

FLAT PRODUCTS

TECHNICAL SPECIFICATIONS

LATEST VERSION UPDATED DECEMBER 2024

ABBREVIATIONS

SYMBOL	UNIT	DESCRIPTION
TS	MPa	Tensile Strength.
YS	MPa	Yield Strength.
EL	%	Elongation Percentage.
Gr.	–	Steel Grade.
EAFF	–	Electric Arc Furnace.
LF	–	Ladle Furnace.
TSC	–	Thin Slab Casting.
LCR	–	Liquid Core Reduction.
HSM	–	Hot Strip Mill.
HRC	–	Hot Rolled Coil.
SKP	–	Skin Pass Mill.
PKL	–	Pickling (Chemical Surface Treatment Plant).
SLT	–	Slitting.
CTL	–	Cut-to-Length.
NGO	–	Non Grain Oriented.
FB	–	Ferritic-Bainitic.
CP	–	Complex Phase.
DP	–	Dual-Phase.
TRIP	–	Transformation-Induced Plasticity.
ISO	–	International Organization for Standardization.
API	–	American Petroleum Institute.
EN	–	European Standard.
BS	–	British Standard.
DIN	–	Deutsches Institut für Normung.
ASTM	–	ASTM International Standard (formerly, American Society for Testing and Materials).
JIS	–	Japanese Industrial Standard.
MT	Ton	Metric Ton.
SAE	–	Society of Automotive Engineers.
CSA	–	Canadian Standards Association.

1. PRODUCT FEATURES

1.1 Ultra-thin Gauge

Ezz Steel is equipped with the latest hot rolled coil (HRC) production facilities. These facilities include Compact Strip Production (CSP®) technology from SMS Demag and Quality Strip Production (QSP®) technology from DANIELI. Advanced thin slab continuous casting and Liquid Core Reduction (LCR) technologies enable Ezz Steel to produce hot-rolled coils (HRC) to thickness of 1.0 mm. Few mills worldwide can produce such ultra-thin gauge.

1.2 Tolerance and Uniform Distribution

Hot rolled coils are produced with very accurate tolerance and uniform distribution along the coil regarding dimensions, flatness and mechanical properties through latest up to date technology models.

1.3 High Quality Steel

Direct reduced iron (DRI) is the major raw material for producing Ezz Steel’s hot rolled coils which allows producing high quality steel.

1.4 Surface Quality

It is continuously monitored using online inspection system “PARSYTEC™” for ensuring high quality flat products delivered to our customers.

2. EZZ STEEL FACILITIES FOR HOT ROLLED FLAT STEEL PRODUCTION

2.1

Two Electric Arc Furnaces (EAF) to produce low and medium carbon steel.

2.2

Two Ladle Furnaces (LF) for production of clean steel up to specified chemical, mechanical and metallurgical properties.

2.3

Two Thin Slab Continuous Casters (TSC) to produce thin slabs with thickness range from 48 mm to 85 mm.

2.4

Two Hot Strip Mills (HSM) to produce hot-rolled coils (HRC) with variant thickness range from 1.0 mm to 18.0 mm.

2.5

Two Skin Pass Mills (SKP) to enhance produced HRC flatness.

2.6

One surface chemical treatment plant (PKL) to produce pickled and oiled coils.

2.7

One slitting line (SLT) to slit coils into rings or trimmed coils with various widths and weights.

2.8

Two Cut-to-Length lines (CTL) to produce sheets with various lengths and widths.

3. DIMENSIONS AND TOLERANCE

3.1 Dimensions

Specifications of produced hot rolled flat steel:

DIMENSION RANGE (mm)	PLANT PRODUCT				
	HSM	SKP	Pickling	Slitting	CTL
Thickness	1.0–18.0 ^[1]	1.0–5.0	1.0–5.0	1.0–10.0	1.0–13.0 ^[2]
Width	900–1,600	900–1,600	900–1,500	60–1,580	600–1,600
Length	–	–	–	–	600–12,000
Inner Diameter	762	762	610 or 762	610 or 762	–
Outer Diameter	2,000 (max.)				–

^[1] HRC with thicknesses from 16.0 mm to 18.0 mm can be supplied upon agreement.

^[2] Maximum cutting thickness is 16 mm for S235 or equivalent and 14 mm up to grade S355 or equivalent.

3.2 Coil Weight

Coil maximum weight that can be produced is 28.8 tons (based on maximum 18 kg/mm width).

3.3 Coil Length (m) =
$$\frac{\text{Coil Weight (ton)} \times 1,000,000}{\text{Coil Width (mm)} \times \text{Coil Thickness (mm)} \times 7.85}$$

3.4 Tolerance

Regular produced hot rolled flat steel specified tolerances on dimensions, shape and flatness according to Ezz Steel’s standard which is tighter than international standards (e.g. EN 10051: 2024, ASTM A635/A635M-22 and ASTM A568/A568M-19a).

Tighter tolerances may be produced upon request, please contact sales team for more details.

3.4.1 THICKNESS TOLERANCE

THICKNESS RANGE, t (mm)	LOWER TOLERANCE (mm)	UPPER TOLERANCE (mm)
$1.0 \leq t \leq 2.0$	-0.15	+0.05
$2.0 < t \leq 4.0$	-0.19	+0.06
$4.0 < t \leq 16.0$	-0.20	+0.10

3.4.2 WIDTH TOLERANCE

NOMINAL WIDTH (mm)	WIDTH TOLERANCE (mm)			
	Mill Edge		Trimmed Edge	
	Lower	Upper	Lower	Upper
900-1,600	0	+20	0	+3

3.4.3 LENGTH TOLERANCE

NOMINAL LENGTH, L (mm)	LOWER TOLERANCE (mm)	UPPER TOLERANCE (mm)
$L < 2,000$	0	+7
$2,000 \leq L < 8,000$	0	+10 ~ +32 ⁽¹⁾
$8,000 \leq L$	0	+30

⁽¹⁾ Tolerance = $+0.004 \times L$

4. APPLICATIONS OF EZZ STEEL HOT ROLLED FLAT STEEL

Ezz Steel produces hot rolled flat steel for various applications:

- Tubes, built-up sections, and infrastructure applications.
- Home appliances.
- General structural applications, steel furniture.
- Automotive internal parts.
- Gas bottles and Pressure vessels.
- Line pipes (petroleum piping according to API specifications).
- Lamination for motors, generators and transformers.
- Outdoor constructions (atmospheric corrosion resistance steel/weathering steel).
- Ship building, ship repair, and offshore platforms.
- Steels for heat treatment applications including manufacturing of various machine components and automotive parts.
- Abrasion Resistance for construction machinery, and mining.
- Ballistic steels for civil applications such as Armored Cash Transport Vehicles.

