Carbon Steel Comparison Tabel

Europe			Germany	France	Italy	Belgium	Sweden	U.K.	Canada	India	Japan		International	USA
EN 10025-2 (2004)	EN 10025 (1993)	EN 10025 (1990)	DIN 17100	NF A 35-501	UNI 7070	NBN21-101	MNC 810E	BS 4360	CSAG40-21	IS	JIS 3101	JIS 3106	ISO 630	ASTM
S185	S185	Fe 310-0	St 33	A 33	Fe 320	A 320	13 00-00				SS 330			
													FE 310	A283 A,B,C,D
	S235JR	Fe 360B	St 37-2	E24-2	Fe 360 B	AE 235-B	13 11-00							
	S235JRG1	Fe 360BFU	USt 37-2											
S235JR	S235JRG2	Fe E360BFN	RSt 37-2	E24-2	Fe 360 B	AE 235-B	13 12-00	40(A)B	230 G	IS226	SS400	SM 400A	Fe 360 B	A284 gr. C, D
S235J0	S235J0	Fe E 360 C	St37-3U	E 24-3	Fe 360 C	AE 235-C		40C		Fe 410-S		SM400B	Fe 360C	
S235J2+N	S235J2G3	Fe E 360 D1	St 37-3 N	E24-4	Fe 360 D	AE 235-D		40D				SM400C	Fe 360 D	
S235J2	S235J2G4	Fe E360 D2						40 EE						A 36
						AE 255 A,B,C,D								
S275JR	S275JR	Fe 430 B	ST 44-2	E 28-2	Fe430B	AE 295-B	14 12-00	43(A)B	260W,WT	IS2062			Fe 430B	
S275J0	S275J0	Fe 430 C	St44-3U	E 28-3	Fe 430 C	AE 295-C		43 C		Fe410 WA			Fe 430C	A529 gr. 42,50
S275J2+N	S275J2G3	Fe 430 D1	St 44-3N	E 28-4	Fe 430D	AE 295-D	14 14-00	43 D		Fe 410 WB			Fe 430D	
S275J2	S275J2G4	Fe 430 D2				AE 295-DD	14 14-01	43EE		Fe 410 WC				A572 gr. 42,50
							26 32-00		300W.WT					
							26 34-11							
							21 72-00							A 573 gr. 58,65, 70
							21 74-01							
S355JR	S355JR	Fe 510 B		E 36-2	Fe 510 B	AE 355-B	21 32-01	50 B	350 W, WT	IS 961	SS490	SM 490A	FE 510 B	
S355J0	S355J0	Fe 510 C	St 52-3 U	E 36-3	Fe 510C	AE 335-C	21 34-01	50 C		Fe 570 HT		SS490B	Fe 510 C	A633 gr. A,C,D
S355J2+N	S355J2G3	Fe 510 D1	St 52-3 N		Fe 510D	AE 355 D	21 35-01	50 D		Fe 540 WHT		SS 490 C	Fe 510D	
S335J2	S335J2G4	Fe 510 D2					26 42-00					SS 490 YA	A 656	A656 gr. 50
S335K2+N	S335K2G3	Fe 510 D D1		E 36 -4	Fe 510 DD	AE355-DD	26 44-11	50 DD				SS490 YB		
S335K2	S335K2G4	Fe 510 DD2						50 EE				SM 520 B		
												SM 520 C		
														A 709 gr.36,50,50 W
														A 808

Europe			Germany	France	Italy		Sweden	U.K.						
EN 10025-3 (2004)	EN 10025-4 (2004)	EN 10113-2 (1993)	DIN	NF A 36-201	UNI		SS 14..	BS 4360						
S275N		S 275N	StE285		Fe E 275 KG N									
S275NL		S 275NL	TStE285		Fe E 275 KT N			43EE						
S355N		S 355 N	StE355	E 355 R	Fe E 355 KG N		2134-01							
S355NL		S 355 NL	TStE355	E 355 FP	Fe E 355 KT N		2135-01	50EE						
S420N		S420N	StE420	E 420 R										
S420NL		S420NL	TStE420	E 420 FP										
S460N		S460 N	StE460	E 460 R	Fe E 460 KG N									
S460NL		S460 NL	TStE460	E 460 FP	Fe E 460 KT N			55EE						
	S275M	S275M			Fe E 275 KG TM									
	S275ML	S275ML			Fe E 275 KT TM									
	S355M	S355M	StE355 TM		Fe E 355 KG TM									
	S355ML	S355ML	TStE355 TM		Fe E 355 KT TM									
	S420M	S420M	StE420 TM											
	S420ML	S420ML	TStE420 TM											
	S460M	S460M	StE460 TM		Fe E 460 KG TM									
	S460ML	S460ML	TStE460 TM		Fe E 460 KT TM									

Comparison Table Boiler Steels

Material	EN 10028-2	DIN 17155	NFA 36-205	UNI 5869	BS 1501	UNE 36087	ASTM	JIS G3115
1.0345	P235GH	HI	A 37 CP	Fe 360 - 1KW	161 Gr. 360 164 Gr. 360	A 37 RCI	A 285 Gr. C A 414 Gr. C A 516 Gr. 55	SPV 24
1.0425	P265GH	HII	A 42 CP	Fe 410 - 1KW	161 Gr. 400 / 164 Gr. 400 / 224 Gr. 400	A 42 RCI	A 414 Gr. E / A 516 Gr. 60	
1.0481	P295GH	17 Mn 4	A 48 CP	Fe 460 - 1KW	224 Gr. 490	A 47 RCI	A 414 Gr. F / A 516 Gr. 65	SPV 32
1.0473	P355GH	19 Mn 6	A 52 CP	Fe 510 - 1KW		A 52 RCI	A 414 Gr. G	SPV 36
1..5415	16Mo3	15 Mo 3	15 D3	15 Mo 3	1503 - 243 B	16 Mo 3	A 204 Gr. B	
1.7335	13CrMo4-5	13CrMo 4 4	15 CD 4-05	14 CrMo 4.5	620 Gr. 27	14 CrMo 4.5	A 387 Gr. 12	
1.738	10CrMo9-10	10CrMo 9 10	10 CD 9.10		622 Gr. 31		A 387 Gr. 22	
1.7383	11CrMo9-10			12 CrMO 9.10		12 CrMo 9.10		

Comparison Table Fine Grain Structural Steels, Thermo Mecanically Rolled

Material	EN 10025-4	SEW 083	NFA 36-201	UNI 7382	BS 4360	UNE	ASTM	JIS
1.8818	S275M	StE 275 TM		Fe E 275 KGTM				
1.8819	S275ML	TStE 275 TM		Fe E 275 KTTM				
1.8823	S355M	StE 355 TM	E 355 R	Fe E 355 KGTM			A 572 Gr. C	
1.8834	S355ML	TStE 355 TM	E 355 FP	Fe E 355 KTTM	50 EE		A 633 Gr. C	
1.8825	S420M	StE 420 TM	E 420 R				A 572 Gr. 60	
1.8836	S420ML	TStE 420 TM	E 420 FP				A 633 Gr. E	
1.8827	S460M	StE 460 TM	E 460 R	Fe E 460 KGTM			A 572 Gr. 65	
1.8838	S460ML	TStE 460 TM	E 460 FP	Fe E 460 KGTM	55 EE		A 572 Gr. 65	

Comparison Table Fine Grain Structural Steels, Normalized Rolled

Material	EN 10025-3	SEW 083	NFA 36-201	UNI 7382	BS 4360	UNE	ASTM	JIS
1.049	S275N	StE 285		Fe E 275 KGN			A 572 Gr. 42	
1.0491	S275NL	TStE 285		Fe E 275 KTN	43 EE		A 633 Gr. A	
1.0545	S355N	StE 355	E 355 R	Fe E 355 KGN	50 E	AE 355 KG	A 572 Gr. 50	
1.0546	S355NL	TStE 355	E 355 FP	Fe E 355 KTN	50 EE	AE 355 KT	A 633 Gr. C, D A 537 Cl. 1	
1.8902	S420N	StE 420	E 420 R	Fe E 420 KGN		AE 420 KG	A 255 Gr. D	SM 490 A
1.8912	S420NL	TStE 420	E 420 FP		50 F		A 633 Gr. E A 572 Gr. 60 A 738 Gr. C	

Comparison Table High Carbon Steels

Material	EN 10083-2	DIN 17200	NFA 33-101	UNI 7846	BS 970	UNE 36011	SAE J 403-AISI	JIS G 4051
1.0501	C35	C 35	AF55-C35	C 35	070 M 36	C 35 k	1035	S 35 C
1.0511	C40	C 40	AF60-C45	C 40	070 M 40		1038 / 1040	S 40 C
1.0503	C45	C 45	AF65-C45	C 45	070 M 46	C 45 k	1042 / 1045	S 45 C
1.054	C50	C 50			070 M 50		1049 / 1050	S 50 C
1.0535	C55	C 55	AF70-C55	C 55	070 M 55	C 55 k	1055	S 55 C
1.0601	C60	C 60			070 M 60		1060	S 58 C
1.0603	1 C 67	C 67	XC 68	C 67	080A67		1070	
1.0605	1 C 75	C 75	XC 75	C 75	080A72		1074	

Comparison Table High Strength Steels for Cold Forming, Normalized

Material	EN 10149-3	SEW 092	NFA	UNI	BS 1149	UNE	ASTM	JIS
1.0971	S260NC	QStE 260 N						
					HR 40/30			
1.0973	S315NC							
					HR 43/35			
1.0977	S355NC							
					HR 46/40			
1.0981	S420NC	QStE 420 N						
					HR 50/45			

Comparison Table Engineering Steels

Europe		Belgium	Germany	France	Sweden	International	Italy	Japan
EN 10025-2 (2004)	EN 10025 (1990)	NBNA21201	DIN 17100	NFA35501	MNC 850 E	ISO 1052	UNI 7070	JISG
		A 330-1,2						
		A-360 1,2,3						
		A-410 1,2,3						
E295	Fe 490-2	A 490-1,2	St 50-2	A 60-2	15 50-00	Fe E 490	Fe 490	SS 500
					15 50-01	5		
E335	Fe 590-2	A 590-1,2	St 60-2	A 60-2	16 50-00	Fe E 690	Fe 590	
					16 50-01			
E360	Fe 690-2	A 690-1,2	St 70-2	A 70-2	16 55-00	Fe E 690	Fe 690	
					16 65-01			

Comparison Table General Purpose Structural Ste

Material	EN 10025-2	DIN 17100	NFA 35-501	UNI 7070	BS 4360	UNE 36.080	ASTM	JIS G3101
1.0035	S185	St 33	A 33	Fe 320		A 310-0	A 283 B A 569 CQ	SS 330
1.0037	S235JR	St 37-2	E 24-2	Fe 360 B	40 A		A 283 C A 570 Gr. 33	
1.0038	S235JR	RSt 37-2	E 24-2 NE		40 B	AE 235 B-FN		
1.0116	S235J2+N	St 37-3 N	E 24-4	Fe 360 D	40 D	AE 235 D		
1.0117	S235J2							
1.0044	S275JR	St 44-2	E 28-2	Fe 430 B	43 B	AE 275 B	A 283 D A 36	SS 400
1.0143	S275J0	St 44-3 U	E 28-3	Fe 430 C	43 C	AE 275 C	A 578 Gr. 70	
1.0144	S275J2+N	St 44-3 N	E 28-4	Fe 430 D	43 D	AE 275 D	A 633 Gr. A	
1.0145	S275J2							
1.0045	S355JR		E 36-2	Fe 510 B	50 B	AE 355 B	A 572 Gr. 50 A 678 Gr. A	SS 490
1.0553	S355J0	St 52-3 U	E 36-3	Fe 510 C	50 C	AE 355 C	A 441	
1.057	S355J2+N	St 52-3 N		Fe 510 D	50 D	AE 355 D		
1.0577	S355J2							
1.0595	S355K2+N		E 36-4		50 DD			
1.0596	S355K2							
1.005	E295	St 50-2	A 50-2	Fe 490		A 490		SS 500
1.006	E335	St 60-2	A 60-2	Fe 590		A 590		
1.007	E360	St 70-2	A 70-2	Fe 690		A 690		

Comparison Table Steel for Offshore Structure - Grade S355/API 2H and 2W - Chemical Compositions

Grade	Thickness (mm)	Delivery condition	C	P	S	Ni	Mo	Nb	CE (HW)	Pcm	Standard
S355G2+N	≤ 25	N	≤ 0.20	≤ 0.035	≤ 0.030	≤ 0.50	≤ 0.10	≤ 0.060	≤ 0.43	-	EN 10225
S355G3+N	≤ 40	N	≤ 0.18	≤ 0.030	≤ 0.025	"	"	"	"	-	"
S355G5+M	≤ 25	TMCP	≤ 0.14	≤ 0.035	≤ 0.030	≤ 0.30	≤ 0.20	≤ 0.060	≤ 0.43	-	"
S355G6+M	≤ 40	TMCP	"	≤ 0.030	≤ 0.025	"	"	"	"	-	"
S355G7+N	≤ 150	N	≤ 0.14	≤ 0.030	≤ 0.010	≤ 0.50	≤ 0.08	≤ 0.040	≤ 0.43	≤ 0.24	"
S355G7+M	≤ 100	TMCP	"	"	"	"	"	"	"	"	"
S355G8+N	≤ 150	N	≤ 0.14	≤ 0.030	≤ 0.007 *)	≤ 0.50	≤ 0.08	≤ 0.040	≤ 0.43	≤ 0.24	"
S355G8+M	≤ 100	TMCP	"	"	"	"	"	"	"	"	"
S355G9+N	≤ 40 < 40 ≤ 150	N "	≤ 0.12 "	≤ 0.030 "	≤ 0.010 "	≤ 0.70 ≤ 0.30 ≤ 0.70	≤ 0.08 "	≤ 0.040 "	≤ 0.43 "	≤ 0.22 "	" "
S355G9+M	≤ 40 < 40 ≤ 75 < 75 ≤ 100	TMCP " "	≤ 0.12 " "	≤ 0.030 " "	≤ 0.010 " "	≤ 0.70 < 0.30 ≤ 0.70 "	≤ 0.08 " ≤ 0.20	≤ 0.030 " "	≤ 0.41 " ≤ 0.42	≤ 0.21 " ≤ 0.22	" " "
S355G10+N	≤ 40 < 40 ≤ 150	N "	≤ 0.12 "	≤ 0.015 "	≤ 0.005 *) "	≤ 0.70 "	≤ 0.08 "	≤ 0.040 "	≤ 0.43 "	≤ 0.22 "	" "
S355G10+M	≤ 40 < 40 ≤ 75 < 75 ≤ 100	TMCP " "	≤ 0.12 " "	≤ 0.015 " "	≤ 0.005 *) " "	≤ 0.70 < 0.30 ≤ 0.70 "	≤ 0.08 " ≤ 0.20	≤ 0.040 " "	≤ 0.41 " ≤ 0.42	≤ 0.21 " ≤ 0.22	" " "
API211-50(T)	≤ 50.8 < 50.8 ≤ 101.6	N "	≤ 0.18 "	≤ 0.030 "	≤ 0.010 "	- -	- -	0.005-0.05 "	≤ 0.43 ≤ 0.45	- -	API 2H "
API2W-50(T)	≤ 38.1 < 38.1 ≤ 88.9 < 88.9 ≤ 152.6	TMCP " "	≤ 0.16 " "	≤ 0.030 " "	≤ 0.010 " "	≤ 0.75 " "	≤ 0.08 " "	≤ 0.030 " "	≤ 0.39 ≤ 0.41 ≤ 0.43	≤ 0.23 " ≤ 0.24	API 2W " "
355EM	≤ 40 < 40 ≤ 75 < 75 ≤ 150	N/TMCP " "	≤ 0.15 " "	≤ 0.025 " "	≤ 0.015 " "	≤ 0.45 " "	≤ 0.08 " "	≤ 0.040 " "	≤ 0.43 ≤ 0.44 ≤ 0.45	- - -	BS7191 " "
355EMZ	≤ 40 < 40 ≤ 75 < 75 ≤ 150	N/TMCP " "	≤ 0.15 " "	≤ 0.025 " "	≤ 0.005 *) " "	≤ 0.45 " "	≤ 0.08 " "	≤ 0.040 " "	≤ 0.43 ≤ 0.44 ≤ 0.45	- - -	BS7191 " "
E36/EH36 (max 100 mm)	≤ 50 < 50 ≤ 100 < 100 ≤ 150	N/TMCP " "	≤ 0.18 " "	≤ 0.025 " "	≤ 0.025 " "	≤ 0.40 " "	≤ 0.08 " "	≤ 0.02 - 0.05 " "	≤ 0.38 *) ≤ 0.40 **) ≤ 0.41 **)	- - -	Ship NV-rules Mobile Offsh.units

