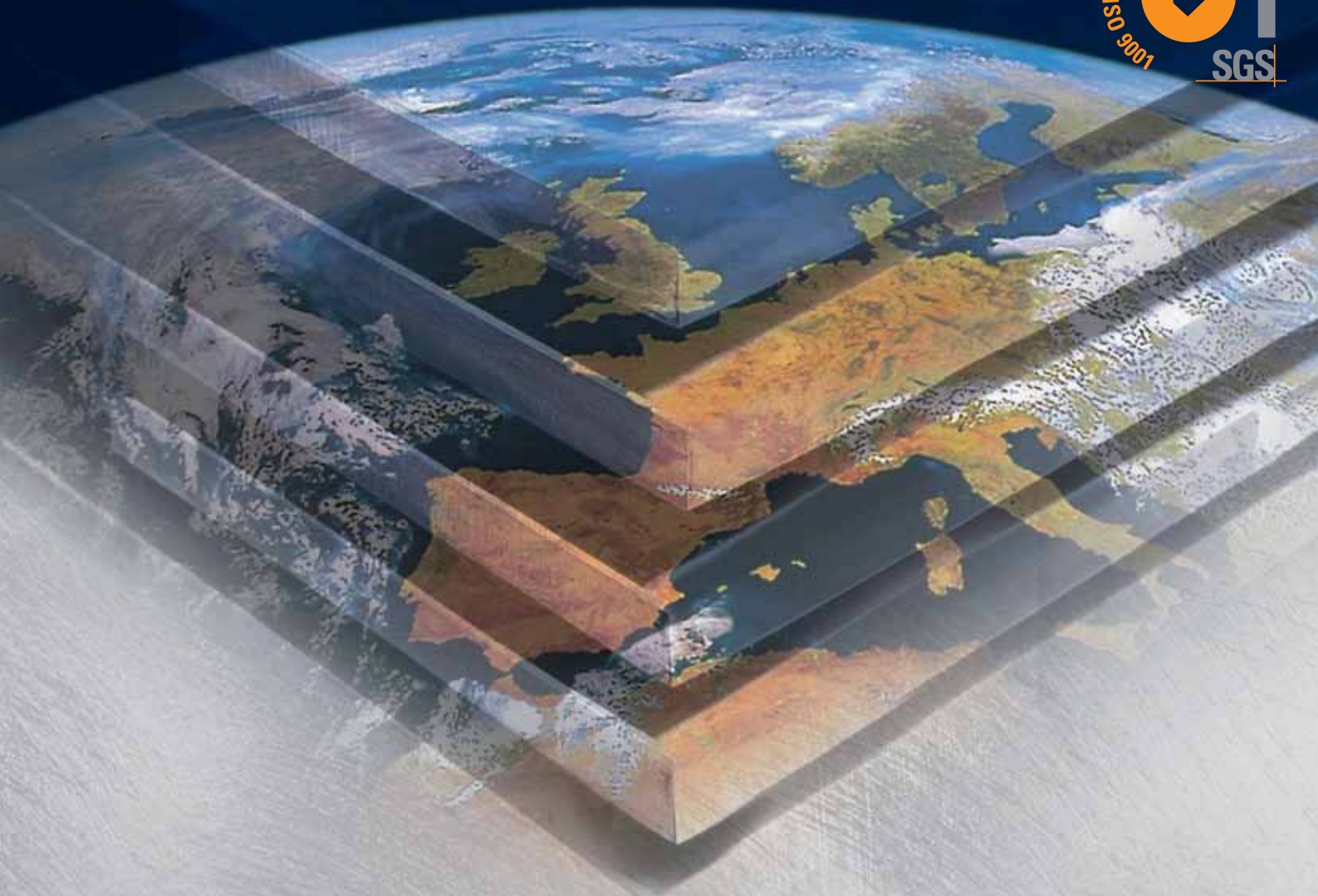


Your partner in steel



 **UnionOcel**



2009



UnionOcel, company limited was founded in October 2001 as a metallurgical wholesale dealing with:

- Metal plates
- Flame cut elements

Following our customer's wishes, we offer the above-mentioned goods both from our warehouse and production. The offered goods comes from our storage and service center in Kopřivnice. If the required goods is not available at our Kopřivnice center or in the warehouse of our sister company, UnionStahl, Duisburg, Germany, we are still able to offer and deliver it at your destination in a short delivery time, thanks to an extensive network of our business partners all over Europe. This, of cours, depends on the nature of your order.

The Kopřivnice storage and service center was opened in September 2005. It ranges among the state-of-the-art establishments of this kind in Central and Eastern Europe, and extends the offered services of UnionOcel by additional activities, such as flame cutting, plasma-arc cutting, hydraulic shears cutting, and laser cutting considered for the future.

We can also offer ex-works deliveries from renowned European producers. This appliers especially in case of extensive orders with the required delivery time within a few weeks or months.

As far as the variety of the offered goods is concerned, this is discussed in details on the following pages. There you will find detailed specifications concerning the quality, dimensions, chemical composition and mechanical properties. All specifications comply with the related European standards or the works standards.

Attest documents, arrangement of independent inspection, ultrasonic tests, import customs clearence, delivery to the destination, and arranging of other services according to customer's wishes is a matter of course.

We can also offer our professional knowledge and counseling with our suppliers' distinguished professionals.

We are looking to co-operation with you and we are fully at your disponal.

You, as a satisfied client, are the highest motivation in our efforts.

Do not hesitate to call us.

UnionOcel - your steel partner.



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## Plates

<b>EN 10025-2</b> [EN 10025]	plates from non-alloy constructional steels
<b>EN 10025-3</b> [EN 10113-2]	plates from non-alloy constructional fine-grain steels normalised
<b>EN 10025-4</b> [EN 10113-3]	plates from non-alloy constructional fine-grain steels thermomechanical rolled
<b>EN 10025-5</b> [EN 10155]	plates from constructional steels resistant to climatic effects - Corten A, Corten B
<b>EN 10025-6</b> [EN 10137]	plates from high-strength fine-grain steels heat treated
<b>EN 10028-2</b>	boiler plates
<b>EN 10028-3</b>	plates from fine-grain steels
<b>EN 10083</b>	plates from steels designated for heat treatment
<b>EN 10084</b>	plates from carburising steels
<b>EN 10149-2</b>	hot-rolled plates with high yield strength for cold forming
<b>0000000</b>	abrasion-resistant plates
<b>0000000</b>	plates resistant to effects of hydrogen atmosphere
<b>0000000</b>	plates from steels according to ASME standard
<b>0000000</b>	ship building quality plates
<b>0000000</b>	stainless steel plates

### Further possibilities:

- cut sizes and forgings from plates – separation by cutters, blowtorch, plasma and laser according ISO EN 9013
- fixed dimensions from unreeling equipment
- edging up to 16 m of individual lengths
- blasting and conservation
- examination by ultrasound in accordance with SEL 072/77, EN 10160
- acceptance by all known attesting companies, e.g.: DB/TÜV/LRS/GL/ČD

**We substantiate each order with inspection certificates in accordance with EN 10204/3.1 or 2.2**

We assure you reliable and timely processing of your order.

Figures in the tables given in this catalogue are for informational purposes only.