5. PRODUCIBLE STANDARDS

Ezz Steel produces hot rolled flat steel according to international standards:

5.1 Egyptian Standard

ES 260-2:2018, ES 260-4:2015, ES 260-5:2015

5.2 American Standards

ASTM A1011M-23, ASTM A569M-98, ASTM A570M-98, ASTM A1018M – 23a, ASTM A907M-96, ASTM A568M-19a, ASTM A53M-24, ASTM A283M-24, ASTM A36M-19, ASTM A572M – 21e1, ASTM A516M-17, API 5L:2018, ASTM A131M-19, SAE J403-2014

5.3 European Standards

EN 10111: 2008, EN 10025-2: 2019, EN 10025-4: 2019, EN 10025-5: 2019, EN 10083-1: 2006, EN 10120: 2017, EN 10149-2: 2013, EN 10208:2009, EN 10338: 2015, EN 10083-2, EN 10083-3, EN 10084

5.4 German Standards

DIN 17100:1980, DIN 1614-1:1986, DIN 1614-2: 1986

5.5 Japanese Standards

JIS G3131:2018, JIS G3132:2018, JIS G3113:2018, JIS G3101: 2020, JIS G3134: 2018, JIS G3116: 2020, JIS G3125: 2021, JIS G3132: 2018, JFS A1001

5.6 Canadian Standards

CSA G40.21:2013

5.7 SAE Standards

SAE J403:2014

Other standards can be produced upon customer request. Please contact sales team for more details.

6. HOT ROLLED COIL (BLACK AND PICKLED) CATEGORIES

- Steel for cold forming/ cold rolling/Enameling applications.
- Low strength steel for structural/general applications.
- Medium strength steel for structural/general applications.
- High strength steel for structural/general applications.
- Steel for engineering and automotive applications.
- Steel for gas bottles and pressure vessels applications.
- Steel for petroleum piping (according to API requirements).
- Atmospheric corrosion resistance (weathering steel).
- Steel for electrical applications.
- Marine Steel.
- Floor Plates/Chequered Plates.
- Heat-treatable Steel.
- Steel for Wear-Resistance.
- Ballistic Steel for Civil Applications.

7. HOT ROLLED FLAT PRODUCTS DIMENSIONS

7.1 BLACK AND PICKLED HRC DIMENSIONS

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Cold Forming Cold Rolling Enameling	1.00	1.29	1,250	1,230	1,250	1,230	EN 10111: DD11, DD12, DD13, DD14
	1.30	1.39	1,500	1,480	1,500	1,480	DIN 1614-1: St22, St24, RRSt23
	1.40	4.00	1,600	1,580	1,500	1,480	DIN 1614-2: StW22, StW24, RRStW23
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	ASTM A569M: Type B
	5.01	7.50	1,600	1,560 ⁽¹⁾	–	–	ASTM A1011M and ASTM A1018M: CS type B, DS type B
	7.51	10.00	1,600	1,550 ⁽¹⁾	–	–	ASTM A568M and SAE J403: SAE1006, SAE1008
	10.01	14.00	1,600	–	–	–	JIS G3131: SPHC, SPHD, SPHE
	14.01	16.00	1,560	–	–	–	JIS G3132: SPHT1, SPHT2

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Low Strength Steel	1.00	1.39	1,250	1,230	1,250	1,230	ES 260-2: S235 series
	1.40	1.59	1,500	1,480	1,500	1,480	EN 10025-2: S235 series
	1.60	4.00	1,600	1,580	1,500	1,480	DIN 17100: St 37-2
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	ASTM A570M and ASTM A907M: Gr. 30, Gr. 33
	5.01	7.50	1,600	1,560 ⁽¹⁾	–	–	ASTM A1011M and ASTM A1018M: Gr. 30(SS), Gr. 33(SS)
	7.51	10.00	1,600	1,550 ⁽¹⁾	–	–	ASTM A568M: SAE1010-Modified
	10.01	14.00	1,600	–	–	–	ASTM A53M and ASTM A283M: Gr.A, Gr.B, Gr.C
	14.01	16.00	1,560	–	–	–	JIS G3113: SAPH370

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

HRC with thicknesses from 16.0 mm to 18.0 mm can be supplied upon agreement.

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Medium Strength Steel	1.30	1.59	1,000	980	1,000	980	ES 260-2: S275 Series, S355 Series
	1.60	2.24	1,250	1,230	1,250	1,230	EN 10025-2: S275 Series, S355 Series
	2.25	2.44	1,500	1,480	1,500	1,480	DIN 17100: St 44, St 52
	2.45	4.00	1,600	1,580	1,500	1,480	ASTM A36M: A36
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	ASTM A570M and ASTM A907M: Gr. 36, Gr. 40, Gr. 50
	5.01	7.50	1,600	1,560 ⁽¹⁾	–	–	ASTM A1011M and ASTM A1018M: SS: Gr. 36, 40, 45, 50. HSLA: Gr. 45, Gr. 50
	7.51	10.00	1,600	1,550 ⁽¹⁾	–	–	ASTM A572M: Gr. 50
	10.01	14.00	1,600	–	–	–	ASTM A568M and SAE J403: SAE 1015-Modified, SAE 1018, SAE 1022
	14.01	16.00	1,560	–	–	–	JIS G3101: SS400 JIS G3132: SPHT3

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

HRC with thicknesses from 16.0 mm to 18.0 mm can be supplied upon agreement.

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
High Strength Steel	1.45	1.54	1,000	980	1,000	980	ASTM A570M and ASTM 907M: Gr. 55 ASTM A1011M and ASTM A1018M: SS: Gr. 55, 60 HSLA: Gr. 55, class 1 ASTM A572M: Gr. 65 EN 10025-4: S420M ES 260-4: S420M
	1.55	1.74	1,100	1,080	1,100	1,080	
	1.75	1.89	1,200	1,180	1,200	1,180	
	1.90	1.94	1,225	1,200	1,225	1,200	
	1.95	2.09	1,260	1,240	1,260	1,240	
	2.10	2.39	1,350	1,330	1,350	1,330	
	2.40	2.44	1,450	1,430	1,450	1,430	
	2.45	2.49	1,500	1,480	1,500	1,480	
	2.50	2.59	1,524	1,500	1,500	1,480	
	2.60	4.00	1,600	1,580	1,500	1,480	
	4.00	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	
	5.01	7.50	1,600	1,560 ⁽¹⁾	–	–	
	7.51	10.00	1,600	1,550 ⁽¹⁾	–	–	
	10.01	13.0	1,600	–	–	–	
	13.01	16.00	1560	–	–	–	

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Engineering and Automotive (Medium Strength)	1.30	1.59	1,000	980	1,000	980	JIS G3113: SAPH400, SAPH440
	1.60	2.24	1,250	1,230	1,250	1,230	
	2.25	2.44	1,500	1,480	1,500	1,480	
	2.45	4.00	1,600	1,580	1,500	1,480	
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	
	5.01	7.50	1,600	1,560 ⁽¹⁾	–	–	
	7.51	10.00	1,600	1,550 ⁽¹⁾	–	–	
	10.01	14.00	1,600	–	–	–	
	14.01	16.00	1560	–	–	–	
Engineering and Automotive (High Strength)	2.00	2.24	1,250	1,230	1,250	1,230	EN 10149-2: S315MC, S355MC, S420MC, S460MC, S500MC ⁽²⁾ EN 10338: MULTIPHASE ⁽³⁾ (FB, DP, CP) HTD450F, HDT580F, HDT580X, HDT760C JIS G3134: SPFH 490, SPFH 540, SPFH 540Y, SPFH 590, SPFH 590Y
	2.25	2.44	1,500	1,480	1,500	1,480	
	2.45	4.00	1,600	1,580	1,500	1,480	
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500 ⁽¹⁾	1,480	
	5.01	12.05 ⁽²⁾	1,600	1,570 ⁽¹⁾	–	–	
Engineering and Automotive (S550MC)	4.00	6.00	1500	1480	–	–	EN10149-2: S550MC

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

⁽²⁾ For Steel Grade S500MC, the Maximum Pickling Width Limit is 1250 mm for the Mill Edge and 1230 mm for the Trim Edge.

