ISD DUNAFERR

COLD-ROLLED PRODUCTS HOT-ROLLED PICKLED AND HOT ROLLED PICKLED SKIN-PASSED PRODUCTS

1. STEEL GRADES

With regard to standards, the specifications of the standards of the latest issue date are valid. Mechanical properties and chemical composition in the tables are valid by taking into account the supplementary specifications of the indicated standards.

1.1. Cold-rolled wide and slit strips and sheets

1.1.1. Cold-rolled unalloyed mild steel for cold-forming

Typical fields of application: die forming or small and medium scale deep drawing (DC 01-DC 03), or production of specially deep-drawn and complex parts (DC 04-DC 05).

Standard designation EN 10130:2006	Designation of superseded or other standards			
	EN 10130:91	DIN 1623 T1	ASTM A568/A568M	JIS G 3141
DC 01*	FePO1*	St 12*	A 366 (SAE 1010)	SPCC
DC 03	FePO3	RRSt 13	A 619 (SAE 1008)	SPCD
DC 04	FePO4	St 14	A 620 (SAE 1006)	SPCEN
DC 05	FePO5	—	—	—

*The * marked grade can be produced of two steel types: Al-killed (DC 01 Al, FePO1 Al, RSt 12) and Si- and Al-semikilled.*

Specification of mechanical properties and chemical composition according to the EN 10130:2006.

Grade EN 10130:2006	$R_e$max, N/mm²	R_m N/mm²	A_{80} min. %	r_{90} min.	n_{90} min.	Chemical composition max. %			
						C	P	S	Mn
DC 01	280	270–410	28	—	—	0.12	0.045	0.045	0.60
DC 03	240	270–370	34	1.3	—	0.10	0.035	0.035	0.45
DC 04	210	270–350	38	1.6	0.180	0.08	0.030	0.030	0.40
DC 05	180	270–330	40	1.9	0.200	0.06	0.025	0.025	0.35

The above grades can also be ordered in rolled, hard condition.
Typical fields of application: hot dip galvanising of steel strip, production of binding bands.

1.1.2. Cold re-rolled grades for providing a specified tensile strength

Typical fields of application: bending, punching, production of tubes, supporting structure for industrial and commercial shelves, etc.

Standard designation EN 10139	Comparison of superseded standard designations DIN 1624
DC 01 C 290	St 2 K 32
DC 01 C 340	St 2 K 40
DC 01 C 390	St 2 K 40
DC 01 C 440	St 2 K 50
DC 01 C 490	St 2 K 50
DC 01 C 590	St 2 K 60
DC 01 C 690	St 2 K 70
DC 03 C 290 - C 590*	RR St 3 K 32 - K 60*
DC 04 C 290 - C 590*	St 4 K 32 - K 60*

** The steel grades of the fully killed DC03 and DC04, RRSt 3 and St 4 group are given without the listing of the intermediate steel grades.*

Specification of the mechanical properties and chemical composition can be found at the C 290–C 690 grade group of the standard EN 10139.

Grade	R_e	R_m	A_{80} min.	Hardness HV		Chemical composition max.			
	N/mm²	N/mm²	%	min.	max.	%			
DC 01						C	P	S	Mn
C 290	200–380	290–430	18	95	125	0.12	0.045	0.045	0.60
C 340	min. 250	340–490	—	105	155				
C 390	min. 310	390–540	—	117	172				
C 440	min. 360	440–590	—	135	185				
C 490	min. 420	490–640	—	155	200				
C 590	min. 520	590–740	—	185	225				
C 690	min. 630	min. 690	—	215	—				

1.1.3. Cold-rolled unalloyed and alloyed electrotechnical steel sheet and strip in semi finished condition for the production of magnetic cores of rotors and stators of electric motors and for other magnetic circuits (e.g. relays, chock coil cores, etc.)

Magnetic properties of an Al killed steel according to the EN 10341.