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## Metal plate processing

### Flame cutting of shaped elements

Flame cutting with an autogenous flame cutting machine ESAB SUPRATX SXE-P 6000

Plate thickness [mm]	Table Dimensions [mm]
3 - 310	4 000 x 24 000

Flame cutting with aa plasma arc-cutting machine ESAB EAGLE 3500 and PIERCE RUM 3500

Plate thickness [mm]	Table Dimensions [mm]
1,5 - 50	3 000 x 24 000

### Shear cutting

Hydraulic shear CNC HGM 3020

Max. sheet width [mm]	Max. sheet thickness $R_e 450$ MPa [mm]	Max. sheet thickness $R_e 700$ MPa [mm]	Max. sheet weight [t]
3 080	20	13	21



## Plates from non-alloy constructional steels EN 10025-2 [EN 10025]

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]			Non-standard thickness
		Thickness	Width	Length to	
S 235 JR	1.0038	3 - 250	1 000 - 4 000	16 000	7,9,11,13,14,16,17,18,22,26,28,32
S 355 J2	1.0577	3 - 300	1 000 - 3 500	16 000	7,13,14,18,22,28,32
S 355 J2C	1.0579	3 - 30	1 000 - 3 500	16 000	

### CHEMICAL COMPOSITION

Marking	Material number	Content of C [%max.] for nominal thick. [mm]			Content of elements - mass [%max.]					
		≤16	> 16 ≤ 40	> 40	Si	Mn	P	S	N	Cu
S 235 JR	1.0038	0,19	0,19	0,23	-	1,50	0,045	0,045	0,014	0,60
S 235 JO	1.0114	0,19	0,19	0,19			0,040	0,040	0,014	
S 235 J2	1.0117	0,19	0,19	0,19			0,035	0,035	-	
S 275 JR	1.0044	0,24	0,24	0,25	-	1,60	0,045	0,045	0,014	0,60
S 275 JO	1.0143	0,21	0,21	0,21			0,040	0,040	0,014	
S 275 J2	1.0145	0,21	0,21	0,21			0,035	0,035	-	
S 355 JR	1.0045	0,27	0,27	0,27	0,60	1,70	0,045	0,045	0,014	0,60
S 355 JO	1.0553	0,23	0,23	0,24			0,040	0,040	0,014	
S 355 J2	1.0577	0,23	0,23	0,24			0,035	0,035	-	
S 355 K2	1.0596	0,23	0,23	0,24			0,035	0,035	-	

### MECHANICAL PROPERTIES

Marking	Min. yield strength $R_{p0.2}$ [MPa] for nominal thick. [mm]									Tensile strength $R_m$ [MPa] for nominal thick. [mm]			
	≤16	> 16 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100	> 100 ≤ 150	> 150 ≤ 200	> 200 ≤ 250	> 250 ≤ 400	3 ≤ 100	> 100 ≤ 150	> 150 ≤ 250	> 250 ≤ 400
S 235 JR										-			-
S 235 JO	235	225	215	215	215	195	185	175		-	360-510	350-500	340-490
S 235 J2										165			330-480
S 275 JR										-			-
S 275 JO	275	265	255	245	235	225	215	205		-	410-560	400-540	380-540
S 275 J2										195			380-540
S 355 JR										-			-
S 355 JO	355	345	335	325	315	295	285	275		-	470-630	450-600	450-600
S 355 J2										265			450-600
S 355 K2										265			450-600

Marking	Orient. of test	Min. ductility [%] $L_{5,65} / S_0$ for nominal thick. [mm]						Testing temperature [°C]	Min. impact energy KV [J]		
		≥ 3,0 ≤ 40	> 40 ≤ 63	> 63 ≤ 100	> 100 ≤ 150	> 150 ≤ 250	> 250 ≤ 400		≤ 150	> 150 ≤ 250	> 250 ≤ 400
S 235 JR	l	26	25	24	22	21	-	20			
S 235 JO								0	27	27	-
S 235 J2	t	24	23	22	22	21	21[+t]	-20			27
S 275 JR	l	23	22	21	19	18	-	20			-
S 275 JO								0	27	27	-
S 275 J2	t	21	20	19	19	18	18[+t]	-20			27
S 355 JR	l	22	21	20	18	17	-	20			
S 355 JO								0	27	27	
S 355 J2								17[+t]	-20		27
S 355 K2	t	20	19	18	18	17	17[+t]	-20	40	33	33



## Abrasion resistant plates

Inspection certificates in accordance with EN 10204/2.2/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>XAR 300</b>	1.8704	3 - 50	1 000 - 2 500	12 000
<b>XAR 400</b>	1.8714	3 - 100	1 000 - 3 000	12 000
<b>XAR 400 W</b>	-	4 - 40	1 000 - 2 500	12 000
<b>XAR 450</b>	1.8722	3 - 100	1 000 - 3 000	12 000
<b>XAR 500</b>	1.8734	3 - 100	1 000 - 3 000	12 000
<b>XAR 600</b>	1.8735	4 - 40	1 000 - 2 500	12 000
<b>Fora 400</b>	-	4 - 100	1 000 - 3 000	14 000
<b>Durostat 400</b>	-	6 - 100	1 000 - 2 500	12 000
<b>Durostat 500</b>	-	10 - 50	1 000 - 2 500	12 000
<b>Dillidur 325 L</b>	1.8705	5 - 50	1 000 - 3 000	12 000
<b>Dillidur 400 V</b>	1.8715	6 - 150	1 000 - 3 000	12 000
<b>Dillidur 500 V</b>	1.8721	8 - 100	1 000 - 3 000	12 000
<b>Brinar 400 Cr</b>	1.8709	5 - 25	1 000 - 2 500	12 000
<b>X 120 Mn 12</b>	1.3401	1,5 - 40	1 000 - 2 000	6 000
<b>Domex Wear</b> (welded)	-	3 - 6	1 000 - 2 500	13 000
<b>ALTRIX / SP</b>	Further details s. special prospectuses.			



## CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]									
		C	Si	Mn	P max.	S max.	Cr	Mo max.	Cu max.	Ni max.	B max.
<b>XAR 300</b>	1.8704	max.0,21	max.0,65	max.1,50	0,025	0,025	max.1,20	0,30	-	-	0,005
<b>XAR 400</b>	1.8714	max.0,20	max.0,80	max.1,50	0,025	0,010	max.1,00	0,50	-	-	0,005
<b>XAR 400 W</b>	-	max.0,26	max.0,80	max.1,30	0,025	0,025	max.1,20	0,60	-	-	0,005
<b>XAR 450</b>	1.8722	max.0,21	max.0,80	max.1,50	0,025	0,012	max.1,30	0,50	0,30	-	0,005
<b>XAR 500</b>	1.8734	max.0,28	max.0,80	max.1,50	0,025	0,010	max.1,00	0,50	-	-	0,005
<b>XAR 600</b>	1.8735	max.0,40	max.0,80	max.1,50	0,025	0,010	max.1,50	0,50	-	1,50	0,005
<b>Fora 400</b>	-	max.0,20	-	max.1,40	0,020	0,003	max.1,00	0,20	-	-	0,003
<b>Durostat 400</b>	-	max.0,18	max.0,60	max. 2,10	0,025	0,010	max.1,00	0,50	-	-	0,005
<b>Durostat 500</b>	-	max.0,30	max.0,60	max. 2,10	0,025	0,010	max.1,00	0,50	-	-	0,005
<b>Dillidur 325 L</b>	1.8705	max.0,23	0,30-0,70	1,20-1,70	0,025	0,010	1,00-1,60	0,50	0,60	0,60	
<b>Dillidur 400 V</b>	1.8715	max.0,20	max.0,50	max.1,80	0,025	0,010	max.1,50	0,50	-	0,80	0,005
<b>Dillidur 500 V</b>	1.8721	max.0,30	max.0,50	max.1,60	0,025	0,010	max.1,50	0,50	-	1,00	0,005
<b>Brinar 400 Cr</b>	1.8709	max.0,18	max.0,50	~1,40	0,015	0,005	~1,50	0,60	-	1,20	-
<b>X 120 Mn 12</b>	1.3401	1,10-1,30	0,30-0,50	12,0-13,0	0,100	0,040	max.1,50	-	-	-	-
<b>Domex Wear</b>	-	~ 1,17	~ 0,30	~ 1,80	0,010	0,010	~ 0,30	~ 0,10	-	-	-
<b>ALTRIX / SP</b>	Further details s. special prospectuses.										

