
Width: 700 - 975mm

- Length: 500 - 1150mm
- Bundle weight: 0.5 - 2.0 t

* Thickness 0.13mm is produced only in grade TS550

HBIS Serbia – Tin Plate Mill Šabac in its processes of tinning, edge trimming, cutting and packaging produces the final product - tin plate, according to the requirements of the EN 10202:2001 standard, and the ordering can be performed according to :

Delivery form:
- tin plate in coils
- tin plate in sheets

Final surface finishing (roughness):

Final surface finishing	Mark	Surface roughness - Ra (μm)
Bright*	BR	≤ 0.35
Fine Stone	FS	0.25 - 0.45
Stone	ST	0.35 - 0.60

* Possibility of Bright (BR) surface production is being agreed upon during ordering

- Passivation:

- 311 (Cathodic Sodium Dichromate - CDC: 3,5- 9,0 mg/m2)
- 300 (Sodium Dichromate Solution: 1,0 - 3,0 mg/m2)

- Oiling:

- DOS (Dioctyl Sebacate: 2 - 10 mg/m2)

- Quantity of tin coating (g/m2):

Possibility of tin plate production in a specific delivery form, final surface finishing (roughness), passivation and quantity of tin coating is being agreed upon during ordering. All other requests related to quality and dimensional range, measures and shapes with tolerances, quality certificates, packaging type and general delivery conditions are discussed during ordering.

Quantity of tin coating (g/m2)	
Normal coating	Differential coating
E 1.0/1.0	D 1.0/1.4
E 1.4/1.4	D 1.0/2.0
E 2.0/2.0	D 1.4/2.0
E 2.8/2.8	D 1.4/2.8
E 4.0/4.0	D 2.0/2.8
E 5.0/5.0	D 2.0/5.0
E 5.6/5.6	D 2.0/5.6
	D 2.8/4.0
	D 2.8/5.0
	D 4.0/2.0
	D 5.6/2.8
	D 8.4/2.8
	D 8.4/5.6
	D11.2/2.8
	D11.2/5.6
Material with differential coating can be produced as stated above and also with reversed values, keeping in mind that tin coating on bottom surface cannot be over 5.6 g/m2.	

STEEL QUALITY

HBIS Serbia delivers tin plate according to EN 10202:2022 standard. Qualities that can be produced are listed in the following table:

Final reduction	SR		DR	
Annealing	CA	BA	CA	BA
Quality	TH 415	TS 245	TH 520	TS 520
	TH 435	TS 260	TH 550	TS 550
		TS 275	TH 580	
		TS 290	TH 620	

Chemical composition:

EN 10202:2022									
Steel type	C min	C max	Mn min	Mn max	S max	P max	Si max	Cu max	Ni max
A	0.04	0.08	0.18	0.35	0.0200	0.0200	0.03	0.08	0.08
B	0.09	0.12	0.30	0.50	0.0200	0.0200	0.03	0.08	0.08
Steel type	Sn max	As max	Mo max	Cr max	N max	Al min	Al max	other max	
A	0.02	0.02	0.02	0.08	0.0080	0.020	0.080	0.02	
B	0.02	0.02	0.02	0.08	0.0080	0.020	0.080	0.02	

Mechanical properties:

EN 10202 / 2022										
GRADE	min. R_e	max R_e	min. R_m (informativno)	max R_m (informativno)	min HR30Tm for $t \leq 0.21$mm	max HR30Tm for $t \leq 0.21$mm	min HR30Tm for $0.21 < t \leq 0.28$mm	max HR30Tm for $0.21 < t \leq 0.28$mm	min HR30Tm for $t > 0.28$mm	max HR30Tm for $t > 0.28$mm
TH415	365	465	385	485	58	66	57	65	56	64
TH435	385	485	410	510	61	69	61	69	61	69
TH520	470	570								
TH550	500	600								
TH580	530	630								
TH620	570	670								
TS245	195	295	290	390	49	57	48	56	47	55
TS260	210	310	310	410	52	60	51	59	50	58
TS275	225	325	325	425	54	62	53	61	52	60
TS290	240	340	340	440	56	64	55	63	54	62
TS520	470	570								
TS550	500	600								

* For TH 620 thickness of 0.291 to 0.38 mm, mechanical properties are not guaranteed according to the standard, but according to: Rp0.2=550-650 MPa and Rm=555-655 MPa.
* For TS 520, the EN10202:2001 standard does not prescribe values of mechanical properties. The given values are internally prescribed.

DELIVERY TYPES, DIMENSIONS AND WEIGHTS

Tin plate is delivered in the dimensions and weight ranges given in the following tables.
The tables show usual delivery forms for this type of steel.
Requests for dimensions and weights that are outside the ranges given in the tables, can also be considered. The possibility of coil or sheet production in specific quality, dimensions and weight is agreed upon during ordering.