Standard designation EN 10341	Standard designation EN 10126	Nominal thickness	Maximum total specific magnetic loss	Minimum magnetic polarisation		
		mm	W/kg	T min.		
			at 50 Hz and 1.5T	2500	5000	10000
M450-50K	M450-50E	0.50	4.5	1.57	1.65	1.75
M560-50K	M560-50E		5.6	1.58	1.66	1.76
M660-50K	M660-50D		6.60	1.62	1.70	1.79
M890-50K	M890-50D		8.90	1.60	1.68	1.78
M1050-50K	M1050-50D		10.50	1.57	1.65	1.77
M520-65K	M520-65E	0.65	5.2	1.57	1.65	1.75
M630-65K	M630-65E		6.3	1.58	1.66	1.76
M800-65K	M800-65D		8.00	1.62	1.70	1.79
M1000-65K	M1000-65D		10.00	1.60	1.68	1.78
M1200-65K	M1200-65D		12.00	1.57	1.65	1.77

On request, we produce semi-finished electrotechnical steel strips with increased Si and P content. The directive mechanical properties and surface roughness are below.

R_m N/mm²	R_p / R_m —	A_{80} min. %	HV 5 —	R_a µm
350–410	> 0.85	20	120–170	>= 1.5

1.1.4. Cold-rolled unalloyed mild steel for conventional enamelling

Typical field of application: production of dishes, sinkbowls, boilers, kitchen stoves, gas heaters and other household appliances.

Standard designation EN 10209	Superseded standard designation DIN 1623 T3
DC 01 EK*	EK 2*
DC 04 EK	EK 4
DC 04 EK–B**	EK 4–B**

** Because a 6-month ageing resistance has to be provided according to standards, the steel is Al-killed. On customer's request the method of killing can differ, but in this case the 6-month ageing resistance is not guaranteed.*

*** This boric microalloyed steel grade was developed by Dunaferr and can easily be formed and enamelled, thus is especially recommended for thicknesses below 0.80 mm.*

Specification of mechanical properties and chemical composition for grades according to EN 10209.

Grade	R_e max. N/mm²	R_m N/mm²	A_{80} min.%	Chemical composition C max %
DC 01 EK	270	270–390	30	0.08
DC 04 EK	220	270–350	36	0.08

Hydrogen transmitting ability: $TH = t_o / d^2$,
where:

t_o = penetration time of hydrogen (min),
d = material thickness (mm).

Enamelability is correct if $TH \geq 6.7$
Directive mechanical properties in the case of boric microalloyed grades are the following.

R_p N/mm²	R_m N/mm²	A_{80} %
200–215	280–340	min. 36

Testing of hydrogen penetration ability is not requested for boric microalloyed grades, enamellability is guaranteed by the production process.

1.1.5. General purpose constructional steel

Typical fields of application: construction, welded structures, production of die formed parts, cold-formed sections and tubes. These grades are supplied also on the basis of the ÜHP certificate of company LGA.

Standard designation

DIN 1623 T2

St 37 - 2G
St 37 - 3G
St 44 - 3G
St 52 - 3G

Specification of mechanical properties and chemical composition for grades according to DIN 1623 T2.

Grade	R_e min. N/mm²	R_m N/mm²	A_{80} min. %	Chemical composition max. %			
				C	P	S	N
St 37–2G	215	360–510	20	0.17	0.040	0.035	0.009
St 37–3G	215	360–510	20	0.17	0.040	0.035	—
St 44–3G	245	430–580	18	0.20	0.040	0.035	—
St 52–3G	325	510–680	16	0.20	0.040	0.035	—

The above grades can also be ordered in rolled, hard condition.

1.1.6. Cold-rolled steel grades resistant to atmospheric corrosion

Fields of application: supporting and facing elements of exterior surfaces exposed to climatic effects, production of sea-fast containers, etc.

The production of these grades is of hot-rolled base material with the chemical composition and mechanical properties according to the standards listed in the table below, the cold-rolling process being regulated by factory standards.