## MECHANICAL PROPERTIES

Marking	Mat. number	Yield strength $R_{eH}$ [MPa]	Tensile strength $R_m$ [MPa]	Ductility A [%]	Hardness according to Brinell
<b>XAR 300</b> <sup>1)</sup>	1.8704	~ 700	1000	12	270 - 340
<b>XAR 400</b> <sup>2)</sup>	1.8714	~ 1050	~ 1250	min. 12	360 - 440
<b>XAR 400 W</b> <sup>2)4)</sup>	-	~ 1100	~ 1250	~ 12	360 - 430
<b>XAR 450</b> <sup>2)</sup>	1.8722	~ 1200	~ 1350	~ 10	410 - 490
<b>XAR 500</b> <sup>2)</sup>	1.8734	~ 1300	~ 1600	min. 9	450 - 530
<b>XAR 600</b> <sup>2)</sup>	1.8735	~ 1700	~ 2000	~ 10	min. 550
<b>Fora 400</b> <sup>2)</sup>	-	~ 1100	~ 1350	~ 13	360 - 440
<b>Durostat 400</b> <sup>2)</sup>	-	~ 1000	~ 1250	~ 10	360 - 440
<b>Durostat 500</b> <sup>2)</sup>	-	~ 1200	~ 1550	~ 8	460 - 540
<b>Dillidur 325 L</b>	1.8705	~ 650	~ 1000	~ 13	325
<b>Dillidur 400 V</b> <sup>2)</sup>	1.8715	~ 1000	~ 1300	~ 12	370 - 430
<b>Dillidur 500 V</b> <sup>2)</sup>	1.8721	~ 1300	~ 1650	~ 8	450 - 530
<b>Brinar 400 Cr</b> <sup>1)</sup>	1.8709	~ 900	~ 1200	~ 12	340 - 440
<b>X 120 Mn 12</b> <sup>2)</sup>	1.3401	min. 350	800 - 1100	min. 40	200 - 500
<b>Domex Wear</b> <sup>1)</sup>	-	~ 800	800 - 950	~ 15	~ 285
<b>ALTRIX / SP</b>	Further details s. special prospectuses.				

<sup>1)</sup> - Normalising, <sup>2)</sup> - Hardened in water, <sup>3)</sup> - Hardened in atmosphere, <sup>4)</sup> - Abrasion resistance guaranteed up to 400°C



## Boiler plates EN 10028-2

Inspection certificates in accordance with EN 10204/3.1. and 3.2. TÜV

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]			Non-standard thicknesses
		Thickness	Width	Length to	
<b>P 265 GH</b>	1.0425	3 - 250	1 000 - 4 000	14 000	<b>P 265 GH:</b> 7,9,11,13,14,17,26,28,32,42,52,75,85,95,125
<b>P 295 GH</b>	1.0481	5 - 120	1 000 - 3 500	12 000	
<b>16 Mo 3</b>	1.5415	1,5 - 200	1 000 - 3 000	12 000	
<b>13 Cr Mo 4-5</b>	1.7335	3 - 160	1 000 - 3 000	12 000	<b>P 295 GH:</b> 13,14,18,26,28
<b>10 Cr Mo 9-10</b>	1.7380	3 - 120	1 000 - 2 500	12 000	

Delivery conditions according to ADW 1/10, TRB 100, TRD 101, VD-TÜV-WLB 354/1 and 357/1.  
Impact energy substantiated in inspection certificate  
Tensile test at temperature of +300°C conducted for each cast

### CHEMICAL COMPOSITION

Marking	Material number	Type division <sup>1)</sup>	Content of elements <sup>2)</sup> - mass [%max.]					
			C	Si max.	Mn	P max.	S max.	Al in all
<b>P 265 GH</b>	1.0425	UQ	max.0,20	0,400	0,50-1,40	0,030	0,025	min.0,020
<b>P 295 GH</b>	1.0481	UQ	0,08-0,20	0,400	0,90-1,50	0,030	0,025	min.0,020
<b>16 Mo 3</b>	1.5415	LE	0,12-0,20	0,350	0,40-0,90	0,030	0,025	<sup>4)</sup>
<b>13 Cr Mo 4-5</b>	1.7335	LE	0,08-0,18	0,350	0,40-1,00	0,030	0,025	<sup>4)</sup>
<b>10 Cr Mo 9-10</b>	1.7380	LE	0,08 <sup>5)</sup> -0,14 <sup>7)</sup>	0,500	0,40-0,80	0,030	0,025	<sup>4)</sup>

Marking	Content of elements <sup>2)</sup> - mass [%max.]							
	Cr	Cu max. <sup>3)</sup>	Mo	Nb max.	Ni max.	Ti max.	V max.	Cr+Cu+Mo+Ni max.
<b>P 265 GH</b>	max.0,30	0,300	max.0,08	0,020	0,300	0,300	0,020	0,700
<b>P 295 GH</b>	max.0,30	0,300	max.0,08	0,020	0,300	0,300	0,020	0,700
<b>16 Mo 3</b>	max.0,30	0,300	0,25-0,35	-	0,300	-	-	-
<b>13 Cr Mo 4-5</b>	0,70-1,15 <sup>6)</sup>	0,300	0,40-0,60	-	-	-	-	max.0,5
<b>10 Cr Mo 9-10</b>	2,00-2,50	0,300	0,90-1,10	-	-	-	-	-

<sup>1)</sup> - UQ = non-alloy quality steel, LE = alloy quality steel.

<sup>2)</sup> - Elements not shown in this table must not be intentionally added to steel without the consent of the customer, with the exception of those necessary for the manufacturing process. It is necessary to conduct all relevant measures in order to prevent transfer of metal elements from metal waste or other materials used in manufacture which have a negative impact on the mechanical properties and usability of the steel.

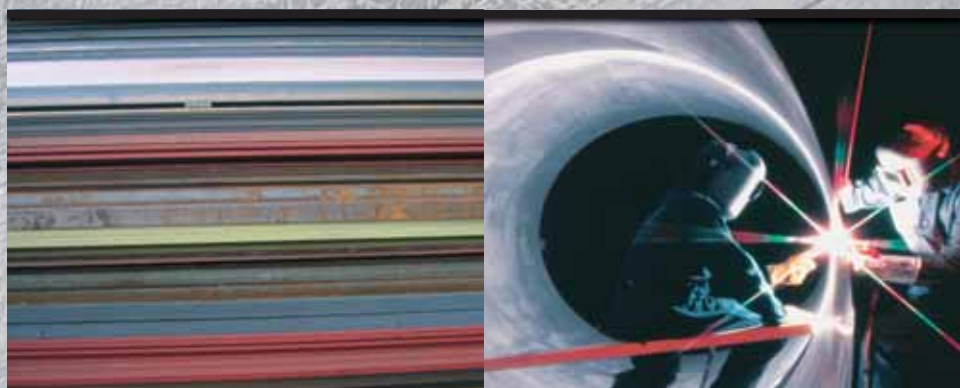
<sup>3)</sup> - Upon ordering a lower content of Cu and higher admissible content of Sn may be agreed upon e.g. with regard to malleability.

<sup>4)</sup> - Stipulate content of Al in cast and state in certification.

<sup>5)</sup> - Should resistance to compressed hydrogen be important, a minimum content of Cr 0.80% may be agreed upon ordering.

<sup>6)</sup> - For thicknesses of products less than 10 mm a minimum content of C 0.06% may be agreed upon ordering.

<sup>7)</sup> - For thicknesses of products over 150 mm a maximum content of C 0.17% may be agreed upon ordering.



