



COLD ROLLED  
PRODUCTS

## COLD ROLLED PRODUCTS

HBIS Serbia produces cold rolled products at a highly automated 5-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 5-stand Tandem mill where the process of cold rolling reduces pickled hot rolled band into 0.17 mm to 3.0 mm thick and 700 mm to 1500 mm wide cold rolled band.

### Delivery form:

- Cold rolled coils
- Cold rolled sheets
- Cold rolled slit 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 galvanizing (Full hard)
- Micro-alloyed high release limit steel 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 - 0.49 and width  $\leq 1350$ mm, D=508/610mm
- For thickness: 0.50 - 3.00mm and width  $\leq 1500$ mm, D=610mm D = 508 - has to be agreed
- 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 (CRSC):**

- 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 that is 600 - 700mm wide 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 reduced)
- 0.14 - 0.39mm for DR material (double reduced)
- Strip width: 700 - 1050mm
- Inside diameter of coil: D = 420/508mm
- Outside diameter: max 1800mm
- Weight: max 18t, min. weight as agreed

## **COLD ROLLED PRODUCTS**

The production process in HBIS Serbia of cold rolled products starts at an automated 5-stand Tandem mill where the process of cold rolling reduces pickled hot rolled band into 0.17 mm to 3.0 mm thick and 700 mm to 1500 mm wide cold rolled strip. The coil produced on the tandem line is non-annealed cold rolled product and as such can be delivered to the buyers as the final Full hard product.

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

### **Delivery type:**

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

## Surface quality

Standard	Quality	
	normal	Special
EN10130/2006	A	B
DIN1623T1/T2/T3/83	O3	O5
ASTM A568M-03	C2	C1

## Surface finish (roughness)

Surface finish marking	Mark (EN 10130/2006)	Roughness Ra ( $\mu\text{m}$ )
Bright	b *	$\leq 0.4$
Semi bright	g	$\leq 0.9$
Normal (matte)	m	$0.6 < \text{Ra} \leq 1.9$
Rough	r *	$\text{Ra} > 1.6 \mu\text{m}$

\* Bright (b) and rough (r) surface finish is the subject of mutual agreement during the ordering.  
Note: Steels for enameling are being produced only with m (matte) surface finish.

### Edge condition

- mill edge
- cut (trim) edge

### Anticorrosive oiling of surface

- oiled
- unoiled \*

### Inside diameter

- 508mm
- 610mm
- 750mm

\* For trimmed edges the oil amount per strip surface unit can be guaranteed:  
a) =max. 1 gr/m<sup>2</sup>, or b)=0.7 - 1.2 gr/m<sup>2</sup>, or c)=1.0 - 1.8 gr/m<sup>2</sup>.  
The rest of the oil amount values per strip surface unit are subject to evaluation during 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 possesses the modern equipment and technology with the controlled cold rolling, annealing and tempering, which provides product quality compatible with the requirements of renowned global standards. Features guaranteed for specific purposes and set the qualitative assortment of cold rolled products are comprised in the following steel types:

- **Low - carbon steel products for cold forming**
- **Structural steel products**
- **Low - carbon steel products for enameling**
- **Steel for galvanizing (Full hard)**
- **Micro-alloyed high release limit steel for cold forming**

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

## LOW - CARBON STEEL COLD ROLLED PRODUCTS

Quality Standard	EN 10130/2006	EN 10130/91+A1/98	DIN 1623 T1/1983	JIS G 3141/90	ASTM A568/2003
Grade	DC 01	DC 01	St 12	SPCC-SD	SAE 1008 ASTM A568/2003 CS Type B ASTM A1008M-15
	DC 03	DC 03	RRSt 13		
	DC 04	DC 04	St 14	SPCEN-SD	SAE 1006 ASTM A568/2003 CS Type A ASTM A1008M-15
	DC 05*				
Standard for strip dimension and shape: EN 10131/2006, DIN 1541/1975, ASTM A568M-03, ASTM A568M-15					

\* Mentioned steel grade requires technical verification during ordering.