Standard designation	Standard designations of the other analogue standards		
EN 10155	MSZ 6259	BS 4360	DASZ 210*
S 235 JOW S 235 J2W	LK 37	—	—
—	LK 45	—	D-COR-TEN 410
S 355 JOW S 355 J2G2W	LK 52	WR 50 B	—

** factory standard*

Specification of mechanical properties and chemical composition according to EN 10155.

Grade	Chemical composition %								R_e min. N/mm²	R_m N/mm²	A_{80} min.%
	C max.	Si max.	Mn	P max.	S max.	N max.	Cr	Cu			
S 235 JOW	0.13	0.40	0.20–0.60	0.040	0.040	0.009	0.40–0.80	0.25–0.55	235	360–510	17
S 235 J2W					0.035	—					
S 355 JOW	0.16	0.50	0.50–1.50	0.040	0.040	0.009	0.40–0.80	0.25–0.55	355	510–680	14
S 355 J2G2W				0.035	0.035	—					

1.1.7. Microalloyed high-strength structural steel grades for cold-forming

Typical fields of application: production of pressed parts (automotive industry), special sections and tubes of specified strength.

Standard designation EN 10268:2006	Superseded standard designation EN 10268:1998	Analogue standard designation SEW 093
HC260LA	H 240 LA	ZStE 260
HC300LA	H 280 LA	ZStE 300
HC340LA	H 320 LA	ZStE 340
HC380LA	H 360 LA	ZStE 380
HC420LA	H 400 LA	ZStE 420

Specification of the chemical composition according to EN 10268:2006.

Grade	Chemical composition %							
	C max.	Si max.	Mn max.	P max.	S max.	Al min.	Nb max.	Ti max.
HC260LA	0.10	0.50	0.6	0.025	0.025	0.015	0.090	0.15
HC300LA	0.10	0.50	1.0	0.025	0.025	0.015	0.090	0.15
HC340LA	0.10	0.50	1.1	0.025	0.025	0.015	0.090	0.15
HC380LA	0.10	0.50	1.6	0.025	0.025	0.015	0.090	0.15
HC420LA	0.10	0.50	1.6	0.025	0.025	0.015	0.090	0.15

Specification of the mechanical properties according to EN 10268:2006.

Grade	$R_{p0,2}$ N/mm²	R_m N/mm²	$A_{80\ min.}$ %	$R_{p0,2}$ N/mm²	R_m N/mm²	$A_{80\ min.}$ %
	transversal			longitudinal		
HC260LA	260–330	350–430	26	240–310	340–420	27
HC300LA	300–380	380–480	23	280–360	370–470	24
HC340LA	340–420	410–510	21	320–410	400–500	22
HC380LA	380–480	440–560	19	360–460	430–550	20
HC420LA	420–520	470–590	17	400–500	460–580	18

1.2. Hot-rolled pickled and hot-rolled, pickled and tempered wide and narrow strips and sheets

Supply of these products is subject to special agreement.

1.2.1. Hot-rolled unalloyed mild steel

Standard designation EN 10111	Analogue superseded standard designation DIN 1614 T2
DD 11	StW 22
DD 12	RRStW 23
DD 13	StW 24
DD 14	—

1.2.2. General purpose constructional steel

According to EN 10025 and DIN 17100 standards.

EN10025+A1:93***	DIN 17100-80
S185	St 33
S235*	—
S235JR	St 37-2
S235JRG1**	USt 37-2**
S235JRG2	RSt 37-2
S235J0	—
S235J2G3	St 37-3
S235J2G4	—
S275*	—
S275JR	St 44-2
S275J0	—
S275J2G3	St 44-3
S275J2G4	—
S355*	—
S355JR	—
S355J0	—
S355J2G3	St 52-3

** According to BS EN 10025*

*** Si subject to agreement*

**** Standard preferred by the producer*

1.2.3. Enamellable steel grades according to special agreement and steel grade FeP13-B according to DASZ 206:97* standard