⁽³⁾ For Multiphase Steel Grades, the Maximum nominal thickness is 6.00 mm.

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Gas Bottles and Closed Vessels (245 series)	1.00	1.39	1,250	1,230	1,250	1,230	EN 10120: P245NB
	1.40	1.59	1,500	1,480	1,500	1,480	
	1.60	4.00	1,600	1,580	1,500	1,480	
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	
Gas Bottles and Closed Vessels (265 series)	1.30	1.59	1,000	980	1,000	980	EN 10120: P265NB JIS G3116: SG255, SG295
	1.60	2.24	1,250	1,230	1,250	1,230	
	2.25	2.44	1,500	1,480	1,500	1,480	
	2.45	4.00	1,600	1,580	1,500	1,480	
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	
	5.01	6.00	1,600	1,560 ⁽¹⁾	–	–	

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Steel for Pressure Vessels (Moderate and Lower Temperature Services)	1.45	1.54	1000	980	1000	980	ASTM A516-17: GR.55, GR.60, GR.65, GR.70
	1.55	1.59	1100	1080	1100	1080	
	1.6	1.74	1250	1080	1100	1080	
	1.75	1.89	1250	1180	1200	1180	
	1.9	1.94	1250	1200	1225	1200	
	1.95	2.09	1260	1240	1260	1240	
	2.1	2.24	1350	1330	1350	1330	
	2.25	2.39	1500	1330	1350	1330	
	2.4	2.44	1500	1430	1450	1430	
	2.45	2.49	1560	1480	1500	1480	
	2.5	2.59	1560	1500	1500	1480	
	2.6	4	1600	1575	1500	1480	
	4.01	5	1600	1575	1500	1480	
	5.01	7.5	1600	1560	–	–	
	7.51	10	1600	1550	–	–	
	10.01	13	1560	–	–	–	
	13.01	16	1560	–	–	–	

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
API (petroleum piping)	1.30	1.59	1,000	980	1,000	980	API 5L PSL 1: Gr. A API 5L PSL 2: Gr. B, X42M, X46M
	1.60	2.24	1,250	1,230	1,250	1,230	
	2.25	2.44	1,500	1,480	1,500	1,480	
	2.45	4.00	1,600	1,580	1,500	1,480	
	4.01	5.00	1,600	1,575 ⁽¹⁾	1,500	1,480	
	5.01	7.50	1,600	1,560 ⁽¹⁾	–	–	
	7.51	10.00	1,600	1,550 ⁽¹⁾	–	–	
	10.01	13.00	1,600	–	–	–	
	13.01	16.00	1560	–	–	–	
API (petroleum piping) X52	5.00	5.50	1,600	1,570 ⁽¹⁾	–	–	API 5L PSL 2: X52
	5.51	7.99	1,600	–	–	–	
	8.00	16.00	1,560	–	–	–	
API (petroleum piping) X56, X60	4.00	16.00	1,560	–	–	–	API 5L PSL 2: X56, X60
API (petroleum piping) X65, X70	4.00	16.00	1,560	–	–	–	API 5L PSL 2: X65, X70

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Weathering Steel (S235 series)	2.00	2.49	1,250	1,230	1,250	1,230	ES 260-5: S235J0W, S235J2W EN 10025-5: S235J0W, S235J2W
	2.50	3.00	1,500	1,480	1,500	1,480	
	3.01	3.50	1,560	1,540	1,500	1,480	
	3.51	5.00	1,560	1,530 ⁽¹⁾	1,500	1,480	
	5.01	10.00	1,600	1,550 ⁽¹⁾	–	–	
	10.01	13.00	1,600	–	–	–	
	13.01	16.00	1560	–	–	–	
Weathering Steel (S355 series)	2.00	2.49	1,250	1,230	1,250	1,230	ES 260-5: S355J2WP, S355J2W EN 10025-5: S355J2WP, S355J2W JIS G3125: SPA-H
	2.50	3.00	1,500	1,480	1,500	1,480	
	3.01	3.50	1,560	1,540	1,500	1,480	
	3.51	5.00	1,560	1,530 ⁽¹⁾	1,500	1,480	
	5.01	10.00	1,600	1,550 ⁽¹⁾	–	–	
	10.01	13.00	1,600	–	–	–	
	13.01	16.00	1560	–	–	–	

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Steel for Electrical Applications Silicon steels, NGO Si <0.8%	1.96	5.00	1,500	1,480 ⁽¹⁾	1,500	1,480	Tailored hot rolled steel grades according to customer requirements suitable for producing with silicon content up to 1.4%.
	5.01	10.00	1,500	1,475 ⁽¹⁾	–	–	
	10.01	13.00	1,500	–	–	–	
Steel for Electrical Applications Silicon steels, NGO Si 0.8 – 1.4%	1.96	2.24	1,250	1,230	1,250	1,230	
	2.25	5.00	1,500	1,480 ⁽¹⁾	1,500	1,480	
	5.01	10.00	1,500	1,475 ⁽¹⁾	–	–	
	10.01	13.00	1,500	–	–	–	

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Marine Steel	1.30	1.59	1000	980	1000	980	ASTM A131M BV: A, B, AH32, AH36, DH32, DH36
	1.60	2.24	1250	1230	1250	1230	
	2.25	2.44	1500	1540	1500	1480	
	2.45	4.00	1600	1580	1500	1480	
	4.01	5.00	1600	1575	1500	1480	
	5.01	7.50	1600	1560	–	–	
	7.51	10.00	1600	1550	–	–	
	10.01	15.00	1600	–	–	–	

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Floor Plates/ Chequered Plates	2.00	12.00	1,600	–	–	–	EN 10025-2 and ES260-2: S235 series, S275 series ASTM A36M: A36

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Heat-treatable Steel ⁽¹⁾	1.60	2.24	1250	–	–	–	EN 10083-2: 28Mn6, C22E, C35E
	2.25	2.44	1500	–	–	–	EN10083-3: 22MnB5, 26MnB5, 30MnB5
	2.45	16.00	1560	–	–	–	EN10084: C15E

⁽¹⁾ Produced as HRC and needs further processing in Cut to Length and Heat Treatment Line.

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Steel for Wear-Resistance ⁽¹⁾	4.5	6.00	1,250	–	–	–	Suitable for production of Steel Grades with Brinell Hardness up to BHW 500 after heat treatment.
	6.01	16.00	1,500	–	–	–	

⁽¹⁾ Produced as HRC and needs further processing in Cut to Length and Heat Treatment Line.