## MECHANICAL PROPERTIES

Marking	W.Nr. material number	Thermal processing	Nominal thick. [mm]		Yield strength $R_{eH}$ [MPa] min.	Tensile strength $R_m$ [MPa]	Ductility A [%] min.	Impact energy [KV] + [J] min. at a temperature in °C of		
			>	≤				- 20	0	+ 20
<b>P 265 GH</b>	1.0425	+N		16	265	410-530	22	27	34	40
			16	40	255					
			40	60	245					
			60	100	215					
			100	150	200	400-530				
	150	250	185	390-530						
<b>P 295 GH</b>	1.0481	+N		16	295	460-580	21	27	34	40
			16	40	290					
			40	60	285					
			60	100	260					
			100	150	235	440-570				
	150	250	220	430-570						
<b>16 Mo 3</b>	1.5415	+N		16	275	440-590	22	a)	a)	31
			16	40	270					
			40	60	260					
			60	100	240	430-580				
			100	150	220	420-570				
	150	250	210	410-570						
<b>13 Cr Mo 4-5</b>	1.7335	+NT		16	300	450-600	19	a)	a)	31
			16	60	290					
			60	100	270					
		+NT/+QT	100	150	255	430-580				
	+QT	150	250	245	420-570	a)	a)	a)		
<b>10 Cr Mo 9-10</b>	1.7380	+NT		16	310	480-630	18	a)	a)	31
			16	40	300					
			40	60	290					
		+NT/+QT	60	100	280	470-620				
			+QT	100	150	260				
			150	250	250	450-600				

+N - normalized  
 +NT - normalized and tempered  
 +QT - quenched and tempered  
 a) - A value may be agreed at the time of enquiry and order

On the Stock



## Plates from fine-grain steels EN 10028 - 3

Inspection certificates in accordance with EN 10204/3.1. and 3.2. TÜV

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
P 275 NH	1.0487	5 - 120	1 000 - 4 000	14 000
P 275 NL 1	1.0488	5 - 120	1 000 - 4 000	14 000
P 275 NL 2	1.1104	5 - 120	1 000 - 4 000	14 000
P 355 N	1.0562	3 - 220	1 000 - 3 500	13 000
P 355 NH	1.0565	3 - 220	1 000 - 3 500	13 000
P 355 NL 1	1.0566	3 - 220	1 000 - 3 500	13 000
P 355 NL 2	1.1106	3 - 220	1 000 - 3 500	13 000
P 460 NH	1.8935	4 - 180	1 000 - 3 000	13 000
P 460 NL 1	1.8915	4 - 180	1 000 - 3 000	13 000
P 460 NL 2	1.8918	4 - 180	1 000 - 3 000	13 000

Delivery conditions according to ADW 1/10, TRB 100, TRD 101, VD-TÜV-WLB 354/1 and 357/1  
Impact energy substantiated in inspection certificates  
Values of impact energy for quality P 275 - P 460 are attested at temperature of - 50°C  
Tensile test at temperature of +400°C conducted for each cast

### CHEMICAL COMPOSITION

Marking	Material number	Type division <sup>1)</sup>	Content of elements - mass [%max.]					
			C max.	Si max.	Mn	P max.	S max.	Al in all
P 275 NH	1.0487	UQ	0,16	0,40	0,80-1,50	0,025	0,015	min.0,020 <sup>2)</sup>
P 275 NL 1	1.0488					0,020	0,010	
P 275 NL 2	1.1104					0,020	0,010	
P 355 N	1.0562	UQ	0,18	0,50	1,10-1,70	0,025	0,015	min.0,020 <sup>2)</sup>
P 355 NH	1.0565					0,020	0,010	
P 355 NL 1	1.0566					0,020	0,010	
P 355 NL 2	1.1106	UE						
P 460 NH	1.8935	LE	0,20	0,60	1,00-1,70	0,025	0,015	min.0,020 <sup>2)</sup>
P 460 NL 1	1.8915					0,020	0,010	
P 460 NL 2	1.8918					0,020	0,010	

Marking	Content of elements - mass [%max.]								
	Cr max.	Cu max. <sup>3)</sup>	Mo max.	N max.	Nb max.	Ni max.	Ti max.	V max.	Nb+Ti+V max.
P 275 NH	0,30 <sup>3)</sup>	0,30 <sup>3)</sup>	0,08 <sup>3)</sup>	0,012	0,05	0,50	0,03	0,05	0,05
P 275 NL 1									
P 275 NL 2									
P 355 N	0,30 <sup>3)</sup>	0,30 <sup>3)</sup>	0,08 <sup>3)</sup>	0,012	0,05	0,50	0,03	0,10	0,12
P 355 NH									
P 355 NL 1									
P 355 NL 2									
P 460 NH	0,30	0,70 <sup>4)</sup>	0,10	0,025	0,05	0,80	0,03	0,20	0,22
P 460 NL 1									
P 460 NL 2									

<sup>1)</sup> - UQ = non-alloy quality steel, UE = non-alloy hardened steel, LE = alloy hardened steel.

<sup>2)</sup> - If nitrogen is additionally bound by columbium, titanium or vanadium, the stipulation for minimum aluminium content does not apply.

<sup>3)</sup> - The total of mass contents of chrome, copper and molybdenum may be maximum 0.45 %.

<sup>4)</sup> - If the mass content of copper is greater than 0.30 %, the mass content of nickel must be minimally one half greater than the mass content of copper.



## MECHANICAL PROPERTIES

Marking	Material number	Thermal treatment <sup>1)</sup>	Min. yield strength $R_{eH}$ [MPa] for. nominal thick. [mm]					
			≤16	> 16 ≤ 40	> 40 ≤ 60	> 60 ≤ 100	> 100 ≤ 150	> 150 ≤ 250
<b>P 275 NH</b>	1.0487	Normalizing	275	265	255	235	225	215
<b>P 275 NL 1</b>	1.0488							
<b>P 275 NL 2</b>	1.1104							
<b>P 355 N</b>	1.0562		355	345	335	315	305	295
<b>P 355 NH</b>	1.0565							
<b>P 355 NL 1</b>	1.0566							
<b>P 355 NL 2</b>	1.1106		460	445	430	400	1)	1)
<b>P 460 NH</b>	1.8935							
<b>P 460 NL 1</b>	1.8915							
<b>P 460 NL 2</b>	1.8918							

Marking	Tensile strength $R_m$ [MPa] for. nominal thick. [mm]				Min. ductility A [%] for. nominal thick. [mm]		
	≤60	> 60 ≤ 100	> 100 ≤ 150	> 150 ≤ 250	> 60	> 60 ≤ 150	> 150 ≤ 250
<b>P 275 NH</b>	390-510	370-490	360-480	350-470	24	23	23
<b>P 275 NL 1</b>							
<b>P 275 NL 2</b>							
<b>P 355 N</b>	490-630	470-610	460-600	450-590	22	21	1)
<b>P 355 NH</b>							
<b>P 355 NL 1</b>							
<b>P 355 NL 2</b>	570-720 <sup>2)</sup>	540-710	1)	1)	17	16 in only 100 mm	1)
<b>P 460 NH</b>							
<b>P 460 NL 1</b>							
<b>P 460 NL 2</b>							

<sup>1)</sup> According to negotiation,

<sup>2)</sup> For thicknesses up to 16 mm is acceptable the highest value 730 MPa

Marking	Nominal thicknesses [mm]	Thermal treatment	Impact energy KV min. [J] at temperatures [°C]									
			Test in crosswise direction					Test in lengthwise direction <sup>2)</sup>				
			-50	-40	-20	0	+20	-50	-40	-20	0	+20
<b>P ... N</b>	5 -250 <sup>1)</sup>	Normalizing	-	-	30	40	50	-	-	45	65	75
<b>P ... NH</b>			-	27	35	50	60	30	40	50	70	80
<b>P ... NL 1</b>			27	30	40	60	70	42	45	55	75	85
<b>P ... NL 2</b>												

<sup>1)</sup> For the steel P460NH, P460NL1 and P460NL2 with the thicknesses up to 100 mm

<sup>2)</sup> Up to 40 mm



# Plates from high-strength fine-grain steels EN 10025-6

Heat treated

[EN 10137]

Inspection certificates in accordance with EN 10204/3.1

## MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
S 690 Q	1.8931	2 - 200	1 000 - 3 500	13 000
S 690 QL	1.8928			
S 690 QL1	1.8988			
S 890 Q	1.8940	4 - 120	1 000 - 3 000	12 000
S 890 QL	1.8983			
S 890 QL1	1.8925			
S 960 Q	1.8941	4 - 100	1 000 - 3 000	12 000
S 960 QL	1.8933			

## CHEMICAL COMPOSITION

Marking	Content of elements - mass [%max.]							
	C max.	Si max.	Mn max.	P max.	S max.	N max.	B max.	Cr max.
S 690 Q	0,20	0,80	1,70	0,025	0,015	0,015	0,0050	1,50
S 690 QL				0,020	0,010			
S 690 QL1				0,025	0,015			
S 890 Q				0,020	0,010			
S 890 QL				0,025	0,015			
S 890 QL1				0,020	0,010			
S 960 Q				0,025	0,015			
S 960 QL				0,020	0,010			