**) Low sulphur content, in order to fulfil the requirements on tensile test in through thickness direction. Verification, if corresponding option is required (EN 10225, option 13 or BS 7191, option B24).*

***) For TMPC only*

Grade S355N - Comparison of Tensile Strength

	BS7191	EN 10255 Norsok			API 2H	Shipbuilding rules LR/GL/NV
355 N	**355EM / EMZ**	**S355G2+N**	**S355G3+N**	**S355G7+N S355G8+N S355G9+N S355G10+N**	**API 2H-50**	**e. g. E 36 / EH 36**
Thick. [mm]	**Tensile strength Rm [MPa]**					
≤25	460 – 620	470 – 630	470 – 630	470 – 630	483 – 620	490 – 620
> 25 ≤40	"	"	"	"	"	"
> 40 ≤100	"	-	"	"	"	"
> 100 ≤150	"	-	-	"	"	"

Grade S355N - Comparison of Yield Strength

	BS7191	EN 10255 Norsok			API 2H	Shipbuilding rules LR/GL/NV
355 N	**355EM / EMZ**	**S355G2+N**	**S355G3+N**	**S355G7+N S355G8+N S355G9+N S355G10+N**	**API 2H-50**	**e. g. E 36 / EH 36**
Thick. [mm]	**Yield strength Rm [MPa]**					
> 25 ≤40	≥345	-	"	≥345	"	"
> 40 ≤63	≥340	-	-	≥335	"	"
> 63 ≤80	≥325	-	-	≥325	≥325*)	"
> 80 ≤100	≥325	-	-	"	"	"
> 100 ≤120	≥315	-	-	"	"	"
> 120 ≤150	≥305	-	-	≥320	"	"

*)$R_{p0.2}$

Grade S355N - Comparison of Toughness

	BS7191	EN 10255 Norsok			API 2H	Shipbuilding rules LR/GL/NV
355 N	**355EM / EMZ**	**S355G2+N**	**S355G3+N**	**S355G7+N S355G8+N S355G9+N S355G10+N**	**API 2H-50**	**e. g. E 36 / EH 36**
	Minimum Impact Energy Av [Joule] - transverse (average/single) - at a test temperature of					
	-40 °C	**-40 °C**	**-40 °C**	**-40 °C**	**-40 °C**	**-40 °C**
Surface	50 / 35	50 / 35	50 / 35	50 / 35	-	-
All thickness	-	-	-	-	41/34	-
≤ 40 mm	-	-	-	-	-	24/17
≤ 50 mm						
Quarter thick.	-	-	-	-	41/34	-
>40	-	-	-	-	-	27 /19
> 50 ≤ 70	-	-	-	-	-	34 / 24
> 70 ≤ 150						
Mid-thickness	-	-	-	-	-	-
All thicknesses > 40 mm	50 / 35	-	-	50 / 35	-	-

Grade 355 TMCP – Comparison of Tensile Strength

	BS 7191	EN 10225 / NORSOK			API 2W	Shipbuilding rules LR / GL / NV etc.
355 TMPC	**355EM/EMZ**	**S355G5+M**	**S355G6+M**	**355G7+M 355G8+M S355G9+M S355G10+M**	**API 2W-50**	**e.g. E 36 / EH 36**
Thick. (mm)	**Tensile strength Rm (Mpa)**					
≤ 25	460 - 620	470 - 610	470 - 610	470 - 630	≥ 483	490 - 620
> 25 ≤ 40	"	-	"	"	"	"
> 40 ≤ 100	"	-	-	"	"	"
> 100 ≤ 150	"	-	-	-	"	-

Grade 355 TMCP – Comparison of Yield Strength

	BS 7191	EN 10225 / NORSOK			API 2W	Shipbuilding rules LR / GL / NV etc.
355 TMPC	**355EM/EMZ**	**S355G5+M**	**S355G6+M**	**355G7+M 355G8+M S355G9+M S355G10+M**	**API 2W-50**	**e.g. E 36 / EH 36**
Thick. (mm)	**Yield strength Rm (Mpa)**					
≤ 25	≥ 355	≥ 355	≥ 355	≥ 355	345 - 551 *)	≥ 355
> 16 ≤ 20	"	≥ 345	≥ 345	"	"	"
> 20 ≤ 25	"	"	"	"	"	"
> 25 ≤ 40	≥ 345	-	-	≥ 345	345 - 517 *)	"
> 40 ≤ 63	≥ 340	-	-	≥ 335	"	"
> 63 ≤ 80	≥ 325	-	-	≥ 325	"	"
> 80 ≤ 100	≥ 325	-	-	"	"	"
> 100 ≤ 120	≥ 315	-	-	"	"	"
> 120 ≤ 150	≥ 305	-	-	-	"	(DNV: ≤ 150 mm)

Grade 355 TMCP – Comparison of Toughness

	BS 7191	EN 10225 / NORSOK			API 2W	Shipbuilding rules LR / GL / NV etc.
355 TMPC	**355EM/EMZ**	**S355G5+M**	**S355G6+M**	**355G7+M 355G8+M S355G9+M S355G10+M**	**API 2W-50**	**e.g. E 36 / EH 36**
	Minimum Impact Energy A (Joule) - transverse (average/single) - at a test temp. of					
	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C
Surface						
All thicknesses	50/35	50/35	50/35	50/35	-	-
≤ 40 mm	-	-	-	-	41/34	-
≤ 50 mm	-	-	-	-	-	24/17
Quarter thick.						
> 40	-	-	-	-	41/34	-
> 50 ≤ 70	-	-	-	-	-	27/19
> 70 ≤ 150	-	-	-	-	-	34/24
Mid-thick.						
All thicknesses	-	-	-	-	-	-
> 40	50/35	-	-	50/35	-	-

355 N and TMCP – Comparison of Yield to Tensile Strength Ratios

	BS 7191	EN 10225 / NORSOK			API	Shipbuilding rules LR / GL / NV etc.
355 N	**355EM/EMZ**	**S355G2+N**	**S355G3+N**	**355G7+N 355G8+N S355G9+N S355G10+N**	**API 2H-50**	**e.g. E 36 / EH 36**
Thick. (mm)	**Tensile strength Rm (Mpa)**					
≤ 16	Info	0.87	0.87	0.87	-	-
> 16	"	0.85	0.85	0.85	-	-
355 TMPC	355EM/EMZ	S355G5+M	S355G6+M	355G7+M 355G8+M S355G9+M S355G10+M	API 2W-50	e.g. E 36 / EH 36
Thick. (mm)	**Tensile strength Rm (Mpa)**					
≤ 16	Info	0.93 *)	0.93 *)	0.93 *)	-	-
> 16	"	0.90	0.90	0.90	-	-

**) for plates max 10 mm, alternative yield to tensile strength ratio may be agreed.*

420 / 450 / 460 TMCP – Comparison of Tensile Strength

	BS 7191	EN 10225		NORSOK (EN 10225)		API 2W	Shipbuilding rules (e.g. NV) Mobile Offshore units		
TMPC	450EM/EMZ	S420G1/G2+M	S460G1/G2+M	S420G1/G2+M	S460G1/G2+M	API 2W-60	E40	E420	E460
Thick. (mm)	Tensile strength Rm (Mpa)								
≤ 16	550 - 620	500 - 660	540 - 700	500 - 660	550 - 700	≥ 518	510 - 650	530 - 680	570 - 620
> 16 ≤ 20	"	"	530 - 690	"	"	"	"	"	"
> 20 ≤ 25	"	"	"	"	"	"	"	"	"
> 25 ≤ 40	"	"	520- 680	"	"	"	"	"	"
> 40 ≤ 63	"	480 - 640	515 - 675	"	"	"	≤ 50 mm	"	"
> 63 ≤ 75	"	"	505 - 665	"	"	"	-	"	"
> 75 ≤ 80	-	"	"	"	"	"	-	"	"
> 80 ≤ 100	-	"	500 - 660	"	"	"	-	"	"

420 / 450 / 460 TMCP - Comparison of Yield Strength

	BS 7191	EN 10225		NORSOK (EN 10225)		API 2W	Shipbuilding rules (e.g. NV) Mobile Offshore units		
TMPC	450EM/EMZ	S420G1/G2+M	S460G1/G2+M	S420G1/G2+M	S460G1/G2+M	API 2W-60	E40	E420	E460
Thick. (mm)	Tensile strength Rm (Mpa)								
≤ 16	≥ 450	≥ 420	≥ 460	≥ 420	≥ 460	414 - 620 *)	≥ 390	≥ 420	≥ 460
> 16 ≤ 20	≥ 430	≥ 400	≥ 440	"	"	"	"	"	"
> 20 ≤ 25	"	"	"	"	"	"	"	"	"
> 25 ≤ 40	≥ 415	"	≥ 420	"	"	414 - 586 *)	"	"	"
> 40 ≤ 63	"	≥ 390	≥ 415	"	"	"	≤ 50 mm	"	"
> 63 ≤ 75	"	≥ 380	≥ 405	"	"	"	"	"	"
> 75 ≤ 80	-	"	"	"	"	"	"	"	"
> 80 ≤ 100	-	"	≥ 400	"	"	"	"	"	"

420 / 450 / 460 TMCP - Comparison of Toughness

	BS 7191	EN 10225		NORSOK (EN 10225)		API 2	Shipbuilding rules (e.g. NV) Mobile Offshore units		
TMPC	450EM/EMZ	S420G1/G2+M	S460G1/G2+M	S420G1/G2+M	S460G1/G2+M	API 2W-60	E40	E420	E460
	Minimum Impact Energy A (Joule) - transverse (average/single) - at a test temparature of								
	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C
Surface									
All Thicknesses	60/42	60/42	60/42	60/42	60/42	-	-	-	-
≤ 50 mm	-	-	-	-	-	-	27/19	28/20	31/22
Quarter thickn.									
> 50 mm	-	-	-	-	-	-	27/19	28/20	31/22
Mid. Thickness									
All Thicknesses						41/43	-	-	-
> 40 mm	60/42	60/42	60/42	60/42	60/42	-	-	-	-

420 / 450 / 460 Q+T – Comparison of Tensile Strength

	BS 7191	EN 10225		NORSOK (EN 10225)		API 2Y	Shipbuilding rules (e.g. NV) Mobile Offshore units		
Q + T	450EM/EMZ	S420G1/G2+Q	S460G1/G2+Q	S420G1/G2+Q	S460G1/G2+Q	API 2Y-60	E40	E420	E460
Thick. (mm)	Tensile strength Rm (Mpa)								
≤ 16	550 - 620	500 - 660	540 - 700	500 - 660	550 - 700	≥ 518	510 - 650	530 - 680	570 - 620
> 16 ≤ 20	"	"	530 - 690	"	"	"	"	"	"
> 20 ≤ 25	"	"	"	"	"	"	"	"	"
> 25 ≤ 40	"	"	520- 680	"	"	"	"	"	"
> 40 ≤ 63	"	480 - 640	515 - 675	"	"	"	"	"	"
> 63 ≤ 75	"	"	505 - 665	"	"	"	"	"	"
> 75 ≤ 80	-	"	"	"	"	"	"	"	"
> 80 ≤ 100	-	"	500 - 660	"	"	"	"	"	"

420 / 450 / 460 Q+T – Comparison of Yield Strength

	BS 7191	EN 10225		NORSOK (EN 10225)		API 2Y	Shipbuilding rules (e.g. NV) Mobile Offshore units		
Q + T	450EM/EMZ	S420G1/G2+Q	S460G1/G2+Q	S420G1/G2+Q	S460G1/G2+Q	API 2Y-60	E40	E420	E460
Thick. (mm)	Yield strength Rm (Mpa)								
≤ 16	≥ 450	≥ 420	≥ 460	≥ 420	≥ 460	414 - 620 *)	≥ 390	≥ 420	≥ 460
> 16 ≤ 20	≥ 430	≥ 400	≥ 440	"	"	"	"	"	"
> 20 ≤ 25	"	"	"	"	"	"	"	"	"
> 25 ≤ 40	≥ 415	"	≥ 420	"	"	414 - 586 *)	"	"	"
> 40 ≤ 63	"	≥ 390	≥ 415	"	"	"	"	"	"
> 63 ≤ 75	"	≥ 380	≥ 405	"	"	"	"	"	"
> 75 ≤ 80	-	"	"	"	"	"	"	"	"
> 80 ≤ 100	-	"	≥ 400	"	"	"	"	"	"

420 / 450 / 460 Q+T – Comparison of Toughness

	BS 7191	EN 10225		NORSOK (EN 10225)		API 2Y	Shipbuilding rules (e.g. NV) Mobile Offshore units		
TMPC	450EM/EMZ	S420G1/G2+M	S460G1/G2+M	S420G1/G2+M	S460G1/G2+M	API 2Y-60	E40	E420	E460
	Minimum Impact Energy A (Joule) - transverse (average/single) - at a test temparature of								
	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C	- 40◦C
Surface									
All Thicknesses	60/42	60/42	60/42	60/42	60/42	-	-	-	-
≤ 50 mm	-	-	-	-	-	-	27/19	28/20	31/22
Quarter thickn.									
> 50 mm	-	-	-	-	-	-	27/19	28/20	31/22
Mid. Thickness									
All Thicknesses	-	-	-	-	-	41/43	-	-	-
> 40 mm	60/42	60/42	60/42	60/42	60/42	-	-	-	-