STEEL GROUP	NOMINAL THICKNESS (mm)		NOMINAL WIDTH, MAX. (mm)				STEEL GRADES
			Black		Pickled		
	From	To	Mill Edge	Trim Edge	Mill Edge	Trim Edge	
Ballistic Steel for Civil Applications ⁽¹⁾	4.5	6.00	1,250	–	–	–	Suitable for production of Steel Grades with Brinell Hardness up to BHW 500 after heat treatment.
	6.01	16.00	1,500	–	–	–	

⁽¹⁾ Produced as HRC and needs further processing in Cut to Length and Heat Treatment Line.

7.2 HOT ROLLED SLIT RING DIMENSIONS AND WEIGHT

7.2.1 AVAILABLE SLIT RING WIDTH

NOMINAL THICKNESS (mm)		SLIT RING WIDTH, MIN. (mm)	
From	To	Black Slit Ring	Pickled Slit Ring
1.00	2.50	60	60
2.51	3.00	100	100
3.01	3.50	150	150
3.51	4.00	200	200
4.01	4.50	300	300
4.51	5.00	400	400
5.01	6.50	500	–
6.51	7.50	600	–
7.51	10.00	600	–

7.2.2 AVAILABLE SLIT RING WEIGHT

RING WIDTH (mm)	SLIT RING WEIGHT (Ton)			
	Coil Inner Diameter: 610 mm		Coil Inner Diameter: 762 mm	
	Min.	Max.	Min.	Max.
60	0.31	1.06	0.23	0.98
70	0.36	1.24	0.27	1.15
80	0.41	1.41	0.31	1.31
90	0.46	1.59	0.35	1.47
100	0.52	1.77	0.39	1.64
110	0.57	1.94	0.43	1.80
120	0.62	2.12	0.47	1.97
130	0.67	2.30	0.50	2.13
140	0.72	2.47	0.54	2.29
150	0.77	2.65	0.58	2.46
175	0.90	3.09	0.68	2.87
200	1.03	3.53	0.78	3.28
250	1.29	4.42	0.97	4.10
300	1.55	5.30	1.16	4.92
350	1.81	6.19	1.36	5.74
400	2.07	7.07	1.55	6.56
450	2.32	7.95	1.75	7.37
500	2.58	8.84	1.94	8.19
550	2.84	9.72	2.13	9.01
600	3.10	10.60	2.33	9.83
700	3.61	12.37	2.71	11.47
800	4.13	14.14	3.10	13.11
900	4.65	15.91	3.49	14.75
1,000	5.16	17.67	3.88	16.39
1,200	6.20	21.21	4.65	19.67
1,300	6.71	22.97	5.04	21.30
1,400	7.23	24.74	5.43	22.94
1,580	8.16	27.92	6.13	25.89

7.3 HOT ROLLED CUT-TO-LENGTH DIMENSIONS

7.3.1 DIMENSIONS AND BUNDLE WEIGHT FOR (BLACK) HOT ROLLED CUT-TO-LENGTH

NOMINAL THICKNESS (mm)		AVAILABLE WIDTH (mm)				AVAILABLE LENGTH (mm)		BUNDLE WEIGHT (Ton)	
		Mill Edge		Trim Edge					
From	To	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1.00	4.00	900	1,600	600	1,580	600	6,000	2.50	5.00
4.01	5.00	900	1,600	600	1,575 ⁽¹⁾	1,000	12,000	5.00	8.00
5.01	7.50	900	1,600	600	1,560 ⁽¹⁾	1,000	12,000	5.00	8.00
7.51	10.00	900	1,600	600	1,550 ⁽¹⁾	1,000	12,000	5.00	8.00
10.01	13.00*	900	1,600	–		1,000	12,000	5.00	8.00

⁽¹⁾ Black trimmed edge max. Width, mm = (Black mill edge max width, mm) – (5×Thickness).

* Maximum cutting thickness is 16 mm for S235 or equivalent and 14 mm up to grade S355 or equivalent.

7.3.2 DIMENSIONS AND BUNDLE WEIGHT FOR (PICKLED) HOT ROLLED CUT-TO-LENGTH

NOMINAL THICKNESS (mm)		AVAILABLE WIDTH (mm)				AVAILABLE LENGTH (mm)		BUNDLE WEIGHT (Ton)	
		Mill Edge		Trim Edge					
From	To	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1.00	4.00	900	1,500	600	1,480	600	3,000	2.50	5.00
4.01	5.00	900	1,500	600	1,480	1,000	3,000	2.50	5.00

8. HOT ROLLED FLAT PRODUCTS MECHANICAL PROPERTIES

8.1 STEEL FOR COLD FORMING/COLD ROLLING/ENAMELING APPLICATIONS

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		EI [%] THICKNESS-WISE
		< 3 mm	≥ 3 mm	< 3 mm	≥ 3 mm	
EN10111	DD11	170–360	170–340	≤ 440		22–28
	DD12	170–340	170–320	≤ 420		24–30
	DD13	170–330	170–310	≤ 400		27–33
	DD14	170–310	170–290	≤ 380		30–36
DIN1614-1	St22	–		–		–
	RRSt23	–		–		–
	St24	–		–		–
DIN1614-2	StW22	–		≤ 440		25–29
	RRStW23	–		≤ 420		27–31
	StW24	–		≤ 410		30–34
ASTM A569M	type B	205–345		–		≥ 25
ASTM A1011M, ASTM A1018M	CS, type B	205–340		–		≥ 25
	DS, type B	205–310		–		≥ 28
ASTM A568M, SAE J403	SAE1006	220–340		320–420		≥ 28
	SAE1008	220–340		320–420		≥ 28
JIS 3131	SPHC	–		≥ 270		27–31
	SPHD	–		≥ 270		30–39
	SPHE	–		≥ 270		31–41
JIS 3132	SPHT-1	–		≥ 270		30–37
	SPHT-2	–		≥ 340		25–32

8.2 LOW STRENGTH STEEL FOR STRUCTURAL/GENERAL APPLICATION

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		EI [%] THICKNESS-WISE
		< 3 mm	≥ 3 mm	< 3 mm	≥ 3 mm	
EN10025-2, ES 260-2	S235 series	≥ 235		360–510	360–510	16–24
DIN17100	St37-2	≥ 235		360–510	340–470	16–24
ASTM A570M	Gr. 30	≥ 205		≥ 340		21–25
	Gr. 33	≥ 230		≥ 360		18–23
ASTM A907M	Gr. 33	≥ 230		≥ 360		≥ 22
ASTM A53M	Gr. A	≥ 205		≥ 330		19–29
	Gr. B	≥ 240		≥ 415		16–24
ASTM 283M	Gr. C	≥ 205		380–515		22–25
ASTM A1011M, ASTM A1018	Gr. 30 (SS)	≥ 205		≥ 340		21–25
	Gr. 33 (SS)	≥ 230		≥ 360		18–23
ASTM A568M	SAE1010	≥ 210		350–480		≥ 28
JIS G3113	SAPH370	≥ 255		≥ 370		32–37