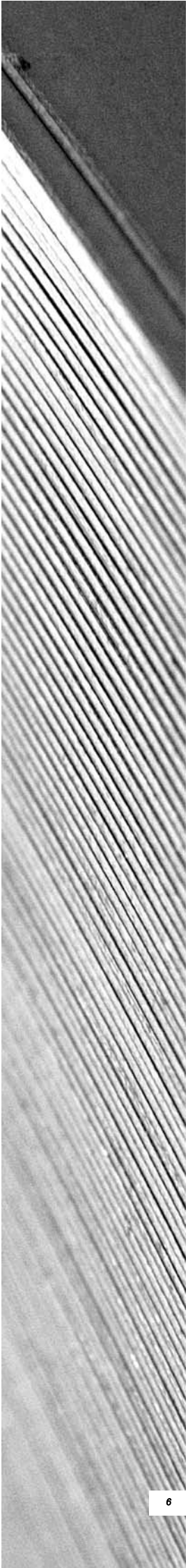
** factory standard*

Typical field of application: production of boilers.

1.2.4. Microalloyed steel grades

According to standards EN 10113 and SEW 092.

SEW 092:90	EN 10149-2
—	S315MC
QStE 340 TM	S355MC
QStE 380 TM	—
QStE 420 TM	S420MC
QStE 460 TM	S460MC



2. SURFACE

2.1. Surface qualities per steel grades according to the specifications of different standards

Steel grades	Designation of the surface quality					
	EN 10130		DIN 1623 T1		EN 10139	
Mild steel	A	B*	O3	O5*	MA	MB*
Re-rolled steel grades					MA	MB*
Mild steels for enamelling	A		O3			
Cold-rolled constructional steel	A		O3			
Hot-rolled, pickled constructional steel						
Cold-rolled steel grades resistant to atmospheric corrosion	A*		O3*			
Hot-rolled, pickled and tempered steel grades						
Hard rolled steel grades	A		O3			

Recommended surface types by application purposes for cold-rolled steel grades:

— spray lacquering and galvanising: B, O5, MB
— enamelling in two layers, electrophoretic painting, powder painting: A, O3, MA
— electrolytic surface finishing: A, O3

** supply is subject to special agreement*

2.2. Surface roughness of cold-rolled products

According to the types specified in the order:

Average roughness	Denomination	Designation
$R_a =< 0.90\ \mu m$	semi-bright	g
$0.60 < R_a =< 1.90\ \mu m$	mat	m
$R_a > 1.60\ \mu m$	rough	r

When otherwise not specified, the products are supplied with a mat surface, with the exception of re-rolled and hard grades, where the supplied surface quality is semi-bright.

3. SUPPLIED SIZES

3.1. Cold-rolled sheets

Thickness (mm)	Width (mm)			
	>= 500 <= 800	> 800 <= 1000	> 1000 <= 1300	> 1300 <= 1520
	Length (mm)			
>= 0.40 < 0.58	700–1500	800–2000	—	—
>= 0.58 < 0.80	700–1500	800–2000	1000–3200	—
>= 0.80 < 2.50	700–2000	800–3200	1000–3200	1300–3200

Note:
Sheets above 2.0 thickness are supplied only with edge trimmed finish done during the pickling process.

3.2. Hot-rolled pickled or hot-rolled, pickled and tempered sheets

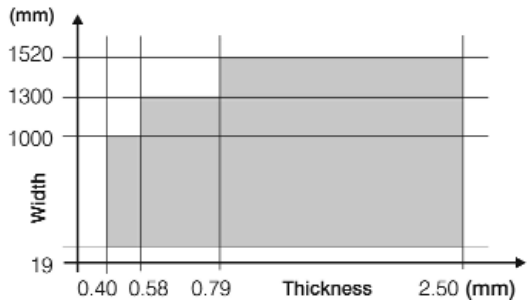
Thickness (mm)	Width (mm)		
	> 800 <= 1000	> 1000 <= 1300	> 1300 <= 1500
	Length (mm)		
>= 1.50 < 2.00	800–3200	—	—
>= 2.00 < 2.50	800–3200	1000–3200	—
2.50	800–3200	1000–3200	1300–3200

Note:
Sheets above 2.0 mm thickness are supplied only with edge trimmed finish done during the pickling process.