		EN Standard		Retningsgivende analyser				
		NS EN 10 088		C	Cr	Ni	Mo	Andre
		Nummer	Betegnelse	max				
Generelt bruksområde vedr. korrosjon	Austenittisk	1.4307	x 2 cr Ni 18-9	0,03	17,0-19,0	8,0-10,0	-	-
		1.4311	x 2 Cr Ni N 18-10	0,03	17,0-19,0	8,0-11,0	-	N
		1.4301	x 5 Cr Ni 18-10	0,05	17,0-19,0	8,0-10,0	-	-
		1.4541	x 6 Cr Ni Ti 18-10	0,08	17,0-19,0	9,0-12,0	-	Ti
		1.4401	x 5 Cr Ni Mo 17-12-2	0,05	16,5-18,5	10,0-13,0	2-2,5	-
		1.4404	x 2 Cr Ni Mo 17-12-2	0,03	16,5-18,5	10,0-13,0	2-2,5	-
		1.4571	x 6 Cr Ni Mo Ti 17-12-2	0,08	16,5-18,5	10,5-14,0	2-2,5	Ti
		1.4432	x 2 Cr Ni Mo 17-12-3	0,03	16,5-18,0	10,5-13,0	2,5-3	
	Duplex	1.4162	x 2 Cr Ni N 22-5-2	0,04	21,0-22,0	1,35-1,70	0,1-0,8	Cu,N,Mn
		1.4362	x 2 Cr Ni N 23-4	0,03	23,0	4,0	-	N
		1.4460	x 3 Cr Ni Mo N 27-5-2	0,03	24,0-27,0	4,5-7,0	1,3-2,0	N
	Andre	1.4418	x 4 Cr Ni Mo 16-5-1	0,05	15,0-17,0	4,0-6,0	0,8-1,5	-
Utsatt bruksområde vedr. korrosjon	Austenittisk	1.4435	x 2 Cr ni Mo 18-4-3	0,03	17,0-19,0	12,5-15,0	2,5-3,0	-
		1.4429	x 2 Cr Ni Mo N 17-13-3	0,03	16,5-18,5	9,5-13,0	2,5-3,0	N
		1.4436	x 3 Cr Ni Mo 17-13-3	0,03	16,0-18,5	10,5-13,0	2,5-3,0	-
		1.4438	x 2 Cr Ni Mo 18-15-4	0,03	17,5-19,5	13,5-17,0	3,0-4,0	-
		1.4539	x 1 Ni Cr Mo Cu 25-20-5	0,02	19,0-21,0	24,0-26,0	4,0-5,0	Cu
		1.4547	x 1 Cr Ni Mo Cu N 20-18-7	0,02	19,5-20,5	17,5-18,5	6,0-6,5	Cu, N
	Duplex	1.4410	x 2 Cr Ni Mo N 25-7-4	0,03	24,0-26,0	6,0-8,0	3,0-4,5	N
		1.4462	x 2 Cr Ni Mo N 22-5-3	0,03	21,0-23,0	4,5-6,5	2,5-3,5	N
Varmefast	Austenittisk	1.4835	x 9 Cr Ni Si N Ce 21-11-2	0,12	20,0-22,0	10,0-12,0		Si,N,Ce
		1.4845	x 8 Cr Ni 25-21 *)	0,08	24,0-26,0	19,0-22,0	-	-
		1.4841	x 15 Cr Ni Si 25-21 *)	0,20	24,0-26,0	19,0-22,0	-	-
Automat	Auste-nittisk	4305	x 8 Cr Ni S 18-9	0,10	17,0-19,0	8,0-10,0	0,6	S
	Duplex	UNS S32003		0,03	19,5-22,5	3,0-4,0	1,5-2,0	N,Mn

Verdiene i tabellen er basert på tilgjengelige standarder, og ovennevnte opplysninger må betraktes som retningsgivende.

* EN 10 095

		Nasjonale rustfrie standarder			Mekaniske standarder				
		Svensk SS	USA AISI (UNS)	Andre	Min. Re 0,2 N/mm²	Rm N/mm²	A5 %	Skalnings-temperatur	Øvrige bemerkninger
Generelt bruksområde vedr. korrosjon	Austenittisk	2352	304 L	-	190	480-680	40	850ºC	Sveisbar
		2371	304 LN	-	270	550-750	35	850ºC	Sveisbar
		2333	304	-	210	500-700	40	850ºC	Sveisbar
		2337	321	-	210	510-710	35	850ºC	Sveisbar
		2347	316	-	220	510-710	40	850ºC	Sveisbar
		2348	316 L	-	210	490-690	40	850ºC	Sveisbar
		2350	316 Ti	-	220	510-710	35	850ºC	Sveisbar
		2343	316 L	-	200	500-700	30	850ºC	Sveisbar
	Duplex		S32101	LDX2101	450	650-800	30		Sveisbar
		2327	S 32304	SAF2304	400	600-820	25	1000ºC	Sveisbar
		2324	329	-	450	600-800	20	1070ºC	Sveisbar
	Andre	2387	-	-	620	830-1030	15	850ºC	Sveisbar
Utsatt bruksområde vedr. korrosjon	Austenittisk	2353	316 L	-	210	490-690	40	850ºC	Sveisbar
		2375	316 LN	-	290	580-780	35	850ºC	Sveisbar
		2343	316	-	220	510-710	40	850ºC	Sveisbar
		2367	317 L	-	220	490-690	35	850ºC	Sveisbar
		2562	N 08904	904 L	220	500-750	35	1000ºC	Sveisbar
		2378	S 31254	254 SOM	300	650-850	35	1000ºC	(Sveisbar)
	Duplex	2377	S31803	SAF2205	480	680-880	25	-	(Sveisbar)
Varmefast	Austenittisk	2361	310 S	-	-	max. 780	-	1150ºC	Sveisbar
		-	-	-	230	550-750	28	1150ºC	Sveisbar
Automat	Austenittisk	2346	303	-	210	490-780	35	850ºC	Sveisbar
	Duplex		532003	AT120030	min. 450-485	min. 655-695	min. 25	1000ºC	Sveisbar

Comparison Table Stainless Steels

U.S.A. AISI	GERMANY DIN 17006	GERMANY W.N. 17007	FRANCE AFNOR	JAPAN JIS	ITALY UNI	SWEDEN SIS	U.K. BSI	U.E. EURONORM	SPAIN UNE	RUSSIA GOST
201				SUS 201						
301	X 12 CrNi 17 7	jan.10	Z 12 CN 17-07	SUS 301	X 12 CrNi 1707	23 31	301S21	X 12 CrNi 17 7	X 12 CrNi 17-07	
302	X 5 CrNi 18 7	jan.19	Z 10 CN 18-09	SUS 302	X 10 CrNi 1809	23 31	302S25	X 10 CrNi 18 9	X 10 CrNi 18-09	12KH18N9
303	X 10 CrNiS 18 9	1.4305	Z 10 CNF 18-09	SUS 303	X 10 CrNiS 1809	23 46	303S21	X 10 CrNiS 18 9	X 10 CrNiS 18-09	
303 Se			Z 10 CNF 18-09	SUS 303 Se	X 10 CrNiS 1809		303S41		X 10 CrNiS 18-09	12KH18N10E
304	X 5 CrNi 18 10 X 5 CrNi 18 12	1.4301 1.4303	Z 6 CN 18-09	SUS 304	X 5 CrNi 1810	23 32	304S15 304S16	X 6 CrNi 18 10	X 6 CrNi 19-10	08KH18N10 06KH18N11
304 N				SUS 304N1	X 5 CrNiN 1810					
304 H				SUS F 304H	X 8 CrNi 1910				X 6 CrNi 19-10	
304 L	X 2 CrNi 18 11	1.4306	Z 2 CN 18-10	SUS 304L	X 2 CrNi 1911	23 52	304S11	X 3 CrNi 18 10	X 2 CrNi 19-10	03KH18N11
	X 2 CrNiN 18 10	1.4311	Z 2 CN 18-10-Az	SUS 304LN	X 2 CrNiN 1811	23 71				
305			Z 8 CN 18-12	SUS 305	X 8 CrNi 1812	23 33	305S19	X 8 CrNi 18 12	X 8 CrNi 18-12	
			Z 6 CNU 18-10	SUS XM7				X 6 CrNiCu 18 10 4 Kd		
309	X 15 CrNiSi 20 12	1.4828	Z 15 CN 24-13	SUH 309	X 16 CrNi 2314		309S24	X 15 CrNi 23 13		
309 S				SUS 309S	X 6 CrNi 2314			X 6 CrNi 22 13		
310	X 12 CrNi 25 21	1.4845		SUH 310	X 22 CrNi 2520		310S24			20KH23N18
310 S	X 12 CrNi 25 20	1.4842	Z 12 CN 25-20	SUS 310S	X 5 CrNi 2520	23 61		X 6 CrNi 25 20		10KH23N18
314	X 15 CrNiSi 25 20	1.4841	Z 12 CNS 25-20		X 16 CrNiSi 2520			X 15 CrNiSi 25 20		20KH25N20S2
316	X 5 CrNiMo 17 12 2	1.4401	Z 6 CND 17-11	SUS 316	X 5 CrNiMo 1712	23 47	316S31	X 6 CrNiMo 17 12 2	X 6 CrNiMo 17-12-03	
316	X 5 CrNiMo 17 13 3	1.4436	Z 6 CND 17-12	SUS 316	X 5 CrNiMo 1713	23 43	316S33	X 6 CrNiMo 17 13 3	X 6 CrNiMo 17-12-03	
316 F	X 12 CrNiMoS 18 11	1.4427								
316 N				SUS 316N						
316 H				SUS F 316H	X 8 CrNiMo 1712				X 5 CrNiMo 17-12	
316 H					X 8 CrNiMo 1713				X 6 CrNiMo 17-12-03	
316 L	X 2 CrNiMo 17 13 2	1.4404	Z 2 CND 17-12	SUS 316L	X 2 CrNiMo 1712	23 48	316S11	X 3 CrNiMo 17 12 2	X 2 CrNiMo 17-12-03	03KH17N14M2
	X 2 CrNiMoN 17 12 2	1.4406	Z 2 CND 17-12-Az	SUS 316LN	X 2 CrNiMoN 1712					
316 L	X 2 CrNiMo 18 14 3	1.4435	Z 2 CND 17-13		X 2 CrNiMo 1713	23 53	316S13	X 3 CrNiMo 17 13 3	X 2 CrNiMo 17-12-03	03KH16N15M3
	X 2 CrNiMoN 17 13 3	1.4429	Z 2 CND 17-13-Az		X 2 CrNiMoN 1713	23 75				
	X 6 CrNiMoTi 17 12 2	1.4571	Z6 CNDT 17-12		X 6 CrNiMoTi 1712	23 50	320S31	X 6 CrNiMoTi 17 12 2	X 6 CrNiMoTi 17-12-03	08KH17N13M2T 10KH17N13M2T
	X 10 CrNiMoTi 18 12	1.4573			X 6 CrNiMoTi 1713		320S33	X 6 CrNiMoTI 17 13 3	X 6 CrNiMoTi 17-12-03	08KH17N13M2T 10KH17N13M2T
	X 6 CrNiMoNb 17 12 2	1.4580	Z 6 CNDNb 17-12		X 6 CrNiMoNb 1712			X 6 CrNiMoNb 17 12 2		08KH16N13M2B
	X 10 CrNiMoNb 18 12	1.4583			X 6 CrNiMoNb 1713			X 6 CrNiMoNb 17 13 3		09KH16N15M3B
317				SUS 317	X 5 CrNiMo 1815	23 66	317S16			
317 L	X 2 CrNiMo 18 16 4	1.4438	Z 2 CND 19-15	SUS 317L	X 2 CrNiMo 1815	23 67	317S12	X 3 CrNiMo 18 16 4		
317 L	X 2 CrNiMo 18 16 4	1.4438	Z 2 CND 19-15	SUS 317L	X 2 CrNiMo 1816	23 67	317S12	X 3 CrNiMo 18 16 4		
330	X 12 NiCrSi 36 16	jan.64	Z 12NCS 35-16	SUH 330						
321	X 6 CrNiTi 18 10 X 12 CrNiTi 18 9	1.4541 1.4878	Z 6 CNT 18-10	SUS 321	X 6 CrNiTi 1811	23 37	321S31	X 6 CrNiTi 18 10	X 6 CrNiTi 18-11	08KH18N10T
321 H				SUS 321H	X 8 CrNiTi 1811		321S20		X 7 CrNiTi 18-11	12KH18N10T
329	X 8 CrNiMo 27 5	1.4460		SUS 329J1		23 24				
347	X 6 CrNiNb 18 10	1.4550	Z 6 CNNb 18-10	SUS 347	X 6 CrNiNb 1811	23 38	347S31	X 6 CrNiNb 18 10	X 6 CrNiNb 18-11	08KH18N12B
347 H				SUS F 347H	X 8 CrNiNb 1811				X 7 CrNiNb 18-11	
904L		1.4939	Z 12 CNDV 12-02							
	X 20 CrNiSi 25 4	1.4821								
UNS31803	X 2 CrNiMoN 22 5	1.4462								
UNS32760	X 3 CrNiMoN 25 7	jan.01	Z 3 CND 25-[illegible]							
403	X 6 Cr 13 X 10 Cr 13 X 15 Cr 13	1.4000 1.4006 1.4024	Z 12 C 13	SUS 403	X 12 Cr 13	23 02	403S17	X 10 Cr 13 X 12 Cr 13	X 6 Cr 13	12Kh13
405	X 6 CrAl 13	1.4002	Z 6 CA 13	SUS 405	X 6 CrAl 13		405S17	X 6 CrAl 13	X 6 CrAl 13	
	X 10 CrAl 7	1.4713	Z 8 CA 7					X 10 CrAl 7		
	X 10 CrAl 13	1.4724			X 10 CrAl 12					10Kh13SYu
	X 10 CrAl 18	1.4742						X 10 CrSiAl 18		15Kh18SYu
409	X 6 CrTi 12	1.4512	Z 6 CT 12	SUH 409	X 6 CrTi 12		409S19	X 5 CrTi 12		
					X 2 CrTi 12					
410	X 6 Cr 13 X 10 Cr 13 X 15 Cr 13	1.4000 1.4006 1.4024	Z 10 C 13 Z 12 C 13	SUS 410	X 12 Cr 13	23 02	410S21	X 12 Cr 13	X 12 Cr 13	12Kh13
410 S	X 6 Cr 13	1.4000	Z 6 C 13	SUS 410S	X 6 Cr 13	23 01	403S17	X 6 Cr 13		08Kh13
414										