Marking	Content of elements - mass [%max.]						
	Cu max.	Mo max.	Nb max.	Ni max.	Ti max.	V max.	Zr max.
S 690 Q	0,50	0,70	0,06	2,0	0,05	0,12	0,15
S 690 QL							
S 690 QL1							
S 890 Q							
S 890 QL							
S 890 QL1							
S 960 Q							
S 960 QL							

## MECHANICAL PROPERTIES

Marking	Min. yield strength $R_{0.2}$ [MPa] for th. [mm]			Tensile strength $R_m$ [MPa] for thick. [mm]			Duct. A [%]	Impact energy KV min. [J] at temperatures			
	$\geq 3$	$> 50$	$> 100$	$\geq 3$	$> 50$	$> 100$		min.	0°C	-20°C	-40°C
	$\leq 50$	$\leq 100$	$\leq 150$	$\leq 50$	$\leq 100$	$\leq 150$					
S 690 Q	690	650	630	770-940	760-930	710-900	14	40	30	-	-
S 690 QL								50	40	30	-
S 690 QL1								60	50	40	30
S 890 Q	890	830	-	940-1100	880-1100	-	11	40	30	-	-
S 890 QL								50	40	30	-
S 890 QL1								60	50	40	30
S 960 Q	960	-	-	980-1150	-	-	10	40	30	-	-
S 960 QL								50	40	30	-

Delivery program: **NA-XTRA, Dillimax, ALDUR, Supralsim, XABO**

On the Stock



## Hot-rolled plates with high yield strength for cold forming EN 10149-2

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>S 355 MC</b>	1.0976	2 - 25	1 000 - 2 500	12 000
<b>S 420 MC</b>	1.0980	2 - 25	1 000 - 2 500	12 000
<b>S 460 MC</b>	1.0982	2 - 25	1 000 - 2 500	12 000
<b>S 500 MC</b>	1.0984	2 - 25	1 000 - 2 500	12 000
<b>S 550 MC</b>	1.0986	2 - 25	1 000 - 2 500	12 000
<b>S 650 MC</b>	1.8976	2 - 25	1 000 - 2 500	12 000
<b>S 700 MC</b>	1.8974	2 - 25	1 000 - 2 500	12 000

### CHEMICAL COMPOSITION

Marking	Content of elements - mass [%max.]							
	C max.	Si max.	Mn max.	P max.	S max.	Al - calc. min.	Nb max.	Ti max.
<b>S 315 MC</b>	0,12	0,50	1,50	0,025	0,020	0,015	0,09	0,15
<b>S 355 MC</b>	0,12	0,50	1,50	0,025	0,020	0,015	0,09	0,15
<b>S 420 MC</b>	0,12	0,50	1,60	0,025	0,015	0,015	0,09	0,15
<b>S 460 MC</b>	0,12	0,50	1,60	0,025	0,015	0,015	0,09	0,15
<b>S 500 MC</b>	0,12	0,50	1,70	0,025	0,015	0,015	0,09	0,15
<b>S 550 MC</b>	0,12	0,50	1,80	0,025	0,015	0,015	0,09	0,15
<b>S 600 MC</b>	0,12	0,50	1,90	0,025	0,015	0,015	0,09	0,22
<b>S 650 MC</b>	0,12	0,60	2,00	0,025	0,015	0,015	0,09	0,22
<b>S 700 MC</b>	0,12	0,60	2,10	0,025	0,015	0,015	0,09	0,22

### MECHANICAL PROPERTIES

Marking	Min. yield strength $R_{eH}^{(1)}$ [MPa]	Tensile strength $R_m^{(1)}$ [MPa]	Ductility [%]	
			$A_{80}$ < 3 mm min.	$A_5$ ≥ 3 mm min.
<b>S 315 MC</b>	315	390 - 510	20	24
<b>S 355 MC</b>	355	430 - 550	19	23
<b>S 420 MC</b>	420	480 - 620	16	19
<b>S 460 MC</b>	460	520 - 670	14	17
<b>S 500 MC</b>	500	550 - 700	12	14
<b>S 550 MC</b>	550	600 - 760	12	14
<b>S 600 MC</b>	600	650 - 820	11	13
<b>S 650 MC</b>	650	700 - 880	10	12
<b>S 700 MC</b>	700	750 - 950	10	12

Delivery program: **ALFORM, DOMEX, PAS**



# Plates from non-alloy constructional fine-grain EN 10025-3

Normalised

[EN 10113-2]

Inspection certificates in accordance with EN 10204/3.1

## MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>S 355 NL</b>	1.0546	3 - 220	1 000 - 4 000	16 000
<b>S 420 NL</b>	1.8912	8 - 120	1 000 - 3 500	16 000
<b>S 460 NL</b>	1.8903	4 - 180	1 000 - 3 500	16 000

## CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]						
		C max.	Si max.	Mn	P max.	S max.	Nb max.	V max.
<b>S 355 NL</b>	1.0546	0,20	0,55	0,85-1,75	0,030	0,025	0,06	0,14
<b>S 420 NL</b>	1.8912	0,22	0,65	0,95-1,80				0,22
<b>S 460 NL</b>	1.8903	0,22	0,65	0,95-1,80				0,22

Marking	Material number	Content of elements - mass [%max.]						
		Al min.	Ti max.	Cr max.	Ni max.	Mo max.	Cu max.	N max.
<b>S 355 NL</b>	1.0546	0,015	0,06	0,35	0,55	0,13	0,60	0,017
<b>S 420 NL</b>	1.8912				0,85			0,027
<b>S 460 NL</b>	1.8903				0,85			0,027

## MECHANICAL PROPERTIES

Marking	Min. yield strength $R_{eH}$ [MPa] for thick. [mm]							Tensile strength $R_m$ [MPa] for thick. [mm]			
	≤16	>16 ≤40	>40 ≤63	>63 ≤80	>80 ≤100	>100 ≤150	>150 ≤200	≤100	>100 ≤200	>200 ≤250	
	<b>S 355 NL</b>	355	345	335	325	315	295	285	275	470-630	450-600
<b>S 420 NL</b>	420	400	390	370	360	340	330	320	520-680	500-650	500-650
<b>S 460 NL</b>	460	440	430	410	400	380	370	-	550-720	530-710	-

Marking	Min. ductility [%] $L_{5,65} / S_0$ for thick. [mm]						Orient. of test	Min. impact energy KV [J] Testing temperature [°C]						
	≤16	>16 ≤40	>40 ≤63	>63 ≤80	>80 ≤200	>200 ≤250		+20	0	-10	-20	-30	-40	-50
	<b>S 355 NL</b>	22	22	22	21	21		21	lengthwise	63	55	51	47	40
<b>S 420 NL</b>	19	19	19	18	18	18	crosswise	40	34	30	27	23	20	16
<b>S 460 NL</b>	17	17	17	17	17	-								



On the Stock

## Plates from non-alloy constructional fine-grain EN 10025-4

Termomechanical rolled

[EN 10113-3]

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>S 355 ML</b>	1.8834	8 - 120	1 000 - 4 000	16 000
<b>S 420 ML</b>	1.8836	8 - 120	1 000 - 3 500	16 000
<b>S 460 ML</b>	1.8838	8 - 120	1 000 - 3 500	16 000

### CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]						
		C max.	Si max.	Mn	P max.	S max.	Nb max.	V max.
<b>S 355 ML</b>	1.8834	0,16	0,55	1,70	0,030	0,025	0,06	0,12
<b>S 420 ML</b>	1.8836	0,18	0,55	1,80				0,14
<b>S 460 ML</b>	1.8838	0,18	0,65	1,80				0,14