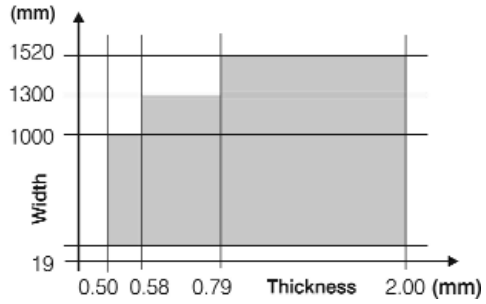
3.3. Cold-rolled wide and slit (narrow) strips

3.3.1. Steel grades:

— mild steels (DC 01, DC 03, and grades according to other standards),
— constructional steels (St 37-2G, St 37-3G and grades according to other standards),
— unalloyed and alloyed electrotechnical steels (0.50–1.00 mm),
— re-rolled steel grades,
— hard rolled steel grades.
— microalloyed steels up to a max. strength of 380 N/mm^2.



3.3.2. Steel grades DC 04 and DC 05

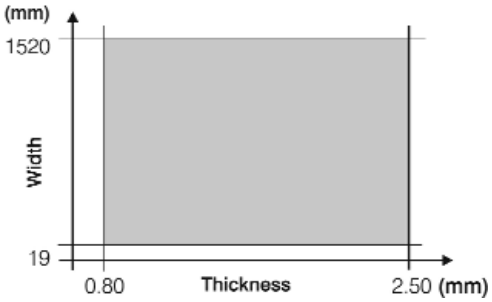


Mild steels DC 04 and DC 05 or analogue grades of other standards, where the maximum thickness can be 2.00 mm.

3.3.3. Steel grades

— constructional steels St 44-3G, St 52-3G and analogue grades of other standards.
— microalloyed steels H 400 LA, HC 420 LA.

available thickness 0.80–2.50 mm



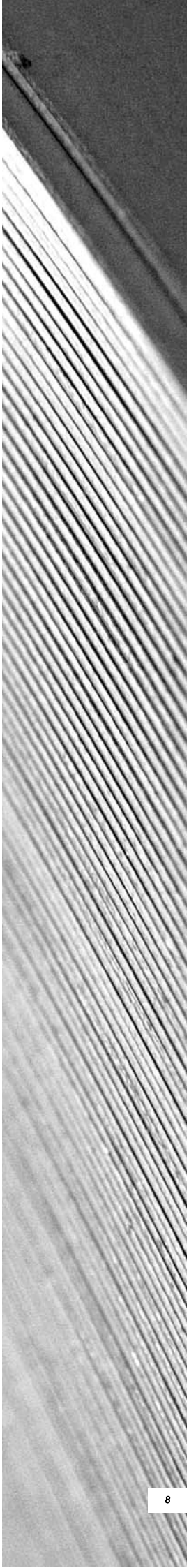
width 19–1520 mm

3.3.4. Steels for enamelling

Maximum thickness:

for grade DC 01 EK: 0.80–2.50 mm
for grade DC 04 EK: 0.80–2.00 mm
for grade DC 04 EK-B: < 0.80 mm

Width is according to point 3.3.1.



3.3.5. Hot-rolled pickled or hot-rolled, pickled and tempered wide strip

Thickness (mm)	Width (mm)
>= 1.5 < 2.0	800–1000
>= 2.0 < 2.5	800–1300
>= 2.5<= 4.5	800–1520

Wide strips:
Slit (narrow) strips: maximum thickness 4.00 mm
minimum width 30 mm

Note:
In the case of a request for sizes differing from the given ones, a special agreement is required.

4. DIMENSION TOLERANCES

The tolerances for dimensions are according to the specifications of the standard EN 10131:2006 for mild steels.