These are austenitic grades

These are ferritic grades

These are ferritic-austenitic grades
(otherwise known as Duplex and Superduplex)

Comparison Table Stainless Steels Chemical Composition

Standard of Country					Chemical Composition							
USA	German		UK	Japan								
AISI	W-Nr	DIN KURZNAME	BS	JIS	C Max	SI Max	Mn Max	P max	S Max	Ni	Cr	Mo
301	14310	X12Cr Ni 177	301S21	SUS 301	0.15	1	2	0.045	0.03	6.00-8.00	16.00-18.00	-
304	14301	XDCr Ni 189	304S16	SUS304	0.08	1	2	0.045	0.03	8.00-10.50	18.00-20.00	-
304L	14306	X3Cr Ni 89	304S12	SUS 304L	0.03	1	2	0.045	0.03	9.00-13.00	18.00-20.00	-
305	14303	X5Cr Ni 1911	305S19	SUS 305	0.12	1	2	0.045	0.03	10.50-13.00	17.00-19.00	-
310S	14841	X 15 Cr Ni Si 2520	310S24	SUS 310S	0.08	01.mai	2	0.045	0.03	19.00-22.00	24.00-26.00	-
316	14401	X15 Cr Ni Mo 1810	306S16	SUS 316	0.08	1	2	0.045	0.03	10.00-14.00	16.00-18.00	2.00-3.00
316L	14435	X15 Cr Ni Mo 1812	306S12	SUS 316 L	0.03	1	2	0.045	0.03	12.00-15.00	16.00-18.00	2.00-3.00
430	14016	X8Cr 17	430S17	SUS 430	0.12	0.75	1	0.04	0.03	0.6	16.00-18.00	-
434	14113	-	-	SUS 434	0.12	1	1	0.04	0.03	0.6	16.00-18.00	0.75-1.25
410	14006	X10 Cr 13	410S21	SUS 410	0.15	1	1	0.04	0.03	0.6	11.50-13.50	-
420	14021	X 20 Cr 13	420S29	SUS 420 J1	0.16-0.25	1	1	0.04	0.03	0.6	12.00-14.00	-
420	14034	X 40 Cr 13	420S45	SUS 420 J2	0.26 - 0.40	1	1	0.04	0.03	0.6	12.00-14.00	-

Comparison Table Stainless Steels Mechanical Properties

	Standard of Country				Mechanical Properties							
USA	German		UK	Japan	Tensile test(min)				Hardness (Max)			
					Y/S		T/S					
AISI	W-Nr	DIN KURZNAME	BS	JIS	kg/mm2	N/mm2	kgf/mm2	N/mm2	Elongation	HB	HRB	Hv
301	14310	X12Cr Ni 177	301S21	SUS 301	21	206	53	520	40	187	90	200
304	14301	XDCr Ni 189	304S16	SUS304	21	206	53	520	40	187	90	200
304L	14306	X3Cr Ni 89	304S12	SUS 304L	18	177	49	481	40	187	90	200
305	14303	X5Cr Ni 1911	305S19	SUS 305	18	177	49	481	40	187	90	200
310S	14841	X 15 Cr Ni Si 2520	310S24	SUS 310S	21	206	53	520	40	187	90	200
316	14401	X15 Cr Ni Mo 1810	306S16	SUS 316	21	206	53	520	40	187	90	200
316L	14435	X15 Cr Ni Mo 1812	306S12	SUS 316 L	18	177	49	481	40	187	90	200
430	14016	X8Cr 17	430S17	SUS 430	21	206	46	451	22	183	88	200
434	14113	-	-	SUS 434	21	206	46	451	22	183	88	200
410	14006	X10 Cr 13	410S21	SUS 410	21	206	45	441	20	200	93	210
420	14021	X 20 Cr 13	420S29	SUS 420 J1	23	226	53	520	18	223	97	234
420	14034	X 40 Cr 13	420S45	SUS 420 J2	23	226	55	539	18	235	99	247

NS - EN 10029

Varmvalsede stålplater med en tykkelse på 3 mm eller mer

Toleranser på dimensjon og form

Tabell 1 - TYKKELSESTOLERANSER (alle mål i mm)

Nominell tykkelse	Toleranser for nominell tykkelse							
	Klasse A		**Klasse B**		**Klasse C**		**Klasse D**	
	Nedre grense	Øvre grense	Nedre grense	Øvre grense	Nedre grense	Øvre grense	Nedre grense	Øvre grense
≥ 3 < 5	-0,3	0,7	-0,3	0,7	0,0	1,0	-0,5	0,5
≥ 5 < 8	-0,4	0,8	-0,3	0,9	0,0	1,2	-0,6	0,6
≥ 8 < 15	-0,5	0,9	-0,3	1,1	0,0	1,4	-0,7	0,7
≥ 15 < 25	-0,6	1,0	-0,3	1,3	0,0	1,6	-0,8	0,8
≥ 25 < 40	-0,7	1,3	-0,3	1,7	0,0	2,0	-1,0	1,0
≥ 40 < 80	-0,9	1,7	-0,3	2,3	0,0	2,6	-1,3	1,3
≥ 80 < 150	-1,1	2,1	-0,3	2,9	0,0	3,2	-1,6	1,6
≥ 150 ≤ 250	-1,2	2,4	-0,3	3,3	0,0	3,6	-1,8	1,8
≥ 250 ≤ 400	-1,3	3,5	-0,3	4,5	0,0	4,8	-2,4	2,4

Klasse A: nedre grense avhengig av nominell tykkelse.
Klasse B: for fastsatt nedre grense på - 0,3 mm.
Klasse C: nedre grense 0 mm.
Klasse D: for symmetrisk toleranse.

Tabell 2 - BREDDETOLERANSE (alle mål i mm)

Nominell bredde	Nedre grense	Øvre grense
< 40	0	20
≥ 40 < 150	0	25
≥ 150 ≤ 400	0	30

Tabell 3 - LENGDETOLERANSE (alle mål i mm)

Nominell lengde	Nedre grense	Øvre grense
< 4000	0	20
≥ 4000 < 6000	0	30
≥ 6000 < 8000	0	40
≥ 8000 < 10000	0	50
≥ 10000 < 15000	0	75
≥ 15000 < 20000	0	100

Tabell 4 - PLANHET, Normal planhetstoleranser, klasse N

	Ståltype L		Ståltype H	
Nominell tykkelse	Målelengde			
	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
≥ 250 < 400	6	9	9	13

Ståltype L: Produkter med spesifisert min flytegrense ≤ 460 N/mm2, og som ikke er herdede eller seigherdede.
Ståltype H: Produkter med spesifisert min flytegrense > 460 N/mm2 og < 700 N/mm2 og alle herdede og seigherdede produkter.

Tabell 5 - Spesielle toleranser for planhet (klasse S)

	Ståltype L		Ståltype H	
Nominell tykkelse	Målelengde			
	1000	**2000**	**1000**	**2000**
≥ 3 < 5	5	10	7	14
≥ 5 < 8	5	10	7	13
≥ 8 < 15	3	6	7	12
≥ 15 < 25	3	6	7	11
≥ 25 < 40	3	6	7	11
≥ 40 < 250	3	6	6	10
≥ 250 < 400	4	7	7	11

NS - EN 10051

Varmvalsede coil og plater

Toleranser på dimensjon og form

tykkelse 2 - 2,5 mm / bredde 600 - 2200 mm

Tabell 1 - ANVENDELSESOMRÅDE

Produkt	Tykkelse mm	Stål kvaliteter i hht (men ikke begrenset til)
Coil og plater f.o.m. 600 t.o.m. 2200	≤ 25	EN 10025-2 til -6 EN 10028-2 til -6 EN 10083-2 og 3 EN 10084 EN 10085 EN 10111 EN 10120 EN 10149-2 og 3 EN 10207 prEN 10338 EN ISO 4957

Tabell 2 - TYKKELSESTOLERANSER for plater og coil egnet for kaldforming (alle mål i mm)

Nominell tykkelse t		Toleranser for en nominell bredde ≤ 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
> 8,00	≤ 11,00	± 0,24	± 0,25	± 0,25	± 0,28

Tabell 3 - TYKKELSESTOLERANSER for plater og coil med minimum flytegrense R_e ≤ 300 MPa (kategori A) (alle mål i mm)

Nominell tykkelse t		Toleranser for en nominell bredde ≤ 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

Tabell 4 - TYKKELSESTOLERANSER for plater og coil med minimum flytegrense 300 MPa < R_e ≤ 360 MPa (kategori B) (alle mål i mm)

Nominell tykkelse t		Toleranser for en nominell bredde ≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	>1800
	≤ 2,00	± 0,20	± 0,22	± 0,24	-
> 2,00	≤ 2,50	± 0,21	± 0,24	± 0,26	± 0,29
> 2,50	≤ 3,00	± 0,23	± 0,25	± 0,28	± 0,30
> 3,00	≤ 4,00	± 0,25	± 0,28	± 0,30	± 0,31
> 4,00	≤ 5,00	± 0,28	± 0,30	± 0,32	± 0,33
> 5,00	≤ 6,00	± 0,30	± 0,32	± 0,33	± 0,36
> 6,00	≤ 8,00	± 0,33	± 0,35	± 0,36	± 0,40
> 8,00	≤ 10,00	± 0,37	± 0,38	± 0,39	± 0,46
> 10,00	≤ 12,50	± 0,40	± 0,41	± 0,43	± 0,49
> 12,50	≤ 15,00	± 0,43	± 0,44	± 0,46	± 0,53
> 15,00	≤ 25,00	± 0,46	± 0,48	± 0,52	± 0,58

Tabell 5 - TYKKELSESTOLERANSER for plater og coil med minimum flytegrense 360 MPa < R_e ≤ 420 MPa (kategori C) (alle mål i mm)

Nominell tykkelse t		Toleranser for en nominell bredde			
		≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	>1800
	≤ 2,00	± 0,22	± 0,25	± 0,27	-
> 2,00	≤ 2,50	± 0,23	± 0,27	± 0,30	± 0,33
> 2,50	≤ 3,00	± 0,26	± 0,29	± 0,31	± 0,34
> 3,00	≤ 4,00	± 0,29	± 0,31	± 0,34	± 0,35
> 4,00	≤ 5,00	± 0,31	± 0,34	± 0,36	± 0,38
> 5,00	≤ 6,00	± 0,34	± 0,36	± 0,38	± 0,40
> 6,00	≤ 8,00	± 0,38	± 0,39	± 0,40	± 0,46
> 8,00	≤ 10,00	± 0,42	± 0,43	± 0,44	± 0,52
> 10,00	≤ 12,50	± 0,46	± 0,47	± 0,48	± 0,56
> 12,50	≤ 15,00	± 0,48	± 0,49	± 0,52	± 0,60
> 15,00	≤ 25,00	± 0,52	± 0,55	± 0,59	± 0,65

Tabell 6 - TYKKELSESTOLERANSER for plater og coil med minimum flytegrense 420 MPa < R_e ≤ 900 MPa (kategori D) (alle mål i mm)

Nominell tykkelse t		Toleranser for en nominell bredde			
		≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	>1800
	≤ 2,00	± 0,24	± 0,27	± 0,29	-
> 2,00	≤ 2,50	± 0,25	± 0,29	± 0,32	± 0,35
> 2,50	≤ 3,00	± 0,28	± 0,31	± 0,34	± 0,36
> 3,00	≤ 4,00	± 0,31	± 0,34	± 0,36	± 0,38
> 4,00	≤ 5,00	± 0,34	± 0,36	± 0,39	± 0,41
> 5,00	≤ 6,00	± 0,36	± 0,39	± 0,41	± 0,43
> 6,00	≤ 8,00	± 0,41	± 0,42	± 0,43	± 0,49
> 8,00	≤ 10,00	± 0,45	± 0,46	± 0,48	± 0,56
> 10,00	≤ 12,50	± 0,49	± 0,50	± 0,52	± 0,60
> 12,50	≤ 15,00	± 0,52	± 0,53	± 0,56	± 0,64
> 15,00	≤ 25,00	± 0,56	± 0,59	± 0,63	± 0,70

Tabell 7- LENGDETOLERANSER (alle mål i mm)

Nominell lengde l		Toleranser	
		Nedre grense	Øvre grense
	< 2000	0	+10
≥ 2000	< 8000	0	0,005 x l
≥ 8000		0	+ 40

Tabell 8 - BREDDETOLERANSER (alle mål i mm)

Nominell bredde		Toleranser			
		Valsekanter		Trimmede kanter 1)	
		Nedre grense	Øvre grense	Nedre grense	Øvre grense
	≤ 1200	0	+20	0	+3
> 1200	≤ 1850	0	+20	0	+5
> 1850		0	+25	0	+6

1) Toleranser for trimmede kanter viser til produkter med nominell tykkelse < 10 mm; for nominell tykkelse > 10 mm må man ved forespørsel og ordre fra verk, bli enig om øvre grenser.