8.3 MEDIUM STRENGTH STEEL FOR STRUCTURAL/GENERAL APPLICATIONS

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
EN10025-2, ES 260-2	S275 series	≥ 275		430-580	410-560	14-21
	S355 series	≥ 355		510-680	470-630	13-20
DIN17100	St44	≥ 275		430-580	410-540	13-20
	St52	≥ 355		510-680	490-630	13-20
JIS G3101	SS400	≥ 245		400-510		17-21
ASTM A568, SAE J403	SAE1015, MOD	≥ 280		400-530		≥ 25
	SAE1018, MOD	≥ 320		≥ 400		≥ 26
	SAE1022, MOD	≥ 300		≥ 450		≥ 25
ASTM A36M	A36	≥ 250		400-550		15-18
ASTM A907M	Gr. 36	≥ 250		≥ 365		≥ 21
	Gr. 40	≥ 275		≥ 380		≥ 19
ASTM A570M	Gr. 36, type 1	≥ 250		≥ 365		17-22
	Gr. 36, type 2	≥ 250		400-550		16-21
	Gr. 40	≥ 275		≥ 380		16-21
	Gr. 50	≥ 345		≥ 450		11-17
ASTM A572M	Gr. 50	≥ 345		≥ 450		11-16
ASTM A1011M	Gr. 36, type 1	≥ 250		≥ 365		17-22
	Gr. 36, type 2	≥ 250		400-550		16-21
	Gr. 40 (SS)	≥ 275		≥ 380		16-21
	Gr. 45 (SS)	≥ 310		≥ 410		14-19
	Gr. 50 (SS)	≥ 340		≥ 450		11-17
ASTM A1011M, ASTM A1018M	HSLA Gr. 45 class 2	≥ 310		≥ 380		23-25
	HSLA Gr. 50, class 1	≥ 340		≥ 450		20-22
	HSLA Gr. 50, class 2	≥ 340		≥ 410		20-22
JIS G3132	SPHT3	-		≥ 415		20-27

8.4 HIGH STRENGTH STEEL FOR STRUCTURAL/GENERAL APPLICATIONS

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
ASTM A570M, ASTM A907M	Gr. 55	≥ 380		≥ 480		9-15
ASTM A1011M, ASTM A1018M	Gr. 55 (SS)	≥ 380		≥ 480		9-15
	Gr. 60 (SS)	≥ 410		≥ 480		8-14
	HSLA Gr. 55 C1	≥ 380		≥ 480		18-20
ASTM A572M	Gr. 65	≥ 450		≥ 550		≥ 15
EN 10025-4, ES 260-4	S420M	≥ 420		520-680		≥ 19

8.5 STEEL FOR ENGINEERING AND AUTOMOTIVE APPLICATIONS

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
EN10149-2	S315MC	≥ 315		390–510		20–24
	S355MC	≥ 355		430–550		19–23
	S420MC	≥ 420		480–620		16–19
	S460MC	≥ 460		520–670		14–17
	S500MC	≥ 500		550–700		12–14
	S550MC	≥ 550		600–760		≥ 14
EN 10338	HTD450F	300–420		≥ 450		24–27
	HDT580F	460–620		≥ 580		15–17
	HDT580X	330–450		≥ 580		19–23
	HDT780C	660–830		≥ 760		10–12
JIS G3113	SAPH400	235–255		≥ 400		31–37
	SAPH440	275–305		≥ 440		29–35
JIS G3134	SPFH490	≥ 325		≥ 490		22–25
	SPFH540	≥ 355		≥ 540		21–24
	SPFH590	≥ 420		≥ 590		19–22
	SPFH540Y	≥ 295		≥ 540		24–26
	SPFH590Y	≥ 325		≥ 590		22–24

8.6 STEEL FOR GAS BOTTLE AND PRESSURE VESSELS APPLICATIONS

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
EN 10120	P245NB	≥ 245		360–450		26–34
	P265NB	≥ 265		410–500		≥ 24
JIS G3116	SG255	≥ 255		≥ 400		≥ 28
	SG295	≥ 295		≥ 440		≥ 26
ASTM A516M	Gr. 55	≥ 205		380–515		≥ 27
	Gr. 60	≥ 220		415–550		≥ 25
	Gr. 65	≥ 240		450–585		≥ 23
	Gr. 70	≥ 260		485–620		≥ 21

8.7 STEEL FOR PETROLEUM PIPING (API)

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
API 5L (PSL1)	Gr. A	≥ 210		≥ 335		23–36
API 5L (PSL2)	Gr. B	245–450		415–655		18–24
	X42M	290–495		415–655		15–24
	X46M	320–525		435–655		18–23
	X52M	360–530		460–760		18–22
	X56M	390–545		490–760		17–21
	X60M	415–565		520–760		20–24
	X65M	450–600		535–760		16–23
	X70M	485–635		570–760		18–21

8.8 ATMOSPHERIC RESISTANT STEELS (WEATHERING STEEL)

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
EN 10025-5, ES 260-5	S355J2W	≥ 355		510–680	470–630	14–22
	S355J2WP	≥ 355		510–680	470–630	14–22
	S235J0W	≥ 235		360–510		17–24
	S235J2W	≥ 235		360–510		17–24
JIS G3125	SPA-H	≥ 355		≥ 490		15–22

8.9 STEEL FOR ELECTRICAL APPLICATIONS

Ezz Steel is capable of producing Non Grain Oriented (NGO) silicon steel qualities for electrical applications according to customer requirements with silicon content up to 1.4%.

8.10 MARINE STEEL

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
ASTM A131M	A	≥ 235		400–520		≥ 22
	B	≥ 235		400–520		≥ 22
	AH32	≥ 315		440–590		≥ 20
	DH32	≥ 315		440–590		≥ 20
	AH36	≥ 355		490–620		≥ 20
	DH36	≥ 355		490–620		≥ 20

8.11 FLOOR PLATES/CHEQUERED PLATES

STANDARD	GRADE	YIELD STRENGTH (MPa)		TENSILE STRENGTH (MPa)		El (%) THICKNESS-WISE
		<3 mm	≥ 3 mm	<3 mm	≥ 3 mm	
EN10025-2, ES 260-2	S235 series	≥ 235		360–510	360–510	16–24
	S275 series	≥ 275		430–580	410–560	14–21