4.1. Thickness tolerance

Nominal thickness (mm)	Standard tolerances nominal width (mm)		Reduced tolerances nominal width (mm)	
	< = 1200	> 1200 <= 1500	<= 1200	> 1200 <=1500
>= 0.35 <= 0.40	± 0.03	± 0.04	± 0.020	± 0.025
> 0.40 <= 0.60	± 0.03	± 0.04	± 0.025	± 0.030
> 0.60 <= 0.80	± 0.04	± 0.05	± 0.030	± 0.035
> 0.80 <= 1.00	± 0.05	± 0.06	± 0.035	± 0.040
> 1.00 <= 1.20	± 0.06	± 0.07	± 0.040	± 0.050
> 1.20 <= 1.60	± 0.08	± 0.09	± 0.050	± 0.060
> 1.60 <= 2.00	± 0.10	± 0.11	± 0.060	± 0.070
> 2.00 <= 2.50	± 0.12	± 0.13	± 0.080	± 0.090
> 2.50 <= 3.00	±0.15	± 0.15	±0.100	± 0.110

Percentage increase of thickness tolerance for the flat products made of high-strength structural steels are increased in four steps between <260 to <420 N/mm^2.

4.2. Width tolerance

Nominal width (mm)	Nominal thickness (mm)	Width tolerance *	
		Standard	Reduced
< 125	< 0.6	+ 0.4	+ 0.2
	>= 0.6 < 1.0	+ 0.5	+ 0.2
	>= 1.0 < 2.0	+ 0.6	+ 0.3
	>= 2.0 <= 3.0	+ 0.7	+ 0.4
>= 125 < 250	< 0.6	+ 0.4	+ 0.2
	>= 0.6 < 1.0	+ 0.5	+ 0.2
	>= 1.0 < 2.0	+ 0.6	+ 0.3
	>= 2.0 <= 3.0	+ 0.7	+ 0.4
>= 250 < 400	< 0.6	+ 0.4	+ 0.2
	>= 0.6 < 1.0	+ 0.5	+ 0.2
	>= 1.0 < 2.0	+ 0.6	+ 0.3
	>= 2.0 <= 3.0	+ 0.7	+ 0.4
>= 400 < 600	< 0.6	+ 0.4	+ 0.2
	>= 0.6 < 1.0	+ 0.5	+ 0.2
	>= 1.0 < 2.0	+ 0.6	+ 0.3
	>= 2.0 <= 3.0	+ 0.7	+ 0.4
>= 600 < 1200	—	+ 4.0	+2.0
>= 1200 < 1500	—	+ 5.0	+ 2.0
> 1500	—	+ 6.0	+ 3.0

** The lower limit of the tolerance field is always 0.*

4.3. Length tolerance

Nominal length (mm)	Tolerances (mm)	
	Standard	Reduced
< 2000	6	3
>= 2000	0.3% of the length	0.15% of the length

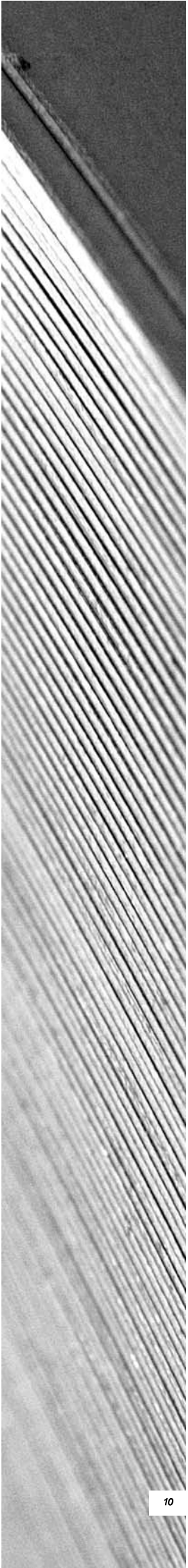
4.4. Flatness

Tolerance		Flatness difference (mm)		
	Nominal width (mm)	Nominal thickness (mm)		
		< 0.7	>= 0.7 < 1.2	>= 1.2
Standard	< 600	7	6	5
	>= 600 < 1200	10	8	7
	>= 1200 < 1500	12	10	8
	>= 1500	17	15	13
Reduced (FS)	< 600	4	3	2
	>= 600 < 1200	5	4	3
	>= 1200 < 1500	6	5	4
	>= 1500	8	7	6

The flatness tolerance values for the sheets made of high-strength structural steels are increased in two steps between <260 to <340 N/mm^2.