Tabell 9 - PLANHETSTOLERANSER for plater og coil med minimum flytegrense Re ≤ 300 MPa (kategori A) (alle mål i mm)

Nominell tykkelse t	Toleranser på planhet av stål med normal deformering.			
	Nominell bredde		Toleranser på planhet	Spesial toleranser på planhet
≤ 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

Tabell 10 - PLANHETSTOLERANSER for plater og coil med minimum flytegrense300 MPa < Re ≤ 900 MPa (kategori B, C og D) (alle mål i mm)

Nominell tykkelse t	Toleranser på planhet av stål med normal deformering.				
	Nominell bredde		Toleranser på planhet for kategori		
			B	C	D
≤ 25		≤ 1200	18	23	skal avtales ved inngåelse av forespørsel og ordre
	> 1200	≤ 1500	23	30	
	> 1500		28	38	

Table 1: Material Data Sheets for Structural Steel

MDS No.	Rev. No.	Standard	Steel grade	Product type	Steel quality level
Y01	5	EN 10025- (all parts) EN 10210- (all parts) EN 10219- (all parts)	S235JR S235JRH S235JRH	Plates and sections Hot finished tubulars Cold formed tubulars	IV
Y02	4	EN 10025- (all parts) EN 10210- (all parts) EN 10219- (all parts)	S275JR S275J0H S275J0H	Plates and sections Hot finished tubulars Cold formed tubulars	IV
Y04	2	EN 10025- (all parts) EN 10210- (all parts) EN 10219- EN 10219-	S355J0 S355J0H S355J2H	Plates and sections Hot finished tubulars Cold formed tubulars	IV
Y05	3	EN 10025- (all parts)	S355J2 S355K2	Plates	III
		EN 10025- (all parts)	S355J2 S355K2	Plates and sections	III
Y06	3	EN 10225	S355G1+N	Hot finished seamless tubulars	III
Y07	3	EN 10210- (all parts)	S355NH/S355K2H	Hot finished tubulars	III
Y08	3	EN 10219 (all parts)	S355MLH	Cold formed tubulars	III
Y15	3	EN 10025 (all parts)	S420ML	Plates and sections	III
Y16	3	EN 10219 (all parts)	S420MLH	Cold formed tubulars	III
Y20	5	EN 10225	S355G10+N/G10+M	Plates	I
Y21	5	EN 10225	S355G12+N/G12+M	Rolled sections	I
Y22	5	EN 10225	S355G15+Q/G15+N	Seamless tubulars	I
Y25	5	EN 10225	S355G9+N/G9+M	Plates	II
Y26	5	EN 10225	S355G11+N/G11+M	Rolled sections	II
Y27	4	EN 10225	S355G14+Q/G14+N	Seamless tubulars	II
Y28	3	EN 10225	S355G13+N	Welded tubulars	II
Y30	5	EN 10225	S420G2+Q/G2+M	Plates	I
Y31	5	EN 10225	S420G4+M	Rolled sections	I
Y32	5	EN 10225	S420G6+Q	Seamless tubulars	I
Y35	4	EN 10225	S420G1+Q/G1+M	Plates	II
Y36	5	EN 10225	S420G3+M	Rolled sections	II
Y37	5	EN 10225	S420G6+Q	Seamless tubulars	II
Y40	5	EN 10225	S460G2+Q/G2+M	Plates	I
Y41	5	EN 10225	S460G4+M	Rolled sections	I
Y42	5	EN 10225	S460G6+Q	Seamless tubulars	I
Y45	5	EN 10225	S460G1+Q/G1+M	Plates	II
Y46	5	EN 10225	S460G3+M	Rolled sections	II
Y47	5	EN 10225	S460G6+Q	Seamless tubulars	II
Y50	5	EN 10225	S500G2+Q/G2+M [a]	Plates	I
Y51	5	EN 10225	S500G4+M [a]	Rolled sections	I
Y52	5	EN 10225	S500G6+Q [a]	Seamless tubulars	I
Y55	5	EN 10225	S500G1+Q/G1+M [a]	Plates	II
Y56	5	EN 10225	S500G3+M [a]	Rolled sections	II
Y57	5	EN 10225	S500G6+Q [a]	Seamless tubulars	II

[a] This steel grade designation is not included in EN 10225

NOTE All references in the MDS are to the relevant material standard unless otherwise specified.

Denne standard og etterfølgende standarder er forenklede utdrag av den originale NORSOK STANDARD M-120 Rev., Rev. 5, November 2008

MATERIAL DATA SHEET MDS - Y01 Rev. 5 June 2007

TYPE OF MATERIAL: Structural Steel

PRODUCT	***STANDARD***	***GRADE***		
Plates and sections	EN 10025	S235JR		
Hot finished tubulars	EN 10210	S235JRH		
Cold formed tubulars	EN 10219	S235JRH		

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. These grades shall not be used for thicknesses above 25 mm.
STEEL GRADE	The grades listed represent the minimum requirements for Y01.
QUALIFICATION	
HEAT TREATMENT/ DELIVERY CONDITION	
CHEMICAL COMPOSITION	
TENSILE TESTING	
IMPACT TESTING	
EXTENT OF TESTING	
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	
MARKING	
CERTIFICATE	EN 10 204 Type 2.2

Sveisbare konstruksjonsstål

* Plater og profiler
* Varmformede rør og hulprofiler
* Kaldformede rør og hulprofiler

MATERIAL DATA SHEET MDS - Y02 Rev. 4 June 2007

TYPE OF MATERIAL: Structural Steel

PRODUCT	***STANDARD***	***GRADE***		
Plates and sections	EN 10025	S275JR		
Hot finished tubulars	EN 10210	S275J0H		
Cold formed tubulars	EN 10219	S275J0H		

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. These grades shall not be used for thicknesses above 25 mm.
STEEL GRADE	The grades listed represent the minimum requirements for Y02.
QUALIFICATION	
HEAT TREATMENT/ DELIVERY CONDITION	
CHEMICAL COMPOSITION	
TENSILE TESTING	
IMPACT TESTING	
EXTENT OF TESTING	
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	
MARKING	
CERTIFICATE	EN 10 204 Type 2.2

Sveisbare konstruksjonsstål

* Plater og profiler
* Varmformede rør og hulprofiler
* Kaldformede rør og hulprofiler

MATERIAL DATA SHEET MDS - Y04 Rev. 2 June 2007

TYPE OF MATERIAL: Structural Steel

Sveisbare konstruksjonsstål

PRODUCT	***STANDARD***	***GRADE***		
Plates and sections	EN 10025	S355J0		
Hot finished tubulars	EN 10210	S355J0H		
Cold formed tubulars	EN 10219	S355J2H		

* Plater og profiler
* Varmformede rør og hulprofiler
* Kaldformede røre og hulprofiler

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. These grades shall not be used for thicknesses above 25 mm.
STEEL GRADE	The grades listed represent the minimum requirements for Y04.
QUALIFICATION	
HEAT TREATMENT/ DELIVERY CONDITION	
CHEMICAL COMPOSITION	
TENSILE TESTING	
IMPACT TESTING	
EXTENT OF TESTING	
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	
MARKING	
CERTIFICATE	EN 10 204 Type 2.2. For EN 10219 S355J2H Type 3.1.

MATERIAL DATA SHEET MDS - Y05 Rev. 3 June 2007

TYPE OF MATERIAL: Structural Steel

Sveisbare konstruksjonsstål

PRODUCT	***STANDARD***	***GRADE***		
Plates	EN 10025	S355J2 S355K2		
Sections	EN 10025	S355J2 S355K2		

* Plater og profiler

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 50 mm.
QUALIFICATIONS	
HEAT TREATMENT/ DELIVERY CONDITION	
CHEMICAL COMPOSITION	C max. 0,16%, CEV max 0,43%
TENSILE TESTING	
IMPACT TESTING	Charpy V-notch energy requirement shall be miniumum 40 J (average)
EXTENT OF TESTING	
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	
MARKING	
CERTIFICATE	EN 10 204 Type 3.1.

MATERIAL DATA SHEET MDS - Y06 Rev. 3 June 2007

TYPE OF MATERIAL: Structural Steel

PRODUCT	***STANDARD***	***GRADE***		
Hot finished seamless tubulars	EN 10 225	S355G1+N		

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 40 mm.
QUALIFICATIONS	
HEAT TREATMENT/ DELIVERY CONDITION	
CHEMICAL COMPOSITION	C max. 0,16%m CEV max 0,43%, Nb+V max. 0,10.
TENSILE TESTING	
IMPACT TESTING	
EXTENT OF TESTING	
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	
MARKING	
CERTIFICATE	EN 10 204 Type 3.1.

Sveisbart konstruksjonsstål

* Varmformede sømløse rør

MATERIAL DATA SHEET MDS - Y07 Rev. 4 Nov. 2008

TYPE OF MATERIAL: Structural Steel

Sveisbart konstruksjonsstål

* Varmformede rør og hulprofiler sømløse eller sveisede

PRODUCT	***STANDARD***	***GRADE***		
Hot finished tubulars seamless or welded	EN 10 210-1	S355NH S355K2H		
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 40 mm. Welded hollow sections are limited to 20 mm wall thickness.			
QUALIFICATIONS				
HEAT TREATMENT/ DELIVERY CONDITION				
CHEMICAL COMPOSITION	Option 1.2 is required. C max. 0,16% and CEV max. 0,43 for all thicknesses			
TENSILE TESTING				
IMPACT TESTING				
EXTENT OF TESTING				
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.			
NON DESTRUCTIVE TESTING (NDT)	For thicknesses of 12 mm and above the NDT shall be UT and with acceptance criteria U3. The weld of the welded hollow section shall be subject to 10% magnetic testing (MT) of external surface and be free of any linear indication. In case of any findings, 100% of the sections with findings shall be examined. The 10% MT shall be carried out for thicknesses above 12 mm. The 10% MT shall be carried out on every section. If the involved parties require more severe defect tolerances for the structural application of the welded hollow section, more severe requirements to be agreed.			
SURFACE PROTECTION				
MARKING				
CERTIFICATE	EN 10 204 Type 3.1.			

NORSOK Standard M-120 Edition 5, November 2008

Deviation Note vs MATERIAL DATA SHEET MDS - Y07 Rev.4 November 2008. This note covers products manufactured at both UK Mills in Corby and Hartlepool.

Tata Steel does not manufacture or supply material in accordance with MDS Y07.

However, we confirm that the EN10210 S355NH material, which we supply to Norsk Stål, complies with the requirements of MDS-Y07 except for:

i We do not conduct 10% MT of the weld area.
We understand that it was introduced because of concerns about defects in the weld area. We maintain that it is an inappropriate test for this type of defect because it will only detect OD surface breaking features and the test does not give an indication of depth and therefore cannot discriminate between defects and minor surface imperfections (e.g., roll marks) which are allowed by the specification. The weld seam UT to EN10246-8 with enhanced sensitivity that we perform (U3 compared to U5 for the standard product) is the appropriate test to detect weld area defects.

ii We do not guarantee that the surface shall comply to rust grade A or rust grade B or better according to ISO 8501-1.

Note that EN10210 S355NH is classified as fully killed fine grain steel and is delivered in the normalized rolled condition.

Norsk Stål

MATERIAL DATA SHEET MDS - Y08 Rev. 3 June 2007

TYPE OF MATERIAL: Structural Steel

PRODUCT	***STANDARD***	***GRADE***		
Cold formed tubulars	EN 10 219-1	S355MLH		

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard. The thickness is limited to 25 mm.
QUALIFICATIONS	
HEAT TREATMENT/ DELIVERY CONDITION	
CHEMICAL COMPOSITION	Option 1.4, C max 0,16%, CEV max. 0,43%, S max. 0,015, P max. 0,025
TENSILE TESTING	
IMPACT TESTING	
EXTENT OF TESTING	
SURFACE CONDITION	The surface of the material shall comply to rust grade A or rust grade B or better according to ISO 8501-1.
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	
MARKING	
CERTIFICATE	EN 10 204 Type 3.1.

Sveisbart konstruksjonsstål

* Koldformede rør

MATERIAL DATA SHEET MDS - Y20 Rev. 5 June 2007

TYPE OF MATERIAL: Structural Steel with documented through thickness properties

PRODUCT	***STANDARD***	***GRADE***		
Plates	EN 10225	S355G10+N/G10+M		

SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.
QUALIFICATIONS	Base material information, shall be submitted with the bid/ be established prior to delivery. The documentation of base material shall cover both delivered and PWHT condition and shall include strain 25<t≤ 40mm 40<t≤ 63mm 63<t≤ 100mm 100<t≤ 150mm Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum
HEAT TREATMENT/ DELIVERY CONDITION	Quenched and tempered is also accepted.
CHEMICAL COMPOSITION	Option 6
TENSILE TESTING	
IMPACT TESTING	
EXTENT OF TESTING	Option 13, Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each
SURFACE CONDITION	
NON DESTRUCTIVE TESTING (NDT)	
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.
CERTIFICATE	EN 10 204 Type 3.1

Sveisbart konstruksjonsstål

* Plater

Dokumenterte krav til stålet i tykkelses-retning for platetykkelser ≥ 25 mm (Z 35)

Norsk Stål

MATERIAL DATA SHEET MDS - Y22 Rev. 5 June 2007

TYPE OF MATERIAL: Structural Steel with documented through thickness properties

Sveisbart konstruksjonsstål

* Sømløse rør
* Sømløse hulprofiler

PRODUCT	STANDARD	GRADE	
Seamless tubulars (Seamless hollow sections)	EN 10 225	S355G15+Q/G15+N	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information, shall be submitted with the bid / be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various thicknesses and for Charpy V also various temperatures. Weldability tests shall be documented according to Annex E, option 18. CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSISTION	Option 6 composition in Table 10 shall be modified as follows: Cmax: 0,16 %		The chemical (option 7)
TENSIL TESTING			
IMPACT TESTING			
EXTENT OF TESTING	Option 13		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)	Option 22		
SURFACE PROTECTION	All surfaces shall receive a preliminary protecticve primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2 1/2 and the surface shall remain at Sa 2 1/2 until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y26 Rev. 5 June 2007

TYPE OF MATERIAL: Structural Steel

Sveisbart konstruksjonsstål

* Valsede profiler

PRODUCT	STANDARD	GRADE	
Rolled Sections	EN 10225	S355G11+N/G11+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information, shall be submitted with the bid/ be established prior to delivery. The documentation of base material shall include typical tensile test results and Charpy V results at various CTOD testing shall be included for weldability testing for thickness above 40 mm and shall meet a requirement of minimum 0,25 mm in as welded condition unless lower values have been accepted by the purchaser.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSITION	Option 6 and option 9		
TENSILE TESTING			
IMPACT TESTING			
EXTENT OF TESTING			
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION	All surfaces shall receive a preliminary protective primer coat. Blast cleaning shall comply with ISO 8501-1 Sa 2½ and the surface shall remain at Sa 2½ until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y28 Rev. 3 June 2007		
TYPE OF MATERIAL: Structural Steel		
PRODUCT	***STANDARD***	***GRADE***
Welded tubulars (welded hollow sections)	EN 10225	S355G13+N
SCOPE	This MDS is applicable for high frequency welded (electric resistance or induction) hollow sections up to and including 20 mm thickness. This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.	
QUALIFICATIONS	Establishment of WPS, qualification of welding procedures and qualification of welding operators shall be in accordance with the NORSOK standard M-101, "Structural Steel Fabrication". With regard to Charpy impact testing the following modifications to NORSOK standard M-101 shall apply: * test temperature: -40ºC * relevant notch positions, e.g.: fusion line (FL), FL+2 mm, FL+5mm * minimum average energy value: 36 J * minimum individual energy value: 26 J * microstructure examination Qualifications shall be carried out for each nominal thickness. Detailed requirements for the qualification of the high frequency welding process (electric resistance or induction) shall be defined and agreed. Base material information, with typical results from chemical composition and mechanical testing, shall be submitted with the bid / be established prior to delivery.	
HEAT TREATMENT/ DELIVERY CONDITION		
CHEMICAL COMPOSISTION	Option 6	
TENSIL TESTING		
IMPACT TESTING		
EXTENT TESTING		
SURFACE CONDITION	Option 23 shall apply. The internal weld bead shall be removed.	
NON DESTRUCTIVE TESTING (NDT)	The welded hollow section longitudinal welds shall be subject to 100% volumetric NDT and 10% surface NDT in accordance with the following requirements and acceptance criteria: * For thicknesses 10 mm and below, the volumetric NDT as per section 8.5.3.3 shall apply. * For thicknesses 12 mm and above, option 23 shall apply, but to acceptance criteria U2. * The weld og the welded hollow section shall be subject to 10% magnetic testing (MT) of external surface and be free of any linear indication. In case of any finding, 100% of the section with finding shall be examined. The 10% MT shall be carried out for all thicknesses. The 10% MT shall be carried out on every section. More severe defect tolerances for the structural application of the welded hollow section may be agreed case by case.	
SURFACE PROTECTION	All surfaces shall receive a preliminary protecticve primer coat. Blast cleaning shall compy with ISO 8501-1 Sa 2 1/2 and the surface shall remain at Sa 2 1/2 until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.	
CERTIFICATE	EN 10 204 Type 3.1	

Konstruksjonsstål

* Sveisede rør
(Sveisede hulprofiler)

NORSOK Standard M-120 Edition 5, November 2008

Deviation Note vs. MATERIAL DATA SHEET MDS – Y28 Rev.5 November 2008. This note covers products manufactured at both UK Mills in Corby and Hartlepool. Tata Steel supplies against an internal MDS, which is '**MDS-Y28 (Tata Modified). Rev03'

Tata Steel does not manufacture or supply material fully in accordance with MDS Y28.