8.12 HEAT TREATABLE STEEL

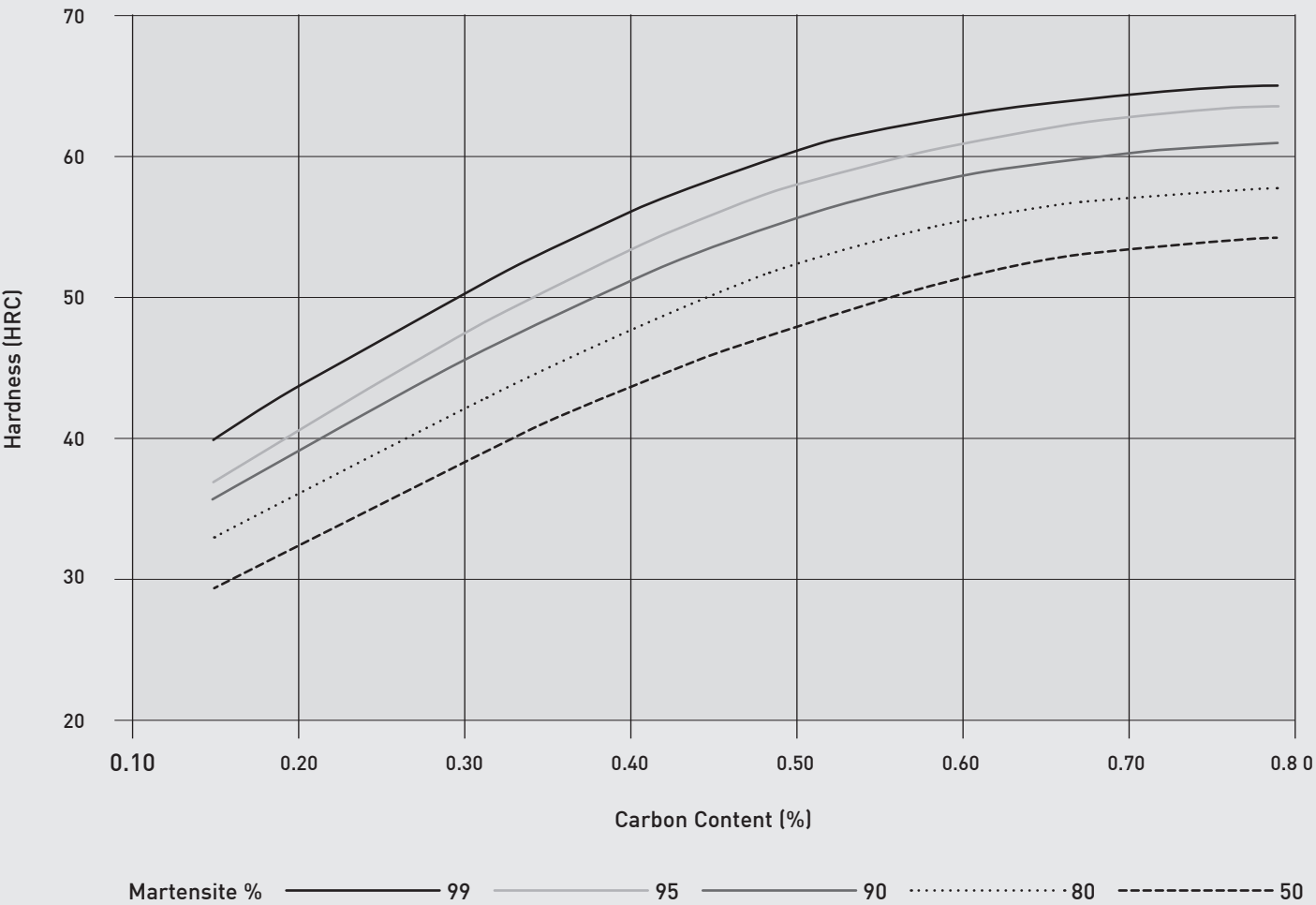
Ezz Steel is capable of producing Heat treatable steel grades according to the standards EN 10083-2 (28Mn6, C22E, and C35E), EN 10083-3 (22MnB5, 26MnB5, and 30MnB5), and EN 10084 (C15E) as hot rolled coils with the specified chemical composition of the relevant product standard without heat treatment.

8.13 STEEL FOR WEAR RESISTANCE AND BALLISTIC STEEL FOR CIVIL APPLICATIONS

Steel for wear resistance and ballistic steel for civil applications are produced as hot rolled coils with the specified chemical composition of the relevant product standard without heat treatment.

Ezz Steel is capable of producing HRC that are suitable for the production of steel grades with Brinell Hardness up to BHW 500 after further processing in Cut to Length and Heat Treatment Line.

The final mechanical properties are achieved by controlled and efficient heat treatment process of the specified steel composition. The graph below (figure 1) shows the relation between the carbon percentage and the achievable hardness according to the percentage of formed martensite in the microstructure after the heat treatment.



Reference: ASM Handbook, Volume 4, Heat Treating, Hardenability Concepts.

Figure 1: Relation between hardness, carbon content, and amount of martensite

9. PACKING AND LABELING

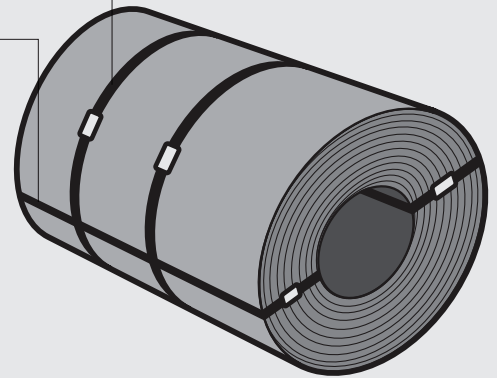
APPLIED PACKING FOR HOT ROLLED COILS (BLACK)

Slit rings of ≤ 200 mm are normally delivered as eye-to-sky.