The flatness tolerances for sheets with yield point over 340 N/mm^2 are subject to special agreement.

Note:
The size and flatness tolerances differing from those in the table above are subject to special agreement.



5. TEMPORARY ANTI-CORROSION PROTECTION

The temporary anti-corrosion protection is made by oiling, and its amount should be specified by ordering in accordance with the following:

oil-free (dry),	
slight oiling	0.4–0.7 g/m^2 per side,
medium oiling	0.8–1.2 g/m^2 per side,
heavy oiling	1.3–2.0 g/m^2 per side.

The amount of oil applied can also be ordered by specifying a definite value in the range of 0.4–2.0 g/m^2.

In the case of an oil-free product the company takes no responsibility for rusting.

The oiled product gets a protection that, with correct packaging and storing as well as correct transport and storage conditions, will not rust for 3 months.

5.1. OLVIKOR 807 temporary anticorrosion oil

Chemical characteristics: mix of paraffin and naphthen hydrocarbons. Contains esters and salts of fatty alcohols as additives.

Field of application:
It is for anticorrosion protection during production, storage and transport of metallic structural materials, semi-finished products and finished products.
The oil can be applied to the surface to be protected by any technique.
The coated surface stays oiled that can be easily removed by organic solvents or by a water solution of detergents.

5.2. Surface protection of hot-rolled pickled and re-rolled or hard rolled strips on rolling stand

The surface of hot-rolled pickled and re-rolled or hard rolled strips on rolling stand is covered by the rolling oil used at the production process, út it gives no satisfactory protection againt corrosion.

Information about the composition of the rolling oil:
The rolling oil is a mix of mineral oil, esters and additives.

Information about the toxicity of the rolling oil:
This product is not subject to classification according to the calculation method of EC Classification Directives.

The safety data sheet of oils used for anticorrosion protection and for rolling will be submitted on request.

6. ORDERED QUANTITIES

The smallest lot weight that can be ordered	Usually	Unusually
Sheet metal	10 t	25 t
Coil	13–18 t	25 t

A product can be considered customary if its width is 1000, 1250, 1500 mm, or every such dimension that can be split from these widths by a division without remainder.

At the fulfilment of the order, a 10% weight difference is allowed.

6.1. Mass of sheet bundles

Mass of the usual sizes, generally	max. 3.5 t
Specified height of the bundle	min. 50 mm
	max. 200 mm

For this reason the weight of a bundle of 500 x 1000 mm can be maximum 800 kg.

6.2. Mass of wide strips

Depending on width, without welding seam and with 500 mm internal diameter:
11.5–13.3 kg/mm

Coil weight at normal production conditions: about 13 t at 1000 mm width
about 15 t at 1250 mm width
about 18 t at 1500 mm width

Smaller coil weights can be formed by cutting.

6.3. Mass of slit (narrow) strips

11.5–13.3 kg/mm

or fractional weights that can be produced from this range of weight without a remainder.

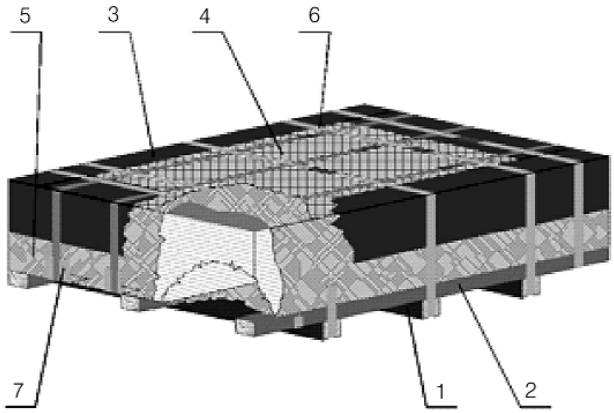
Example:
In the case of 500 mm inside diameter and 1550 mm outside diameter the weight of a 50 mm wide ring can vary between 575 and 665 kg. The smallest outside diameter of a coil that can be produced must be 100 mm larger than its inside diameter.