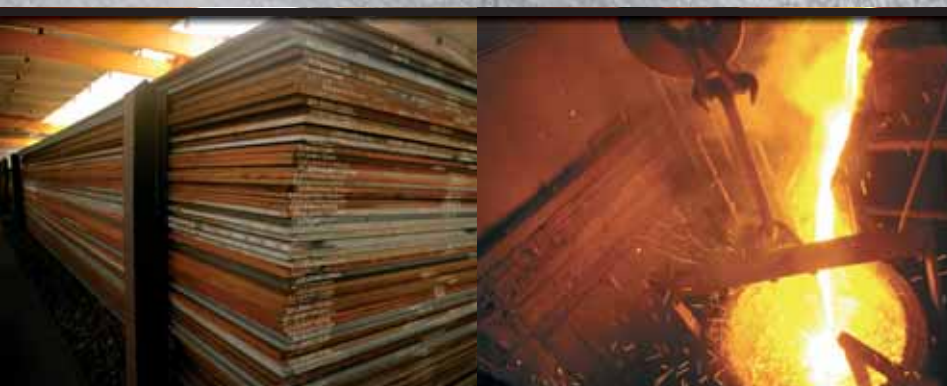
Marking	Material number	Content of elements - mass [%max.]						
		Al min.	Ti max.	Cr max.	Ni max.	Mo max.	Cu max.	N max.
<b>S 355 ML</b>	1.8834	0,015	0,06	0,35	0,55	0,13	0,60	0,017
<b>S 420 ML</b>	1.8836				0,85	0,23		0,027
<b>S 460 ML</b>	1.8838				0,85	0,23		0,027

### MECHANICAL PROPERTIES

Marking	Min. yield strength $R_{eH}$ [MPa] for thick. [mm]						Tensile strength $R_m$ [MPa] for thick. [mm]				
	≤16	> 16 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100	> 100 ≤ 150	≥ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100	> 100 ≤ 150
<b>S 355 ML</b>	355	345	335	325	325	320	470-630	450-610	440-600	440-600	430-590
<b>S 420 ML</b>	420	400	390	380	370	365	520-680	500-660	480-640	470-630	460-620
<b>S 460 ML</b>	460	440	430	410	400	385	540-720	530-710	510-690	500-680	490-660

Marking	Min. ductility [%] $L_{5,65} \sqrt{S_0}$	Orient. of test	Min. impact energy KV [J] Testing temperature [°C]						
			+20	0	-10	-20	-30	-40	-50
<b>S 355 ML</b>	22	lengthwise	63	55	51	47	40	31	27
<b>S 420 ML</b>	19	crosswise	40	34	30	27	23	20	16
<b>S 460 ML</b>	17								

On the Stock



## Plates resistant to effects of hydrogen atmosphere

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>12 Cr Mo 19 5</b>	1.7362	5 - 60	1 000 - 2 500	12 000

### CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]						
		C	Si max.	Mn	P max.	S max.	Cr	Mo
<b>12 Cr Mo 19 5</b>	1.7362	0,08-0,15	0,50	0,30-0,60	0,025	0,020	4,00-6,00	0,45-0,65

### MECHANICAL PROPERTIES

Marking	Yield strength $R_{eH}$ [MPa]	Tensile strength $R_m$ [MPa]	Ductility A [%]	KV [J]	Hardness according to Brinell
<b>12 Cr Mo 19 5</b>	min. 390	590 - 740	min. 17	min. 62	175 - 220

## Rifled plates according to DIN 59 220

Inspection certificates in accordance with EN 10204/3.1

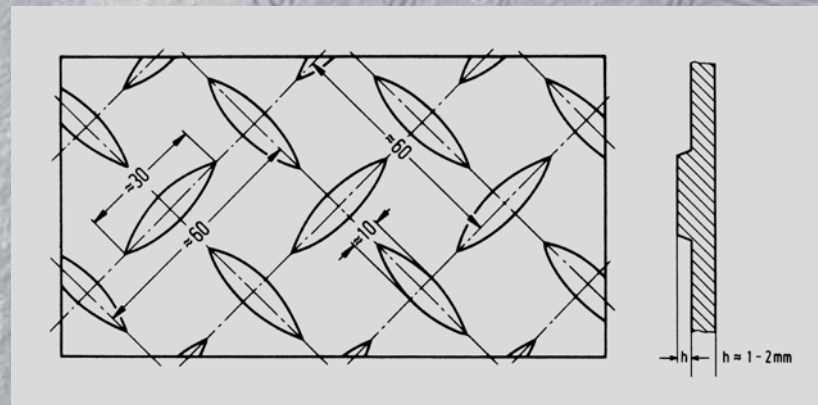
- for qualities S 235 JRG2 and S 355 J2G3 in accordance with EN 10025

Inspection certificates in accordance with EN 10204/3.1 C LRS

- for shipbuilding qualities Grad A and EHS 36

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>S 235 JRG2</b>	1.0038	3/5 - 25/27	1 500 - 2 500	12 000
<b>S 355 J2G3</b>	1.0570	4/6 - 15/17	1 500 - 2 500	12 000



## Plates from steels designated for heat treatment EN 10083

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>2 C 45</b>	1.1191	2 - 150	1 000 - 3 000	12 000
<b>2 C 60</b>	1.1221	2 - 150	1 000 - 2 000	12 000
<b>25 Cr Mo 4</b>	1.7218	3 - 150	1 000 - 2 000	8 000
<b>42 Cr Mo 4</b>	1.7225	3 - 200	1 000 - 2 500	10 000

### CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]						
		C	Si max.	Mn	P max.	S max.	Cr	Mo
<b>2 C 45</b>	1.1191	0,42-0,50	0,40	0,50-0,80	0,035	0,035	max. 0,40	max. 0,10
<b>2 C 60</b>	1.1221	0,57-0,65	0,40	0,60-0,90	0,035	0,035	max. 0,40	max. 0,10
<b>25 Cr Mo 4</b>	1.7218	0,22-0,29	0,40	0,60-0,90	0,035	0,035	0,90-1,20	0,15-0,30
<b>42 Cr Mo 4</b>	1.7225	0,38-0,45	0,40	0,60-0,90	0,035	0,035	0,90-1,20	0,15-0,30

### MECHANICAL PROPERTIES NORMALISED CONDITION

Marking	Min. yield strength $R_{eH}$ [MPa] for thick. [mm]			Min. tensile strength $R_m$ [MPa] for thick. [mm]			Min. ductility A [%]		
	≤ 16	≤ 100	≤ 250	≤ 16	≤ 100	≤ 250	≤ 16	≤ 100	≤ 250
<b>2 C 45</b>	340	305	275	620	580	560	16	16	16
<b>2 C 60</b>	380	340	310	710	670	650	10	11	11
<b>25 Cr Mo 4</b>	380	-	550	600	-	850	~ 22	~ 22	~ 22
<b>42 Cr Mo 4</b>	600	-	800	750	-	1000	~ 15	~ 15	~ 15

Normalising of these steels improves workability without affecting hardenability.

## Plates from carburising steel EN 10084

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>16 Mn Cr 5</b>	1.7131	3 - 200	1 000 - 2 000	12 000
<b>20 Mn Cr 5</b>	1.7147	3 - 200	1 000 - 2 000	12 000

### CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]					
		C	Si max.	Mn	P max.	S max.	Cr
<b>16 Mn Cr 5</b>	1.7131	0,14-0,19	0,40	1,00-1,30	0,035	0,035	0,80-1,10
<b>20 Mn Cr 5</b>	1.7147	0,17-0,22	0,40	1,10-1,40	0,035	0,035	1,00-1,30

### HARDNESS - THERMAL TREATMENT - SOFT ANNEALING

Marking	Hardness according to Brinell
<b>16 Mn Cr 5</b>	max. 207
<b>20 Mn Cr 5</b>	max. 217



## Ship building quality plates

According to prescriptions of classification companies

### MATERIAL DIMENSIONS

Marking	Dimensions [mm]		
	Thickness	Width	Length to
GL - A,B,D,E	3 - 200	1 000 - 4 000	16 000
GL - A 32, D 32, E 32			
GL - A 36, D 36, E 36			

### MECH. PROPERTIES FOR NORMAL STEEL, THICK. UP TO 50 mm

Marking	Yield strength R <sub>eH</sub> [MPa]	Tensile strength R <sub>m</sub> [MPa]	Ductility A [%] min.	Testing temperature [°C]	Minimum impact energy KV [J]	
					lengthwise direction	crosswise direction
GL - A	min. 235	400-490	22	-	-	-
GL - B				0	27	20
GL - D				-20	27	20
GL - E				-40	27	20