However, we confirm that the EN10225 S355 G13+ N + Y28 Modified** material, which we supply to Norsk Stål, complies with the requirements of MDS-Y07 except for:

i Weld line charpy impact testing to test temperature of – 20 ^{C} notch position: fusion line (FL) and not -40^{C}

ii Sizes up to 139.7mm OD x 4mm thick, 90x90x6.3 mm and 100x100x5.0mm and equivalent rectangles are offered EXCEPT Y: T ratio and Clause 9.2 d

iii Corby
For all thicknesses
- Weld area UT to EN10246-8 acceptance level U3 shall apply;
- Weld area Eddy current testing to EN10246-3 using the segment coil technique (Reference: 3.7mm drilled hole).

iv Hartlepool
- for thicknesses 10 mm and below, the volumetric NDT as per section 8.5.3.3 shall apply;
- for thicknesses of 12 mm and above, option 23 shall apply, but to acceptance criteria U2;

v We do not conduct 10% MT of the weld area.

We understand that it was introduced because of concerns about defects in the weld area. We maintain that it is an inappropriate test for this type of defect because it will only detect OD surface breaking features and the test does not give an indication of depth and therefore cannot discriminate between defects and minor surface imperfections (e.g., roll marks) which are allowed by the specification. The weld seam UT to EN10246-8 with enhanced sensitivity that we perform (U3 compared to U5 for the standard product) is the appropriate test to detect weld area defects.

vi Tata Steel Tubes will be delivered in a condition suitable for onward application of the surface protection which is to be carried

Note that EN10225 S355 G13 + N (Y28 Modified**) is classified as fully killed fine grain steel and is delivered in the normalised rolled condition.

MATERIAL DATA SHEET MDS - Y30 Rev.5 June 2007

TYPE OF MATERIAL: Structural steel with documented through thickness properties

Sveisbart konstruksjonsstål

Dokumentert krav til stålet i tykkelsesretning for platetykkelser ≥ 25 mm (Z 35)

*** Plater**

PRODUCT	***STANDARD***	***GRADE***	
Plates	EN 10225	S420G2+Q/G2+M	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
QUALIFICATIONS	Base material information, shall be submitted with the bid / be established prior to delivery The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test results for plates and weldablility tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order: 25 < t ≤ 40mm 40 < t ≤ 63mm 63 < t ≤ 100mm 100 < t ≤ 150mm Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements. CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of minimum 0,25 mm in a welded condition, and minimum 0,20 mm in PWHT condition unless lower values have been accepted by the purchaser. CTOD testing for thicknesses below 40 mm may be required on the basis of special design criteria.		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSISTION	Option 6 and option 9		
TENSIL TESTING	Mechanical properties given in Table 5b shall be modified as follows: Yield Strenght: 420 - 40 Mpa (all thicknesses) Tensile Strenght: 500-660 Mpa (all thicknesses)		
IMPACT TESTING			
EXTENT OF TESTING	Option 13, Tensile testing and impact testing shall be carried out to the extent specified in the standard, except that each nominal wall thickness shall be tested insted of "the same thickness range".		
SURFACE CONDITION			
SURFACE PROTECTION	All surfaces shall receive a preliminary protecticve primer coat. Blast cleaning shall compy with ISO 8501-1 Sa 2 1/2 and the surface shall remain at Sa 2 1/2 until application of ther primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

MATERIAL DATA SHEET MDS - Y50 Rev. 5 June 2007

TYPE OF MATERIAL: Structural Steel with documented through thickness properties

Sveisbart konstruksjonsstål med dokumentert krav til stål i tykkelsesretningen

* Plater
* Z 35 for tykkelser ≥ 25 mm

PRODUCT	***STANDARD***	***GRADE***	
Plates	EN 10225	S500G2+Q/G2+M (see note)	
SCOPE	This MDS specifies the selected options in the referred standard and modified requirements which shall supersede the corresponding requirements in the referred standard.		
STEEL GRADE	Grade S460G2+Q/G2+M shall be modified to Grade S500G2+Q/G2+M as specified by this MDS.		
QUALIFICATIONS	Base material information, shall be submitted with the bid / be established prior to delivery. The documentation of base material shall cover both delivered and PWHT condition and shall include strain ageing tests (see option 12), typical tensile test result for plates and weldablility tests according to Annex E (option 18) within each of the following thickness ranges that are relevant for the order: 25 < t ≤ 40mm 40 < t ≤ 63mm 63 < t ≤ 100mm 100 < t ≤ 150mm Other thickness ranges related to same chemistry and manufacturing process may apply. In such cases the thickest material in the range shall be tested. The results from PWHT condition shall also meet the specified requirements. CTOD testing shall be included for weldability testing for t > 40 mm and shall meet a requirement of		
HEAT TREATMENT/ DELIVERY CONDITION			
CHEMICAL COMPOSISTION	Option 6 and option 9, Ni content minium 0,50% Other limits may be accepted after special agreement.		
TENSIL TESTING	Mechanical properties given in Table 5c for Grade S460G2+Q/S460G2+M shall be modified as follows: Yield strenght (min): 500-600 Mpa (thicknesses ≤ 75mm) Tensile strenght: 600-700 Mpa (thicknesses ≤ 75mm)		
IMPACT TESTING			
EXTENT OF TESTING	Option 13 Tensile testing and impact testing shall be carried out to the extent specified in the standard, except		
SURFACE CONDITION			
NON DESTRUCTIVE TESTING (NDT)			
SURFACE PROTECTION	All surfaces shall receive a preliminary protecticve primer coat. Blast cleaning shall compy with ISO 8501-1 Sa 2 1/2 and the surface shall remain at Sa 2 1/2 until application of the primer. The primer shall consist of 1 coat zinc ethyl silicate primer with 15 microns. Measured on a plane polished steel or glass test plate the DFT shall be maximum 25 microns.		
CERTIFICATE	EN 10 204 Type 3.1		

KALDVALSEDE

TREKKEGENSKAPER	BETEGNELSE	TIDLIGERE BETEGNELSER				
	NS-EN 10130 2006	NS-EN 10130 1991	SS	DIN	BS	USA ASTM
Enklere pressing, knekking	DC 01	Fe P01	1142	St. 12	Cr 4	A 366
Dyppressingskvalitet	DC 03	Fe P03	1146	St. 13	Cr 2	
Større krav til dyppressing	DC 04	Fe P04	1147	St. 14	Cr 1	
Overflatekvalitet						
Handelsoverflate (små feil tillates)	A	A	32	03	GP	GP
Beste overflate (1 side feilfri)	B	B	42	05	FF	FF

Overflateutseende	Symbol	Overflatejevnhet
Blank	b	Ra ≤ 4 µm
Halvblank	g	Ra ≤ 9 µm
Normal	m	0,6 µm < Ra ≤ 1,9 µm
Rå	r	Ra > 1,6 µm

VARMGALVANISERTE

TREKKEGENSKAPER	BETEGNELSE	TIDLIGERE BETEGNELSER		SINKBELEGG
	NS-EN 10327 2004	NS-EN 10142 1995	NS-EN 10142 1990	
Handelskvalitet	Dx51D+Z275	Dx51D+Z275	FeP02GZ275	275 g/m² 2 sider
Dyppressingskvalitet	Dx54D+Z275	Dx54D+Z275	FeP02GZ275	275 g/m² 2 sider

Overflateutførelse	Symbol
Normalt rosemønster, ettervalset	N
Redusert rosemønster (småmønstret)	M

ELEKTROLYTISK GALVANISERTE

TREKKEGENSKAPER	NY BETEGNELSE	TIDLIGERE BETEGNELSER	SINKBELEGG
	NS-EN 10152 2003	1994	
Handelskvalitet	DC01+ZE 25/25 AP	FeP01ZE 25/25 AP	2,5 µ pr 1 side
Dyptrekkskvalitet	DC04+ZE 25/25 AP	FeP04ZE 25/25 AP	2,5 µ pr 1 side
Overflateutførelse			
- Handelsoverflate	A		
- Fosfatert	P		

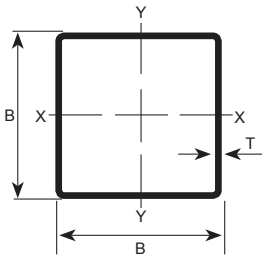
ALUZINK, ALUMINIUM OG SINKBELAGTE

TREKKEGENSKAPER	NY BETEGNELSE	TIDLIGERE BETEGNELSER		SSAB ALUZINK
	NS-EN 10327 2004	NS-EN 10215 1995		
- Handelskvalitet	Dx51D+AZ	Dx51D+AZ	FeP01AZ150	B 500
- Dyptrekkskvalitet	Dx54D+AZ	Dx54D+AZ	FeP06AZ150	F36 A
Belegg sink og aluminium	185 g/m² 2 sider		150 g/m² på 2 sider	150 g/m² 2 sider

FARGEBELAGTE		Betegnelse	Belegg
Prelaq, slette	Handelskvalitet	Plastisol	175 µ pr 1 side
Prelaq med lærpreg	Handelskvalitet	Plastisol	200 µ pr 1 side
Prelaq Green coat	Handelskvalitet	Polyester	36 µ pr 1 side
Colorcoat HPS	Handelskvalitet	Plastisol	200 µ pr 1 side

Dimensjoner, masse og statiske verdier

VF HUP NS-EN 10 210-2



Varmformede hulprofiler

Kvadratiske

Dimensjon	Tykk-else	Masse (7,85kg/dm^3)	Tver-snitts-areal	Annet arealmoment	Treghetsradius	Elastisk tversnitts-modul	Plastisk tverrsnitts-modul	Torsjonskonstanter		Utvendig overflate pr. m.lengde	Nominell lengde pr. tonn
								Annet areal-moment for torsjon	Elastisk tverrsnitts-areal for torsjon		
BxB mm	T mm	M kg/m	A cm^2	I cm^4	i cm	Wel cm^3	Wpl cm^3	It cm^4	Ct cm^3	As m^2/m	m
40 x 40	3.0	3.41	4.34	9.78	1.50	4.89	5.97	15.7	7.10	0.152	293
	3.2	3.61	4.60	10.2	1.49	5.11	6.28	16.5	7.42	0.152	277
	4.0	4.39	5.59	11.8	1.45	5.91	7.44	19.5	8.54	0.150	228
	5.0	5.28	6.73	13.4	1.41	6.68	8.66	22.5	9.60	0.147	189
50 x 50	3.0	4.35	5.54	20.2	1.91	8.08	9.70	32.1	11.8	0.192	230
	3.2	4.62	5.88	21.2	1.90	8.49	10.2	33.8	12.4	0.192	217
	4.0	5.64	7.19	25.0	1.86	9.99	12.3	40.4	14.5	0.190	177
	5.0	6.85	8.73	28.9	1.82	11.6	14.5	47.6	16.7	0.187	146
	6.3	8.31	10.6	32.8	1.76	13.1	17.0	55.2	18.8	0.184	120
60 x 60	3.0	5.29	6.74	36.2	2.32	12.1	14.3	56.9	17.7	0.232	189
	3.2	5.62	7.16	38.2	2.31	12.7	15.2	60.2	18.6	0.232	178
	4.0	6.90	8.79	45.4	2.27	15.1	18.3	72.5	22.0	0.230	145
	5.0	8.42	10.7	53.3	2.23	17.8	21.9	86.4	25.7	0.227	119
	6.3	10.3	13.1	61.6	2.17	20.5	26.0	102	29.6	0.224	97.2
	8.0	12.5	16.0	69.7	2.09	23.2	30.4	118	33.4	0.219	79.9
70 x 70	3.6	7.40	9.42	68.6	2.70	19.6	23.3	108	28.7	0.271	135
	5.0	9.99	12.7	88.5	2.64	25.3	30.8	142	36.8	0.267	100
	6.3	12.3	15.6	104	2.58	29.7	36.9	169	42.9	0.264	81.5
	8.0	15.0	19.2	120	2.50	34.2	43.8	200	49.2	0.259	66.5
80 x 80	3.6	8.53	10.9	105	3.11	26.2	31.0	164	38.5	0.311	117
	4.0	9.41	12.0	114	3.09	28.6	34.0	180	41.9	0.310	106
	5.0	11.6	14.7	137	3.05	34.2	41.1	217	49.8	0.307	86.5
	6.3	14.2	18.1	162	2.99	40.5	49.7	262	58.7	0.304	70.2
	8.0	17.5	22.4	189	2.91	47.3	59.5	312	68.3	0.299	57.0
90 x 90	3.6	9.66	12.3	152	3.52	33.8	39.7	237	49.7	0.351	104
	4.0	10.7	13.6	166	3.50	37.0	43.6	260	54.2	0.350	93.7
	5.0	13.1	16.7	200	3.45	44.4	53.0	316	64.8	0.347	76.1
	6.3	16.2	20.7	238	3.40	53.0	64.3	382	77.0	0.344	61.6
	8.0	20.1	25.6	281	3.32	62.6	77.6	459	90.5	0.339	49.9
100 x 100	4.0	11.9	15.2	232	3.91	46.4	54.4	361	68.2	0.390	83.9
	5.0	14.7	18.7	279	3.86	55.9	66.4	439	81.8	0.387	68.0
	6.3	18.2	23.2	336	3.80	67.1	80.9	534	97.8	0.384	54.9
	8.0	22.6	28.8	400	3.73	79.9	98.2	646	116	0.379	44.3
	10.0	27.4	34.9	462	3.64	92.4	116	761	133	0.374	36.5
120 x 120	5.0	17.8	22.7	498	4.68	83.0	97.6	777	122	0.467	56.0
	6.3	22.2	28.2	603	4.62	100	120	950	147	0.464	45.1
	8.0	27.6	35.2	726	4.55	121	146	1160	176	0.459	36.2
	10.0	33.7	42.9	852	4.46	142	175	1382	206	0.454	29.7
	12.5	40.9	52.1	982	4.34	164	207	1623	236	0.448	24.5
140 x 140	5.0	21.0	26.7	807	5.50	115	135	1253	170	0.547	47.7
	6.3	26.1	33.3	984	5.44	141	166	1540	206	0.544	38.3
	8.0	32.6	41.6	1195	5.36	171	204	1892	249	0.539	30.7
	10.0	40.0	50.9	1416	5.27	202	246	2272	294	0.534	25.0
	12.5	48.7	62.1	1653	5.16	236	293	2696	342	0.528	20.5
150 x 150	5.0	22.6	28.7	1002	5.90	134	156	1550	197	0.587	44.3
	6.3	28.1	35.8	1223	5.85	163	192	1909	240	0.584	35.6
	8.0	35.1	44.8	1491	5.77	199	237	2351	291	0.579	28.5
	10.0	43.1	54.9	1773	5.68	236	286	2832	344	0.574	23.2
	12.5	52.7	67.1	2080	5.57	277	342	3375	402	0.568	19.0
	16.0	65.2	83.0	2430	5.41	324	411	4026	467	0.559	15.3
160 x 160	5.0	24.1	30.7	1225	6.31	153	178	1892	226	0.627	41.5
	6.3	30.1	38.3	1499	6.26	187	220	2333	275	0.624	33.3
	8.0	37.6	48.0	1831	6.18	229	272	2880	335	0.619	26.6
	10.0	46.3	58.9	2186	6.09	273	329	3478	398	0.614	21.6
	12.5	56.6	72.1	2576	5.98	322	395	4158	467	0.608	17.7
180 x 180	6.3	34.0	43.3	2168	7.07	241	281	3361	355	0.704	29.4
	8.0	42.7	54.4	2661	7.00	296	349	4162	434	0.699	23.4
	10.0	52.5	66.9	3193	6.91	355	424	5048	518	0.694	19.0
	12.5	64.4	82.1	3790	6.80	421	511	6070	613	0.688	15.5
	16.0	80.2	102	4504	6.64	500	621	7343	724	0.679	12.5
200 x 200	5.0	30.4	38.7	2445	7.95	245	283	3756	362	0.787	32.9
	6.3	38.0	48.4	3011	7.89	301	350	4653	444	0.784	26.3
	8.0	47.7	60.8	3709	7.81	371	436	5778	545	0.779	21.0
	10.0	58.8	74.9	4471	7.72	447	531	7031	655	0.774	17.0
	12.5	72.3	92.1	5336	7.61	534	643	8491	778	0.768	13.8
	16.0	90.3	115	6394	7.46	639	785	10340	927	0.759	11.1
250 x 250	6.3	47.9	61.0	6014	9.93	481	556	9238	712	0.984	20.9
	8.0	60.3	76.8	7455	9.86	596	694	11525	880	0.979	16.6
	10.0	74.5	94.9	9055	9.77	724	851	14106	1065	0.974	13.4
	12.5	91.9	117	10915	9.66	873	1037	17164	1279	0.968	10.9
	16.0	115	147	13267	9.50	1061	1280	21138	1546	0.959	8.67
300 x 300	6.3	57.8	73.6	10547	12.0	703	809	16136	1043	1.18	17.3
	8.0	72.8	92.8	13128	11.9	875	1013	20194	1294	1.18	13.7
	10.0	90.2	115	16026	11.8	1068	1246	24807	1575	1.17	11.1
	12.5	112	142	19442	11.7	1296	1525	30333	1904	1.17	8.97
	16.0	141	179	23850	11.5	1590	1895	37622	2325	1.16	7.12
350 x 350	8.0	85.4	109	21129	13.9	1207	1392	32384	1789	1.38	11.7
	10.0	106	135	25884	13.9	1479	1715	39886	2185	1.37	9.44
	12.5	131	167	31541	13.7	1802	2107	48934	2654	1.37	7.62
	16.0	166	211	38942	13.6	2225	2630	60990	3264	1.36	6.04
400 x 400	10.0	122	155	39128	15.9	1956	2260	60092	2895	1.57	8.22
	12.5	151	192	47839	15.8	2392	2782	73906	3530	1.57	6.63
	16.0	191	243	59344	15.6	2967	3484	92442	4362	1.56	5.24
	20.0	235	300	71535	15.4	3577	4247	112489	5237	1.55	4.25