a. Local

Body Strap

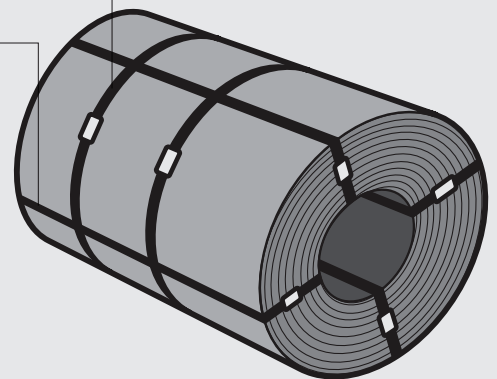
Eye Strap



b. Export

Body Strap

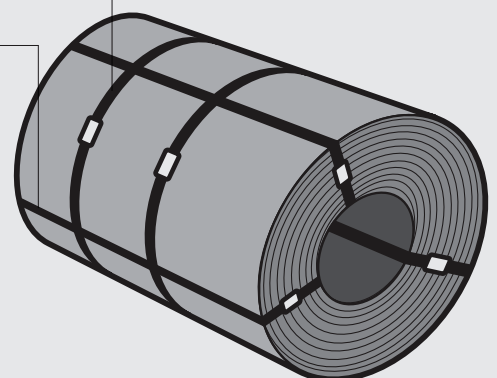
Eye Strap



c. Special Export for USA, Canada and Gulf Area

Body Strap

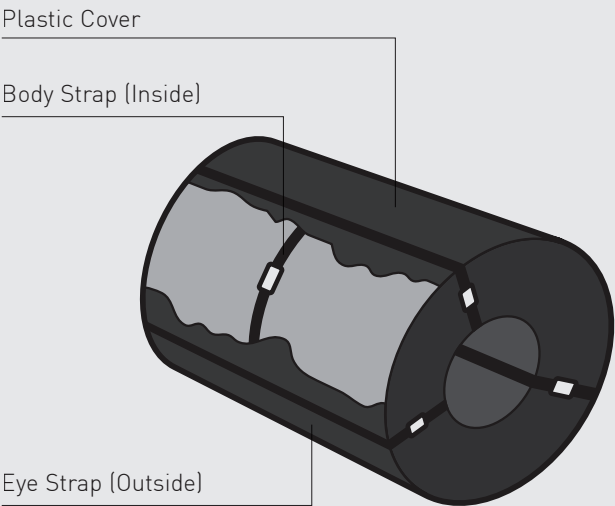
Eye Strap



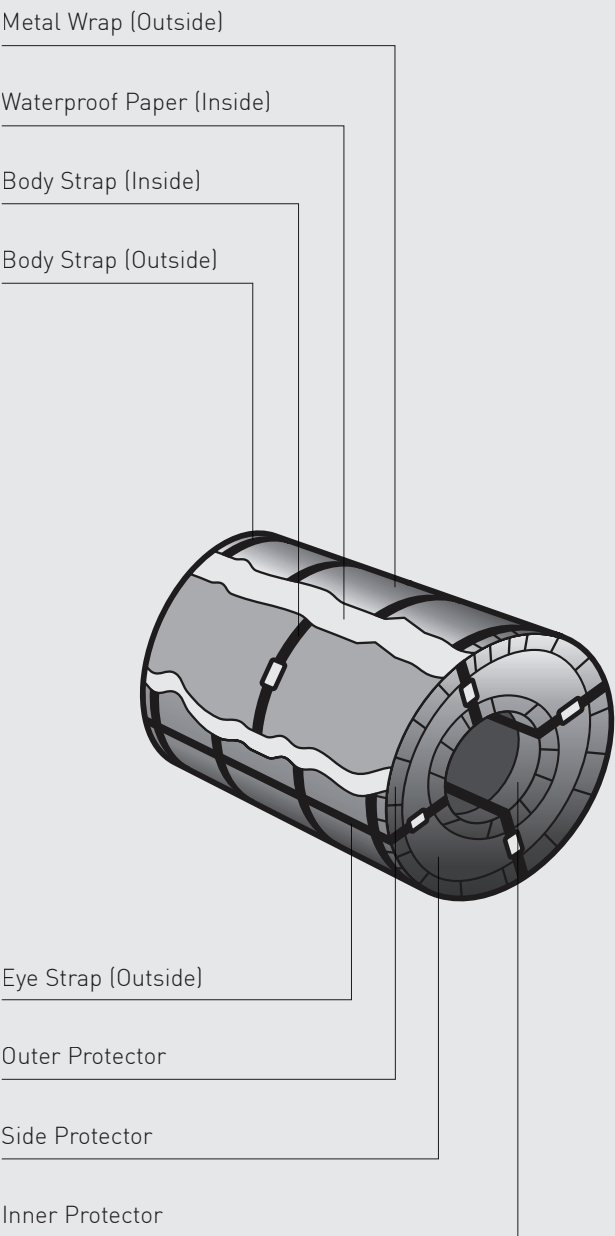
APPLIED PACKING FOR HOT ROLLED COILS (PICKLED)

Slit rings of ≤200 mm are normally delivered as eye-to-sky.

a. Local

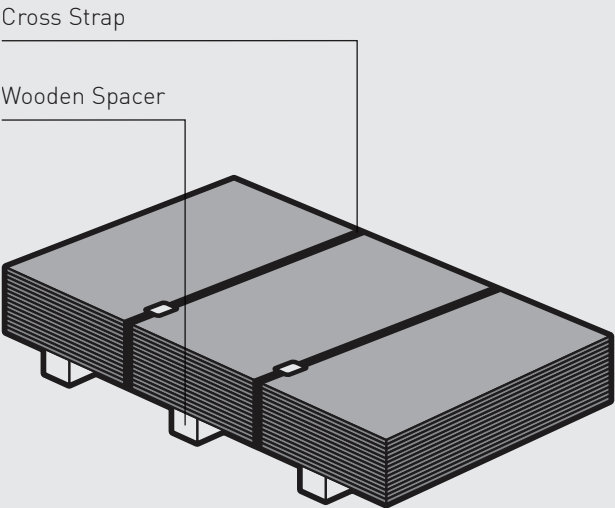


b. Export

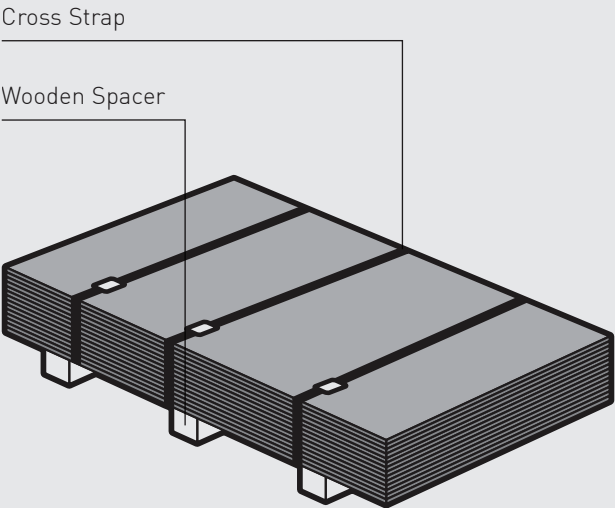


APPLIED PACKING FOR HOT ROLLED SHEETS (BLACK)