### MECH. PROPERTIES FOR NORMAL STEELS WITH INCREASED STRENGTH, THICK. UP TO 50 mm

Marking	Yield strength R <sub>eH</sub> [MPa]	Tensile strength R <sub>m</sub> [MPa]	Ductility A [%] min.	Testing temperature [°C]	Minimum impact energy KV [J]	
					lengthwise direction	crosswise direction
GL - A 32	min. 315	440-590	22	0	31	22
GL - D 32				-20	31	22
GL - E 32				-40	31	22
GL - A 36	min. 355	490-620	21	0	34	24
GL - D 36				-20	34	24
GL - E 36				-40	34	24

## Plates from steel according to ASME - standard

### MATERIAL DIMENSIONS

Marking	Dimensions [mm]			Non - standard thickness
	Thickness	Width	Length to	
SA 516 Grade 60	3 - 130	1 000 - 4 000	14 000	7,9,11,13,14,17,26,28,32,42,52,75,85,95,125
SA 516 Grade 70	3 - 200	1 000 - 3 500	13 000	13,14,17,26,28
SA 387 Grade 12 CL 2	3 - 150	1 000 - 3 000	12 000	
SA 387 Grade 22 CL 2	4 - 80	1 000 - 2 500	12 000	
SA 283 Grade C	3 - 15	1 000 - 2 500	12 000	
SA 285 Grade C	3 - 15	1 000 - 2 500	12 000	
SA 387 Grade 5	5 - 60	1 000 - 2 500	12 000	
SA 203 Grade E	5 - 30	1 000 - 2 000	6 000	



## Plates resistant to atmospheric effects EN 10025-5 [EN 10155]

Inspection certificates in accordance with EN 10204/3.1

### MATERIAL DIMENSIONS

Marking	Material number	Dimensions [mm]		
		Thickness	Width	Length to
<b>S355J0WP</b>	1.8945	1 - 12	1 000 - 2 500	max. 12 000
<b>S355J2WP</b>	1.8946	1 - 12	1 000 - 2 500	max. 12 000
<b>S355J0W</b>	1.8959	3 - 50	1 000 - 2 500	max. 12 000
<b>S355J2W</b>	1.8965	3 - 50	1 000 - 2 500	max. 12 000

### CHEMICAL COMPOSITION

Marking	Material number	Content of elements - mass [%max.]								
		C max.	Si max.	Mn	P	S max.	Cr	Cu	N max.	Addition of nitrogen binding elem.
<b>S355J0WP</b>	1.8945	0,15	0,80	max. 1,10	0,05 0,16	0,035	0,25 1,35	0,20 0,60	0,010	yes
<b>S355J2WP</b>	1.8946	0,15	0,80	max. 1,10	0,05 0,16	0,030	0,25 1,35	0,20 0,60	-	yes
<b>S355J0W</b>	1.8959	0,19	0,55	0,45 1,60	max. 0,040	0,035	0,35 0,85	0,20 0,60	0,010	yes
<b>S355J2W</b>	1.8965	0,19	0,55	0,45 1,60	max. 0,035	0,030	0,35 0,85	0,20 0,60	-	yes

### MECHANICAL PROPERTIES

Marking	Material number	Yield strength $R_{eH}$ [MPa]					Tensile strength $R_m$ [MPa]		Orient. of test	Ductility A [%] min.					
		Nominal thickness [mm]					Nominal thick. [mm]			$L_0=80$ mm			$L_0=5,65 \sqrt{S_0}$		
		≤16	>16	>40	>63	>80	≤3	>3		>1,5	>2	>2,5	>3	>40	>63
<b>S355J0WP</b>	1.8945	355	345 <sup>a)</sup>	-	-	-	510-680	470-630	l t	16 14	17 15	18 16	22 20	-	-
<b>S355J2WP</b>	1.8946	355	345 <sup>a)</sup>	-	-	-	510-680	470-630	l t	16 14	17 15	18 16	22 20	-	-
<b>S355J0W</b>	1.8959	355	345	335	325	315	510-680	470-630	l t	16 14	17 15	18 16	22 20	21 19	20 18
<b>S355J2W</b>	1.8965	355	345	335	325	315	510-680	470-630	l t	16 14	17 15	18 16	22 20	21 19	20 18

Delivery program:

**CORTEN A, CORTEN B,  
DOCOL 355W** - (cold rolling)



## Dimensions norm **EN 10051** continuously hot-rolled uncoated plate

**Table 2**

**TOLERANCE OF THICKNESS** Dimensions in [mm]

Continuously hot-rolled low carbon steel sheet/plate for cold forming

Nominal thickness	Tolerances for a nominal width			
	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
≤ 2,00	± 0,13	± 0,14	± 0,16	-
> 2,00 ≤ 2,50	± 0,14	± 0,16	± 0,17	± 0,19
> 2,50 ≤ 3,00	± 0,15	± 0,17	± 0,18	± 0,20
> 3,00 ≤ 4,00	± 0,17	± 0,18	± 0,20	± 0,20
> 4,00 ≤ 5,00	± 0,18	± 0,20	± 0,21	± 0,22
> 5,00 ≤ 6,00	± 0,20	± 0,21	± 0,22	± 0,23
> 6,00 ≤ 8,00	± 0,22	± 0,23	± 0,23	± 0,26

**Table 3**

**TOLERANCE OF THICKNESS** Dimensions in [mm]

Sheet/plate made OF steels with a normal deformation resistance AT elevated temperatures [ Class A ]

Nominal thickness	Tolerances for a nominal width			
	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
≤ 2,00	± 0,17	± 0,19	± 0,21	-
> 2,00 ≤ 2,50	± 0,18	± 0,21	± 0,23	± 0,25
> 2,50 ≤ 3,00	± 0,20	± 0,22	± 0,24	± 0,26
> 3,00 ≤ 4,00	± 0,22	± 0,24	± 0,26	± 0,27
> 4,00 ≤ 5,00	± 0,24	± 0,26	± 0,28	± 0,29
> 5,00 ≤ 6,00	± 0,26	± 0,28	± 0,29	± 0,31
> 6,00 ≤ 8,00	± 0,29	± 0,30	± 0,31	± 0,35
> 8,00 ≤ 10,00	± 0,32	± 0,33	± 0,34	± 0,40
> 10,00 ≤ 12,50	± 0,35	± 0,36	± 0,37	± 0,43
> 12,50 ≤ 15,00	± 0,37	± 0,38	± 0,40	± 0,46
> 15,00 ≤ 25,00	± 0,40	± 0,42	± 0,45	± 0,50

**Table 4**

**TOLERANCE OF THICKNESS**

Steels exhibiting a high deformation resistance at elevated temperatures

Tolerances for a nominal width		
Class B	Class C	Class D
expansion 15%	expansion 30%	expansion 40%

**TOLERANCE OF LENGTH** Dimensions in [mm]

Nominal length	Tolerances	
	Lower	Upper
< 2000	0	+ 10
≥ 2000 < 8000	0	+ 0,005 x jm. dél.
≥ 8000	0	+ 40

**TOLERANCE OF WIDTH**

Dimensions in [mm]

Nominal width	Mill edges		Trimmed edges	
	Lower	Upper	Lower	Upper
≤ 1200	0	+ 20	0	+ 3
> 1200 ≤ 1500	0	+ 20	0	+ 5
> 1500	0	+ 25	0	+ 6

Tolerances for trimmed edges apply to products with nominal thicknesses ≤ 10 mm, for nominal thickness > 10 mm the upper tolerances shall be agreed at the time of enquiry and order.