7. PACKAGING (BASIC TYPES)

We would like to satisfy the customers' storage and transport requests at the lowest possible expenditure and to recycle the packaging material. We make every effort to satisfy the customer's requests. We supply our products with environmentally friendly packaging that involves foil coated paper and paper edge protectors. The figures below show the characteristic packaging of our main products.

7.1. Packaging of sheets (DWA SZ 001)

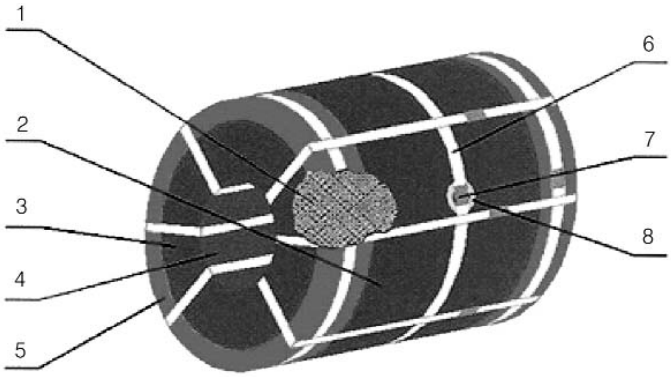
1. transversal bar
2. longitudinal bar
3. paper edge protector
4. plastic coated main board
5. foil coated paper
6. banding strap
7. paper pad for banding



Note:
The plastic coated main board placed under the upper protectors.

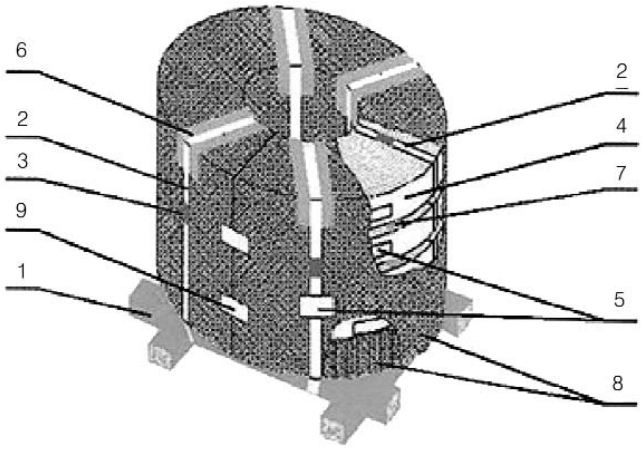
7.2. Packaging of coils — with a horizontal axis (DWA SZ 002)

1. foil coated paper
2. painted cover sheet
3. side guarding ring
4. inside steel mantle
5. wavy edge guard
6. strapping
7. clip
8. clip filler piece



7.3. Packaging of coils — with a vertical axis (DWA SZ 002)

1. pallet
2. strapping
3. clip
4. coil end fixing
   a) with strapping
   b) with adhesive band
5. label
   a) per band
   b) per bundle
6. bent edge guard
7. intermediate wooden piece
8. foil coated paper
9. adhesive band



8. DOCUMENTS

8.1. Identification

Identification of the product is by labels with barcode of type CODE 39.

8.2. Certification

The manufacturer supplies its products with the following documents:

In case of domestic contracts

— Consignment note that contains the quality certificate according to point 2.1 of EN 10204 (accompanying list)
— Commercial invoice
— Label (on the product)
— Certification of origin on request

In case of export contracts as an extra to the above mentioned

— EUR-1 printed form
— CMR
— Duty bill
— Quality certificate according to point 2.3 of EN10204

We also satisfy special customer requirements concering product marking, documentation and information.

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