Tin plate in coil:

Final reduction	Annealing	Thickness(mm)	Width(mm)
SR*	BA	0.17-0.49	685-955
	CA	0.17-0.49	700-976
DR*	BA	0.14-0.26	700-950
	CA*	0.14-0.39	700-975

DR*CA* Maximum / minimum thickness depends on the steel quality as given in the table.

DR-CA	
Grade	Thickness (mm)
TH 520	0.14-0.39
TH 550	0.14-0.29
TH 580	0.14-0.39
TH 620	0.14-0.37

Coil ID (Inner diameter): 420mm (+10/-15mm)
Coil OD (Outer diameter): max. 1675 mm
Weight: 4 - 18t, depending on the dimensions

Tin plate in sheets:

Final reduction	Annealing	Thickness(mm)	Width(mm)	Length (mm)
SR*	BA	0.17-0.49	685-955	500-1150
	CA	0.17-0.49	700-976	
DR*	BA	0.13*-0.26	700-950	
	CA*	0.14-0.39	700-975	

Package weight: 0.5-2.0t SR* (single reduced) - single reduced tin plate; DR* (double reduced)- double reduced tin plate
BA - annealing under annealing bell
CA - continuous annealing
* thickness 0.13 mm is produced only in grade TS550
DR*CA* Maximum / minimum thickness depends on the steel quality as given in the table for tin plate in coil.

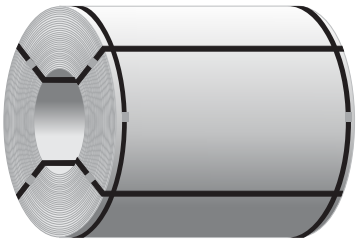
PACKAGING AND TRANSPORT

HBIS SERBIA

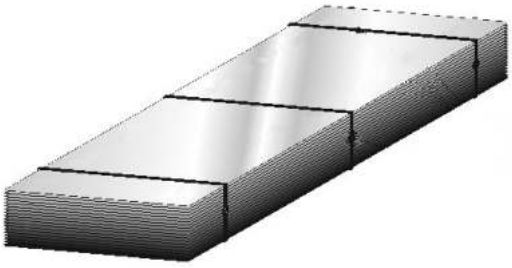
PAKOVANJE I TRANSPORT

Packaging of finished products is done according to the internal packaging standard.

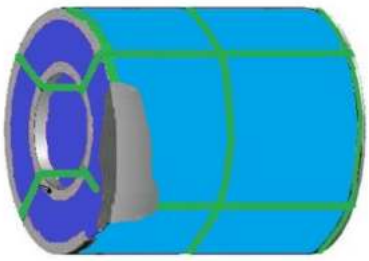
Packages are divided into five basic categories: Basic Packaging, Premium Basic Packaging, Enhanced Packaging, Enhanced Premium and Special Packaging.
Below are images of typical packaging for each type of product. For all other packaging methods, the customer can contact the Sales Department of HBIS Serbia.



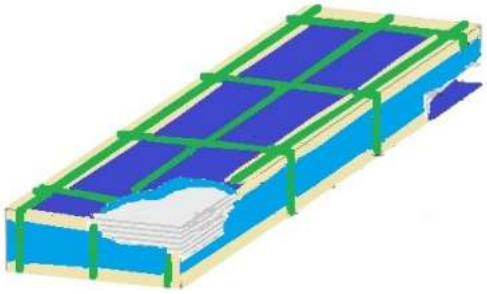
HOT ROLLED COILS
packaging P108



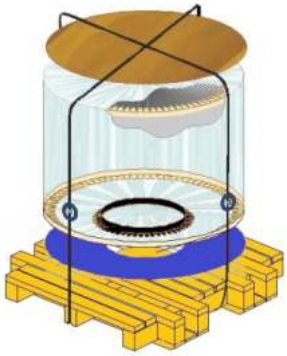
HOT ROLLED SHEETS
packaging P224



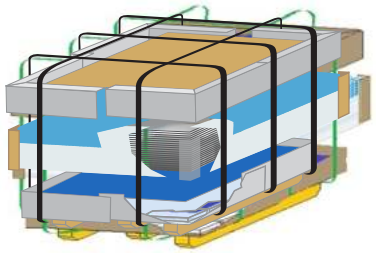
COLD ROLLED COILS
packaging P543



COLD ROLLED SHEETS
packaging P530



TIN PLATE IN COILS
packaging 2U1GF



TIN PLATE IN SHEETS
packaging PPBLB

CUSTOMER REQUIREMENTS

In order for us to clearly understand and respond to your requests, it is needed that the requests include the following elements:

- type of product,
- grade,
- quality standard,
- dimensions,
- standard for dimensions,
- condition of edges,
- quality and type of surface for CR products,
- special features, if any,
- end use of the product,
- unit weight of the product,
- quantity,
- obligation of lotting (lot size)
- type of packaging and binding,
- the way of marking,
- deadline and dynamics of deliveries,
- requirements of laws and regulations that are applicable to the product, and other special requirements, if any, but which are not listed above.

HBIS SERBIA

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