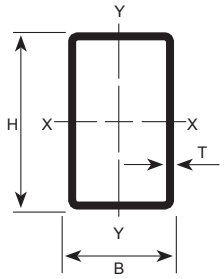
Dimensjoner, masse og statiske verdier

Varmformede hulprofiler

VF HUP

NS-EN 10210-2

Rektangulære



Dimensjon	Tykk-else	Masse (7,85kg/dm^3)	Tver-snitts-areal	Annet arealmoment		Treghetsradius		Elastisk tversnitts-modul		Plastisk tverrsnitts-modul		Torsjonskonstanter		Utvendig overflate pr. m.lengde	Nominell lengde pr. tonn
												Annet areal-moment for torsjon	Elastisk tverrsnitts-areal for torsjon		
HxB mm	T mm	M kg/m	A cm^2	Ixx cm^4	Ixy cm^4	ixx cm	iyy cm	Welxx cm^3	Welyy cm^3	Wplxx cm^3	Wplyy cm^3	It cm^4	Ct cm^3	As m^2/m	m
50 x 30	3.2	3.61	4.60	14.2	6.20	1.76	1.16	5.68	4.13	7.25	5.00	14.2	6.80	0.152	277
60 x 40	3.0	4.35	5.54	26.5	13.9	2.18	1.58	8.82	6.95	10.9	8.19	29.2	11.2	0.192	230
	4.0	5.64	7.19	32.8	17.0	2.14	1.54	10.9	8.52	13.8	10.3	36.7	13.7	0.190	177
	5.0	6.85	8.73	38.1	19.5	2.09	1.50	12.7	9.77	16.4	12.2	43.0	15.7	0.187	146
80 x 40	3.2	5.62	7.16	57.2	18.9	2.83	1.63	14.3	9.46	18.0	11.0	46.2	16.1	0.232	178
	4.0	6.90	8.79	68.2	22.2	2.79	1.59	17.1	11.1	21.8	13.2	55.2	18.9	0.230	145
	5.0	8.42	10.7	80.3	25.7	2.74	1.55	20.1	12.9	26.1	15.7	65.1	21.9	0.227	119
	6.3	10.3	13.1	93.3	29.2	2.67	1.49	23.3	14.6	31.1	18.4	75.6	24.8	0.224	97.2
	8.0	12.5	16.0	106	32.1	2.58	1.42	26.5	16.1	36.5	21.2	85.8	27.4	0.219	79.9
90 x 50	3.6	7.40	9.42	98.3	38.7	3.23	2.03	21.8	15.5	27.2	18.0	89.4	25.9	0.271	135
	5.0	9.99	12.7	127	49.2	3.16	1.97	28.3	19.7	36.0	23.5	116	32.9	0.267	100
	6.3	12.3	15.6	150	57.0	3.10	1.91	33.3	22.8	43.2	28.0	138	38.1	0.264	81.5
100 x 50	3.0	6.71	8.54	110	36.8	3.58	2.08	21.9	14.7	27.3	16.8	88.4	25.0	0.292	149
	3.2	7.13	9.08	116	38.8	3.57	2.07	23.2	15.5	28.9	17.7	93.4	26.4	0.929	140
	4.0	8.78	11.2	140	46.2	3.53	2.03	27.9	18.5	35.2	21.5	113	31.4	0.290	114
	5.0	10.8	13.7	167	54.3	3.48	1.99	33.3	21.7	42.6	25.8	135	36.9	0.287	92.8
	6.3	13.3	16.9	197	63.0	3.42	1.93	39.4	25.2	51.3	30.8	160	42.9	0.284	75.4
	8.0	16.3	20.8	230	71.7	3.33	1.86	46.0	28.7	61.4	36.3	186	48.9	0.279	61.4
100 x 60	3.6	8.53	10.9	145	64.8	3.65	2.44	28.9	21.6	35.6	24.9	142	35.6	0.311	117
	5.0	11.6	14.7	189	83.6	3.58	2.38	37.8	27.9	47.4	32.9	188	45.9	0.307	86.5
	6.3	14.2	18.1	225	98.1	3.52	2.33	45.0	32.7	57.3	39.5	224	53.8	0.304	70.2
	8.0	17.5	22.4	264	113	3.44	2.25	52.8	37.8	68.7	47.1	265	62.2	0.299	57.0
120 x 60	3.6	9.66	12.3	227	76.3	4.30	2.49	37.9	25.4	47.2	28.9	183	43.3	0.351	103
	5.0	13.1	16.7	299	98.8	4.23	2.43	49.9	32.9	63.1	38.4	242	56.0	0.347	76.1
	6.3	16.2	20.7	358	116	4.16	2.37	59.7	38.8	76.7	46.3	290	65.9	0.344	61.6
	8.0	20.1	25.6	425	135	4.08	2.30	70.8	45.0	92.7	55.4	344	76.6	0.339	49.9
120 x 80	5.0	14.7	18.7	365	193	4.42	3.21	60.9	48.2	74.6	56.1	401	77.9	0.387	68.0
	6.3	18.2	23.2	440	230	4.36	3.15	73.3	57.6	91.0	68.2	487	92.9	0.384	54.9
	8.0	22.6	28.8	525	273	4.27	3.08	87.5	68.1	111	82.6	587	110	0.379	44.3
	10.0	27.4	34.9	609	313	4.18	2.99	101.6	78.1	131	97.3	688	126	0.374	36.5
150 x 100	5.0	18.6	23.7	739	392	5.58	4.07	98.5	78.5	119	90.1	807	127	0.487	53.7
	6.3	23.1	29.5	898	474	5.52	4.01	120	94.8	147	110	986	153	0.484	43.2
	8.0	28.9	36.8	1087	569	5.44	3.94	145	114	180	135	1203	183	0.479	34.7
	10.0	35.3	44.9	1282	665	5.34	3.85	171	133	216	161	1432	214	0.474	28.4
	12.5	42.8	54.6	1488	763	5.22	3.74	198	153	256	190	1679	246	0.468	23.3
160 x 80	4.0	14.4	18.4	612	207	5.77	3.35	76.5	51.7	94.7	58.3	493	88.1	0.470	69.3
	5.0	17.8	22.7	744	249	5.72	3.31	93.0	62.3	116	71.1	600	106	0.467	56.0
	6.3	22.2	28.2	903	299	5.66	3.26	113	74.8	142	86.8	730	127	0.464	45.1
	8.0	27.6	35.2	1091	356	5.57	3.18	136	89.0	175	106	883	151	0.459	36.2
	10.0	33.7	42.9	1284	411	5.47	3.10	161	103	209	125	1041	175	0.454	29.7
200 x 100	5.0	22.6	28.7	1495	505	7.21	4.19	149	101	185	114	1204	172	0.587	44.3
	6.3	28.1	35.8	1829	613	7.15	4.14	183	123	228	140	1475	208	0.584	35.6
	8.0	35.1	44.8	2234	739	7.06	4.06	223	148	282	172	1804	251	0.579	28.5
	10.0	43.1	54.9	2664	869	6.96	3.98	266	174	341	206	2156	295	0.574	23.2
	12.5	52.7	67.1	3136	1004	6.84	3.87	314	201	408	245	2541	341	0.568	19.0
200 x 120	5.0	24.1	30.7	1685	762	7.40	4.98	168	127	205	144	1648	210	0.627	41.5
	6.3	30.1	38.3	2065	929	7.34	4.92	207	155	253	177	2028	255	0.624	33.3
	8.0	37.6	48.0	2529	1128	7.26	4.85	253	188	313	218	2495	310	0.619	26.6
	10.0	46.3	58.9	3026	1337	7.17	4.76	303	223	379	263	3001	367	0.614	21.6
200 x 150	8.0	41.4	52.8	2971	1894	7.50	5.99	297	253	359	294	3643	398	0.679	24.1
	10.0	51.0	64.9	3568	2264	7.41	5.91	357	302	436	356	4409	475	0.674	19.6
250 x 100	10.0	51.0	64.9	4733	1072	8.54	4.06	379	214	491	251	2908	376	0.674	19.6
	12.5	62.5	79.6	5622	1245	8.41	3.96	450	249	592	299	3436	438	0.668	16.0
250 x 150	5.0	30.4	38.7	3360	1527	9.31	6.28	269	204	324	228	3278	337	0.787	32.9
	6.3	38.0	48.4	4143	1874	9.25	6.22	331	250	402	283	4054	413	0.784	26.3
	8.0	47.7	60.8	5111	2298	9.17	6.15	409	306	501	350	5021	506	0.779	21.0
	10.0	58.8	74.9	6174	2755	9.08	6.06	494	367	611	426	6090	605	0.774	17.0
	12.5	72.3	92.1	7387	3265	8.96	5.96	591	435	740	514	7326	717	0.768	13.8
	16.0	90.3	115	8879	3873	8.79	5.80	710	516	906	625	8868	849	0.759	11.1
300 x 100	8.0	47.7	60.8	6305	1078	10.2	4.21	420	216	546	245	3069	387	0.779	21.0
	10.0	58.8	74.9	7613	1275	10.1	4.13	508	255	666	296	3676	458	0.774	17.0
300 x 200	6.3	47.9	61.0	7829	4193	11.3	8.29	522	419	624	472	8476	681	0.984	20.9
	8.0	60.3	76.8	9717	5184	11.3	8.22	648	518	779	589	10562	840	0.979	16.6
	10.0	74.5	94.9	11819	6278	11.2	8.13	788	628	956	721	12908	1015	0.974	13.4
	12.5	91.9	117	14273	7537	11.0	8.02	952	754	1165	877	15677	1217	0.968	10.9
	16.0	115	147	17390	9109	10.9	7.87	1159	911	1441	1080	19252	1468	0.959	8.67
400 x 200	8.0	72.8	92.8	19562	6660	14.5	8.47	978	666	1203	743	15735	1135	1.18	13.7
	10.0	90.2	115	23914	8084	14.4	8.39	1196	808	1480	911	19259	1376	1.17	11.1
	12.5	112	142	29063	9738	14.3	8.28	1453	974	1813	1111	23438	1656	1.17	8.97
	16.0	141	179	35738	11824	14.1	8.13	1787	1182	2256	1374	28871	2010	1.16	7.12
450 x 250	8.0	85.4	109	30082	12142	16.6	10.6	1337	971	1622	1081	27083	1629	1.38	11.7
	10.0	106	135	36895	14819	16.5	10.5	1640	1185	2000	1331	33284	1986	1.37	9.44
	12.5	131	167	45026	17973	16.4	10.4	2001	1438	2458	1631	40719	2406	1.37	7.62
	16.0	166	211	55705	22041	16.2	10.2	2476	1763	3070	2029	50545	2947	1.36	6.04
500 x 300	8.0	97.9	125	43728	19951	18.7	12.6	1749	1330	2100	1480	42563	2203	1.58	10.2
	10.0	122	155	53762	24439	18.6	12.6	2150	1629	2595	1826	52450	2696	1.57	8.22
	12.5	151	192	65813	29780	18.5	12.5	2633	1985	3196	2244	64389	3281	1.57	6.63
	16.0	191	243	81783	36768	18.3	12.3	3271	2451	4005	2804	80329	4044	1.56	5.24
	20.0	235	300	98777	44078	18.2	12.1	3951	2939	4885	3408	97447	4842	1.55	4.25