**TOLERANCE OF FLATNESS Class A**

Dimensions in [mm]

Nominal thickness	Nominal width	Tolerances on flatness	
		Normal	Special
≤ 2,00	≤ 1200	18	9
	> 1200 ≤ 1500	20	10
	> 1500	25	13
> 2,00 ≤ 25	≤ 1200	15	8
	> 1200 ≤ 1500	18	9
	> 1500	23	12

**TOLERANCE OF FLATNESS - Class B, C, D**

Dimensions in [mm]

Nominal thickness	Nominal width	Tolerances on flatness for classes		
		Class B	Class C	Class D
≤ 25	≤ 1200	18	23	Shall be agreed at the time of enquiry and order
	> 1200 ≤ 1500	23	30	
	> 1500	28	38	

Classes B, C, D - are defined in EN 10051, table 4



**TOLERANCE OF THICKNESS**

Dimensions in [mm]

Nominal thickness	Class A		Class B		Class C		Class D	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
≥ 3 < 5	-0,4	+0,8	-0,3	+0,9	0	+1,2	-0,6	+0,6
≥ 5 < 8	-0,4	+1,1	-0,3	+1,2	0	+1,5	-0,75	+0,75
≥ 8 < 15	-0,5	+1,2	-0,3	+1,4	0	+1,7	-0,85	+0,85
≥ 15 < 25	-0,6	+1,3	-0,3	+1,6	0	+1,9	-0,95	+0,95
≥ 25 < 40	-0,8	+1,4	-0,3	+1,9	0	+2,2	-1,1	+1,1
≥ 40 < 80	-1,0	+1,8	-0,3	+2,5	0	+2,8	-1,4	+1,4
≥ 80 < 150	-1,0	+2,2	-0,3	+2,9	0	+3,2	-1,6	+1,6
≥ 150 < 250	-1,2	+2,4	-0,3	+3,3	0	+3,6	-1,8	+1,8

**TOLERANCE OF LENGTH**

Nominal length	Lower	Upper
< 4000	0	+20
≥ 4000 < 6000	0	+30
≥ 6000 < 8000	0	+40
≥ 8000 < 10000	0	+50
≥ 10000 < 15000	0	+75
≥ 15000 < 20000	0	+100

**TOLERANCE OF WIDTH**

Nominal width	Lower	Upper
≥ 600 < 2000	0	+20
≥ 2000 < 3000	0	+25
≥ 3000	0	+30

**TOLERANCE OF FLATNESS Class N**

Nominal thickness	Measuring length			
	Steel group L Res 460 MPa		Steel group H Res 700 MPa	
	1000	2000	1000	2000
≥ 3 < 5	9	14	12	17
≥ 5 < 8	8	12	11	15
≥ 8 < 15	7	11	10	14
≥ 15 < 25	7	10	10	13
≥ 25 < 40	6	9	9	12
≥ 40 < 250	5	8	8	11

**TOLERANCE OF FLATNESS Class S**

Nominal thickness	Measuring length					
	Steel group L Res 460 MPa			Steel group H Res 700 MPa		
	width < 2750		≥ 2750	width < 2750		≥ 2750
≥ 3 < 8	4	8	5	10	values according to order	
≥ 8 < 250	3	6	3	6	values according to order	

**WEIGHT kg/m<sup>2</sup>**

thickness [mm]	mass per sq. m. [kg]	thickness [mm]	mass per sq. m. [kg]	thickness [mm]	mass per sq. m. [kg]	thickness [mm]	mass per sq. m. [kg]	thickness [mm]	mass per sq. m. [kg]
3	24	16	128	38	304	95	760	160	1280
4	32	17	136	40	320	100	800	165	1320
5	40	18	144	45	360	105	840	170	1360
6	48	19	152	46	368	110	880	175	1400
7	56	20	160	50	400	115	920	180	1440
8	64	22	176	55	440	120	960	185	1480
9	72	25	200	60	480	125	1000	190	1520
10	80	26	208	65	520	130	1040	195	1560
11	88	28	224	70	560	135	1080	200	1600
12	96	30	240	75	600	140	1120	210	1680
13	104	32	256	80	640	145	1160	220	1760
14	112	35	280	85	680	150	1200	230	1840
15	120	36	288	90	720	155	1240	240	1920



## Comparison of norms - EN / GOST / Other

W. Nr.	EN	GOST	Other
<b>1.0037</b>	S 235 JR	Cr3cn	St 37-2
<b>1.0553</b>	S 355 JO		St 52-3
<b>1.0577</b>	S 355 J2	17Г1С	
<b>1.0579</b>	S 355 J2C		
<b>1.0425</b>	P265GH	16K	H II
<b>1.0481</b>	P295GH	17Г	17Mn4
<b>1.5415</b>	16Mo3	15M	15Mo3
<b>1.7335</b>	13CrMo4-5	13XM	13CrMo44
<b>1.7380</b>	10CrMo9-10	10X2M	10CrMo9.10
<b>1.7362</b>	12 CrMo19 5		12CrMo19.5
<b>1.0488</b>	P275N/NH/NL1/NL2		StE/WStE/ <b>TStE</b> /EStE 285
<b>1.0566</b>	P355N/NH/NL1/NL2		StE/WStE/ <b>TStE</b> /EStE 355
<b>1.8915</b>	P460N/NH/NL1/NL2	18Г2АФnc	StE/WStE/ <b>TStE</b> /EStE 460
<b>1.8928</b>	S690QL		StE 690
<b>1.8983</b>	S890QL		StE 890
<b>1.8933</b>	S960QL		StE 960
<b>1.8942</b>	S1100QL		StE 1100
<b>1.0978</b>	S355MC		QStE 380 TM
<b>1.0980</b>	S420MC		QStE 420 TM
<b>1.8974</b>	S700MC		QStE 690 TM
<b>1.1141</b>	2 C15	15	Ck 15
<b>1.1191</b>	2 C45	45	Ck 45
<b>1.1221</b>	2 C60	60	Ck 60
<b>1.7131</b>	16MnCr5	16XГ	16MnCr5
<b>1.7147</b>	20MnCr5	18XГТ	20MnCr5
<b>1.7218</b>	25CrMo4	25XM	25CrMo4
<b>1.7225</b>	42CrMo4	40XΦA	42CrMo4
<b>1.3401</b>			X120 Mn 12
<b>1.8704</b>			XAR 300
<b>1.8714 / - / 1.8715</b>			XAR, Durostat, Dillidur 400
<b>1.8709</b>			Brinar 400 Cr
<b>1.8734 / - / 1.8721</b>			XAR, Durostat, Dillidur 500
-			XAR 600
<b>1.0546</b>	S 355 NL		TStE 355
<b>1.8912</b>	S 420 NL		TStE 420
<b>1.8903</b>	S 460 NL		TStE 460
<b>1.8834</b>	S 355 ML		TStE 355 TM
<b>1.8836</b>	S 420 ML		TStE 420 TM
<b>1.8838</b>	S 460 ML		TStE 460 TM
<b>1.8945</b>	S355J0WP		
<b>1.8946</b>	S355J2WP		
<b>1.8959</b>	S355J0W		
<b>1.8965</b>	S355J2W		WTSt 52-3



## Summary of inspection documents EN 10204

Reference	Designation of the document type				Document content	Document validated by
	Czech ver.	English ver.	German ver.	French ver.		
2.1	Prohlášení o shodě s objednávkou	Declaration of compliance with the order	Werksbescheinigung	Attestation de conformité à la commande	Statement of compliance with the order	The manufacturer
2.2	Zkušební zpráva	Test report	Werkszeugnis	Relevé de contrôle	Statement of compliance with the order, with indication of results of non-specific inspection	The manufacturer
3.1	Inspekční certifikát 3.1	Inspection certificate 3.1	Abnahmeprüfzeugnis 3.1	Certificat de réception 3.1	Statement of compliance with the order, with indication of results of specific inspection	The manufacturer's authorized inspection representative independent of the manufacturing department
3.2	Inspekční certifikát 3.2	Inspection certificate 3.2	Abnahmeprüfzeugnis 3.2	Certificat de réception 3.2	Statement of compliance with the order, with indication of results of non-specific inspection	The manufacturer's authorized inspection representative independent of the manufacturing department and either the purchaser's authorized inspection representative or the inspector designated by the official regulations

## Calculation CEV

$$CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$$

Content of elements - weight [% max.]

## Certificate ISO 9001:2000





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