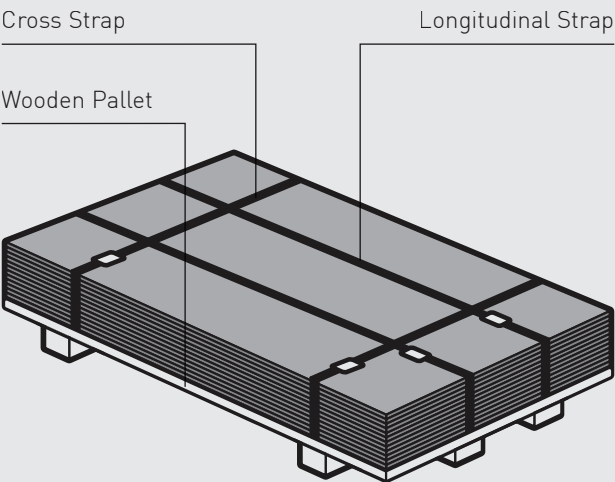
a. Local up to 6,000 mm long



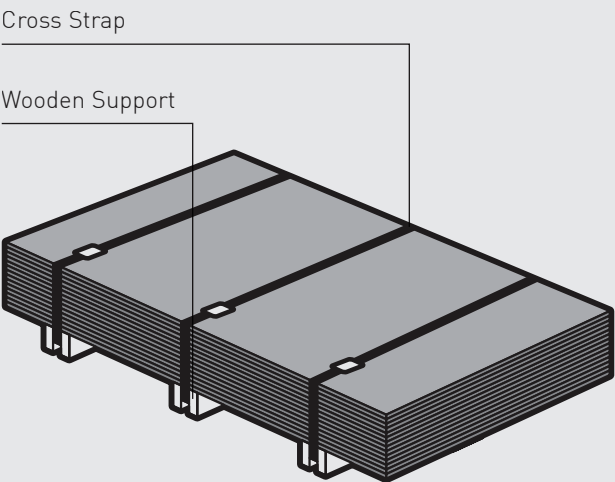
b. Local higher than 6,000 mm long



c. Export up to 3,000 mm long and up to 5.0 mm thickness

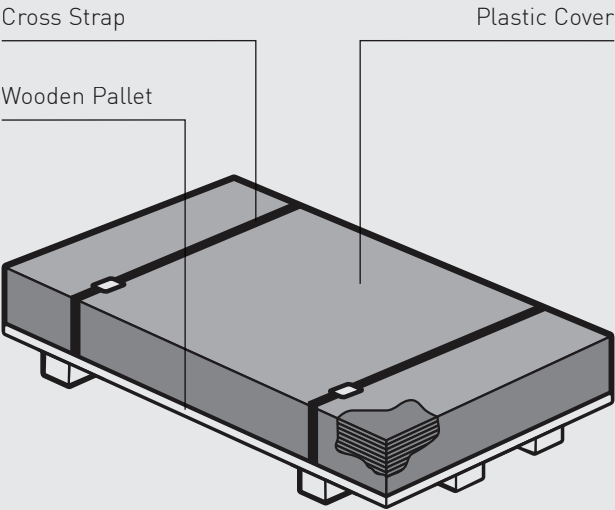


d. Export higher than 3,000 mm long or higher than 5.0 mm thickness

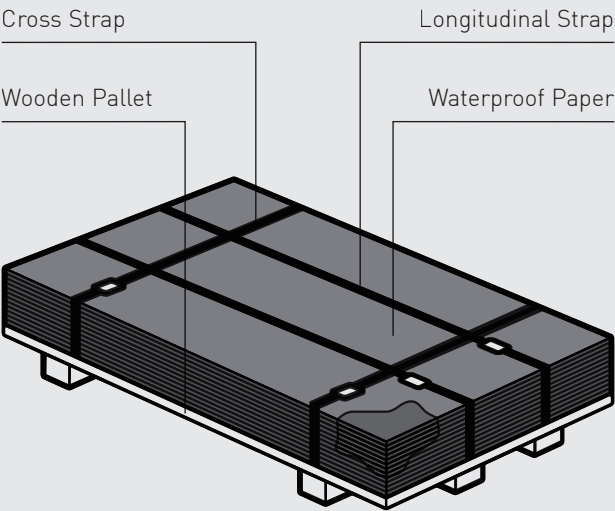


APPLIED PACKING FOR PICKLED SHEETS

a. Local

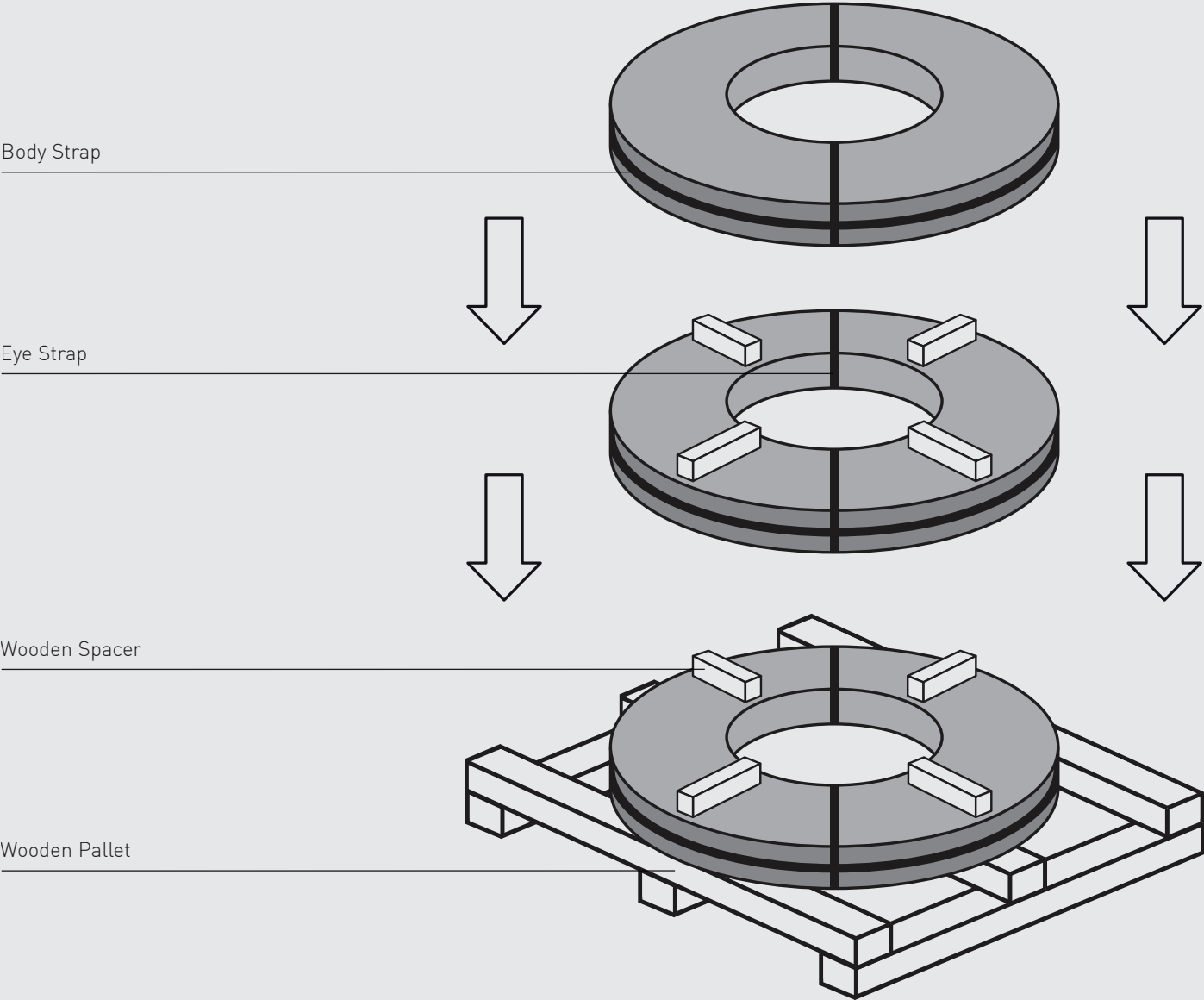


b. Export



APPLIED PACKING FOR SLIT RINGS (WIDTH ≤200 MM)

a. Local/Export



LABELING

The products are marked with a heat and dirt-resistance GRAPHIPLAST® label containing the following data:

- Producing mill.
 - Production date.
 - Coil/Bundle number.
 - Heat number.
 - Product code.
 - Standard.
 - Thickness (mm).
 - Width (mm).
 - Length (mm).
 - Sheet/bundle.
- Weight (MT).
 - Customer name.
 - Order number.
 - Destination.
 - Additional data.
 - White colour for prime product.
 - Green colour for second product.
 - Red colour for lot product.

Wide Label for Coil/Bundle

ISO 9001
ISO 14001
ISO 45001
ISO 50001
ISO/IEC 17025


EZZ DIKHEILA
INRA & STEEL
عز - الدخيلة
الحديد والصلب


Made in Egypt

PRODUCING MILL	
PRODUCTION DATE	
COIL/BUNDLE No.	
HEAT No.	
PRODUCT CODE	
STANDARD	
THICKNESS (mm)	
LENGTH (mm)	
SHEET/BUNDLE	
WEIGHT (MT)	
CUSTOMER NAME	
ORDER No.	
DESTINATION	
ADDITIONAL DATA	

Prime ☐

Second ☒

Lot ☐





Notes:

- **For local market:** One label at the coil/bundle.
- **For export markets:** Two labels at the coil/bundle.
- **Normal wide label is used for both coil/bundle.**
- **Narrow label for rings with width less than 140 mm.**

Narrow Label for Rings

 EZZ DIKHEILA INRA & STEEL عز - الدخيلة الحديد والصلب				
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