### Chemical composition of the ladle analysis grades according to EN10111/2008

EN 10130/2006: Cold rolled products for cold forming				
Grade	C max	Mn max	P max	S max
DC01	0.12	0.6	0.045	0.045
DC03	0.1	0.45	0.035	0.035
DC04	0.08	0.4	0.03	0.03
DC05	0.06	0.35	0.025	0.025

### Mechanical properties for grades according to EN 10130/2006

EN 10130/2006: Cold rolled products for cold forming											
Grade	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

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

### Chemical composition of grade Mot 355 and MOT 315 per INTERNAL STANDARD

INTERNAL STANDARD													
Grade	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 for grades MOT 355 and MOT 315 per INTERNAL STANDARD

INTERNAL STANDARD						
Grade	Rp 0,2 min	Rm - min	A80 min	Tensile Test	Bend Test	Bend Test sample
MOT 355	215	355	24	90	+	90
MOT 315	200	315	28	90		

## LOW - CARBON STEEL PRODUCTS FOR ENAMELING

Standard	EN 10209 / 1996	DIN 1623 T3 / 1987	INTERNAL STANDARD
Grade	DC01EK	EK 2	
	DC04EK		Č0148E
Standard for strip dimensions and shape			
EN 10131 / 2006 i DIN 1541 / 1975			

EN 10209 / 1996: Cold rolled low - carbon steel products for enameling									
Grade	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	Rm min	Rm 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 PRODUCTS FOR GALVANIZING (FULL HARD)

Cold rolled plate can be delivered in a non-annealed form as Full hard. Full hard qualities that are being delivered are the subject of mandatory mutual agreement during the ordering and have the characteristics prescribed by internal quality standards.

## MICROALLOYED HIGH RELEASE LIMIT STEELS FOR COLD FORMING

Quality Standard	EN 10268/2006
Grade	HC260LA*
	HC300LA*

\* Non-standard grade - Quality Assurance inquiry required

### Chemical composition of the ladle analysis for grades according to EN10268/2006

EN 10268/2006									
Grade	C <sub>max</sub>	Si <sub>max</sub>	Mn <sub>max</sub>	P <sub>max</sub>	S <sub>max</sub>	Al <sub>min</sub>	Ti <sub>max</sub>	Nb <sub>max</sub>	(Nb+Ti+V+B) <sub>max</sub>
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 grades according to EN 10268/2006

EN 10268/2006							
Grade	R <sub>p0.2 min</sub>	R <sub>p0.2 max</sub>	R <sub>m min</sub>	R <sub>m max</sub>	A <sub>80</sub> 0.50≤h≤0.70mm min	A <sub>80</sub> h>0.7mm min	Tensile Test
HC260LA	260	330	350	430	24	26	90
HC300LA	300	380	380	480	21	23	90

Note: Steels contain one or more alloyed 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 weights ranges given in the table below. The tables show common delivery types for this type of steel. Dimension and weight requirements outside the table range can also be taken into consideration. The possibility of specific quality dimensions and weight coil or sheet production is agreed during the ordering.

## COLD ROLLED STRIP IN COILS

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

	Low carbon steels for cold forming		Structural steels	Low carbon steels for enameling
Thickness (mm)	0.35 - 0.49	0.50 - 3.00	0.50 - 2.50	0.50 - 2.40
Width (mm)	700 - 1350	700 - 1500	700 - 1500	700 - 1500
Weight	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 steels for cold forming		Structural steels	Low carbon steels for enameling
Thickness (mm)	0.35 - 0.49	0.50 - 3.00	0.50 - 2.50	0.50 - 2.40
Width (mm)	700 - 1350	700 - 1500	700 - 1500	700 - 1500
Length (mm)	1000 - 4000	1000 - 4000	1000 - 4000	1000 - 4000
Weight	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 according to the table below.

	Low carbon steels for cold forming	Structural steels	Low carbon steels for enameling
Thickness	0.35 - 3.00 mm	0.50 - 2.50 mm	0.50 - 2.40 mm
Width	200 - 700 mm	200 - 700 mm	200 - 700 mm

\* Given thickness range is approximate and depends on the width. The weight is evaluated during ordering and depends on the dimensions and packing type.

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

Cold rolled non annealed strips for galvanizing (Full hard) are 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 similar chemical composition to low-carbon and structural steel products.

	Low carbon steel		Structural steels
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

\* 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 mill oil on the surface.