Dimensjoner, masse og statiske verdier

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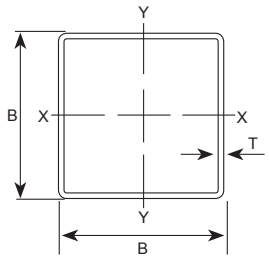

Kaldformede hulprofiler

Kvadratiske

Dimensjon	Tykk-else	Masse (7,85kg/dm^3)	Tver-snitts-areal	Annet arealmoment	Treghetsradius	Elastisk tversnitts-modul	Plastisk tverrsnitts-modul	Torsjonskonstanter		Utvendig overflate pr. m.lengde	Nominell lengde pr. tonn
								Annet areal-moment for torsjon	Elastisk tverrsnitts-areal for torsjon		
BxB mm	T mm	M kg/m	A cm^2	I cm^4	i cm	Wel cm^3	Wpl cm^3	It cm^4	Ct cm^3	As m^2/m	m
25 x 25	2.0	1.36	1.74	1.48	0.924	1.19	1.47	2.53	1.80	0.093	733
	2.5	1.64	2.09	1.69	0.899	1.35	1.71	2.97	2.07	0.091	610
	3.0	1.89	2.41	1.84	0.874	1.47	1.91	3.33	2.27	0.090	529
30 x 30	2.0	1.68	2.14	2.72	1.13	1.81	2.21	4.54	2.75	0.113	596
	2.5	2.03	2.59	3.16	1.10	2.10	2.61	5.40	3.20	0.111	492
	3.0	2.36	3.01	3.50	1.08	2.34	2.96	6.15	3.58	0.110	423
40 x 40	2.0	2.31	2.94	6.94	1.54	3.47	4.13	11.3	5.23	0.153	434
	2.5	2.82	3.59	8.22	1.51	4.11	4.97	13.6	6.21	0.151	355
	3.0	3.30	4.21	9.32	1.49	4.66	5.72	15.8	7.07	0.150	303
	4.0	4.20	5.35	11.1	1.44	5.54	7.01	19.4	8.48	0.146	238
50 x 50	2.0	2.93	3.74	14.1	1.95	5.66	6.66	22.6	8.51	0.193	341
	2.5	3.60	4.59	16.9	1.92	6.78	8.07	27.5	10.2	0.191	278
	3.0	4.25	5.41	19.5	1.90	7.79	9.39	32.1	11.8	0.190	236
	4.0	5.45	6.95	23.7	1.85	9.49	11.70	40.4	14.4	0.186	183
	5.0	6.56	8.36	27.0	1.80	10.8	13.7	47.5	16.6	0.183	152
60 x 60	3.0	5.19	6.61	35.1	2.31	11.7	14.0	57.1	17.7	0.230	193
	4.0	6.71	8.55	43.6	2.26	14.5	17.6	72.6	22.0	0.226	149
	5.0	8.13	10.4	50.5	2.21	16.8	20.9	86.4	25.6	0.223	123
70 x 70	2.5	5.17	6.59	49.4	2.74	14.1	16.5	78.5	21.2	0.271	193
	3.0	6.13	7.81	57.5	2.71	16.4	19.4	92.4	24.7	0.270	163
	3.5	7.06	8.99	65.1	2.69	18.6	22.2	106	28.0	0.268	142
	4.0	7.97	10.1	72.1	2.67	20.6	24.8	119	31.1	0.266	126
	5.0	9.70	12.4	84.6	2.62	24.2	29.6	142	36.7	0.263	103
80 x 80	3.0	7.07	9.0	87.8	3.12	22.0	25.8	140	33.0	0.310	141
	3.5	8.16	10.4	99.8	3.10	25.0	29.5	161	37.6	0.308	123
	4.0	9.22	11.7	111	3.07	27.8	33.1	180	41.8	0.306	108
	5.0	11.3	14.4	131	3.03	32.9	39.7	218	49.7	0.303	88.7
	6.0	13.2	16.8	149	2.98	37.3	45.8	252	56.6	0.299	75.7
90 x 90	3.0	8.01	10.2	127	3.53	28.3	33.0	201	42.5	0.350	125
	3.5	9.26	11.8	145	3.51	32.2	37.9	232	48.5	0.348	108
	4.0	10.5	13.3	162	3.48	36.0	42.6	261	54.2	0.346	95.4
	5.0	12.8	16.4	193	3.43	42.9	51.4	316	64.7	0.343	77.9
	6.0	15.1	19.2	220	3.39	49.0	59.5	368	74.2	0.339	66.2
100 x 100	3.0	8.96	11.4	177	3.94	35.4	41.2	279	53.2	0.390	112
	4.0	11.7	14.9	226	3.89	45.3	53.3	362	68.1	0.386	85.2
	5.0	14.4	18.4	271	3.84	54.2	64.6	441	81.7	0.383	69.4
	6.0	17.0	21.6	311	3.79	62.3	75.1	514	94.1	0.379	58.9
	8.0	21.4	27.2	366	3.67	73.2	91.1	645	114.0	0.366	46.8
120 x 120	4.0	14.2	18.1	402	4.71	67.0	78.3	637	101	0.466	70.2
	5.0	17.5	22.4	485	4.66	80.9	95.4	778	122	0.463	57.0
	6.0	20.7	26.4	562	4.61	93.7	112	913	141	0.459	48.2
	8.0	26.4	33.6	677	4.49	113	138	1163	175	0.446	37.9
	10.0	31.8	40.6	777	4.38	129	162	1376	203	0.437	31.4
140 x 140	4.0	16.8	21.3	652	5.52	93.1	108	1023	140	0.546	59.7
	5.0	20.7	26.4	791	5.48	113	132	1256	170	0.543	48.3
	6.0	24.5	31.2	920	5.43	131	155	1479	198	0.539	40.8
	8.0	31.4	40.0	1127	5.30	161	194	1901	248	0.526	31.8
	10.0	38.1	48.6	1312	5.20	187	230	2274	291	0.517	26.2
150 x 150	4.0	18.0	22.9	808	5.93	108	125	1265	162	0.586	55.5
	5.0	22.3	28.4	982	5.89	131	153	1554	197	0.583	44.9
	6.0	26.4	33.6	1146	5.84	153	180	1833	230	0.579	37.9
	8.0	33.9	43.2	1412	5.71	188	226	2364	289	0.566	29.5
	10.0	41.3	52.6	1653	5.61	220	269	2839	341	0.557	24.2
160 x 160	4.0	19.3	24.5	987	6.34	123	143	1541	185	0.626	51.9
	5.0	23.8	30.4	1202	6.29	150	175	1896	226	0.623	42.0
	6.0	28.3	36.0	1405	6.25	176	206	2239	264	0.619	35.4
	8.0	36.5	46.4	1741	6.12	218	260	2897	334	0.606	27.4
	10.0	44.4	56.6	2048	6.02	256	311	3490	395	0.597	22.5
180 x 180	5.0	27.0	34.4	1737	7.11	193	224	2724	290	0.703	37.1
	6.0	32.1	40.8	2037	7.06	226	264	3223	340	0.699	31.2
	8.0	41.5	52.8	2546	6.94	283	336	4189	432	0.686	24.1
	10.0	50.7	64.6	3017	6.84	335	404	5074	515	0.677	19.7
	12.0	58.5	74.5	3322	6.68	369	454	5865	584	0.658	17.1
	12.5	60.5	77.0	3406	6.65	378	467	6050	600	0.656	16.5
200 x 200	5.0	30.1	38.4	2410	7.93	241	279	3763	362	0.783	33.2
	6.0	35.8	45.6	2833	7.88	283	330	4459	426	0.779	27.9
	8.0	46.5	59.2	3566	7.76	357	421	5815	544	0.766	21.5
	10.0	57.0	72.6	4251	7.65	425	508	7072	651	0.757	17.6
	12.0	66.0	84.1	4730	7.50	473	576	8230	743	0.738	15.2
	12.5	68.3	87.0	4859	7.47	486	594	8502	765	0.736	14.6
250 x 250	6.0	45.2	57.6	5672	9.92	454	524	8843	681	0.979	22.1
	8.0	59.1	75.2	7229	9.80	578	676	11598	878	0.966	16.9
	10.0	72.7	92.6	8707	9.70	697	822	14197	1062	0.957	13.8
	12.0	84.8	108	9859	9.55	789	944	16691	1226	0.938	11.8
	12.5	88.0	112	10161	9.52	813	975	17283	1266	0.936	11.4
300 x 300	8.0	71.6	91.2	12801	11.8	853	991	20312	1293	1.17	14.0
	10.0	88.4	113	15519	11.7	1035	1211	24966	1572	1.16	11.3
	12.0	104	132	17767	11.6	1184	1402	29514	1829	1.138	9.65
	12.5	108	137	18348	11.6	1223	1451	30601	1892	1.14	9.3

Dimensjoner, masse og statiske verdier

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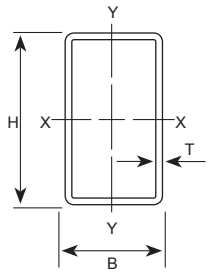


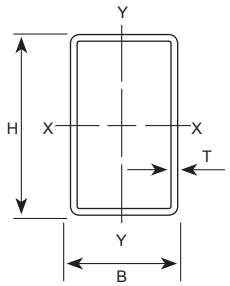
Kaldformede hulprofiler

Rektangulære

Dimensjon	Tykk-else	Masse (7,85kg/dm^3)	Tver-snitts-areal	Annet arealmoment		Treghetsradius		Elastisk tversnitts-modul		Plastisk tverrsnitts-modul		Torsjonskonstanter		Utvendig overflate pr. m.lengde	Nominell lengde pr. tonn
												Annet areal-moment for torsjon	Elastisk tverrsnitts-areal for torsjon		
HxB mm	T mm	M kg/m	A cm^2	Ixx cm^4	Ixy cm^4	ixx cm	iyy cm	Welxx cm^3	Welyy cm^3	Wplxx cm^3	Wplyy cm^3	It cm^4	Ct cm^3	As m^2/m	m
50 x 25	2.0	2.15	2.74	8.38	2.81	1.75	1.01	3.35	2.25	4.26	2.62	7.06	3.92	0.143	465
	2.5	2.62	3.34	9.89	3.28	1.72	0.99	3.95	2.62	5.11	3.12	8.43	4.60	0.141	382
	3.0	3.07	3.91	11.2	3.67	1.69	0.97	4.47	2.93	5.86	3.56	9.64	5.18	0.140	326
50 x 30	2.0	2.31	2.94	9.54	4.29	1.80	1.21	3.81	2.86	4.74	3.33	9.77	4.84	0.153	434
	2.5	2.82	3.59	11.3	5.05	1.77	1.19	4.52	3.37	5.70	3.98	11.7	5.72	0.151	355
	3.0	3.30	4.21	12.8	5.70	1.75	1.16	5.13	3.80	6.57	4.58	13.5	6.49	0.150	303
	4.0	4.20	5.35	15.3	6.69	1.69	1.12	6.10	4.46	8.05	5.58	16.5	7.71	0.146	238
60 x 30	3.0	3.77	4.81	20.5	6.80	2.06	1.19	6.83	4.53	8.82	5.39	17.5	7.95	0.170	265
	4.0	4.83	6.15	24.7	8.06	2.00	1.14	8.23	5.37	10.92	6.62	21.5	9.52	0.166	207
60 x 40	2.5	3.60	4.59	22.1	11.7	2.19	1.60	7.36	5.87	9.06	6.84	25.1	9.72	0.191	278
	3.0	4.25	5.41	25.4	13.4	2.17	1.58	8.46	6.72	10.5	7.94	29.3	11.2	0.190	236
	4.0	5.45	6.95	31.0	16.3	2.11	1.53	10.3	8.14	13.2	9.89	36.7	13.7	0.186	183
	5.0	6.56	8.36	35.3	18.4	2.06	1.48	11.8	9.21	15.4	11.5	42.8	15.6	0.183	152
70 x 40	3.0	4.72	6.01	37.3	15.5	2.49	1.61	10.7	7.75	13.4	9.05	36.5	13.2	0.210	212
	4.0	6.08	7.75	46.0	18.9	2.44	1.56	13.1	9.44	16.8	11.3	45.8	16.2	0.206	164
70 x 50	3.0	5.19	6.61	44.1	26.1	2.58	1.99	12.6	10.4	15.4	12.2	53.6	17.1	0.230	193
	4.0	6.71	8.55	54.7	32.2	2.53	1.94	15.6	12.9	19.5	15.4	68.1	21.2	0.226	149
80 x 40	3.0	5.19	6.61	52.3	17.6	2.81	1.63	13.1	8.78	16.5	10.2	43.9	15.3	0.230	193
	4.0	6.71	8.55	64.8	21.5	2.75	1.59	16.2	10.7	20.9	12.8	55.2	18.8	0.226	149
	5.0	8.13	10.4	75.1	24.6	2.69	1.54	18.8	12.3	24.7	15.0	65.0	21.7	0.223	123
80 x 50	3.0	5.66	7.21	61.1	29.4	2.91	2.02	15.3	11.8	18.8	13.6	65.0	19.7	0.250	177
	4.0	7.34	9.35	76.4	36.5	2.86	1.98	19.1	14.6	24.0	17.2	82.7	24.6	0.246	136
	5.0	8.91	11.4	89.2	42.3	2.80	1.93	22.3	16.9	28.5	20.5	98.4	28.7	0.243	112
80 x 60	3.0	6.13	7.81	70.0	44.9	3.00	2.40	17.5	15.0	21.2	17.4	88.3	24.1	0.270	163
	4.0	7.97	10.1	87.9	56.1	2.94	2.35	22.0	18.7	27.0	22.1	113	30.3	0.266	126
	5.0	9.70	12.4	103	65.7	2.89	2.31	25.8	21.9	32.2	26.4	136	35.7	0.263	103
90 x 50	3.0	6.13	7.81	81.9	32.7	3.24	2.05	18.2	13.1	22.6	15.0	76.7	22.4	0.270	163
	3.5	7.06	8.99	92.7	36.9	3.21	2.03	20.6	14.8	25.8	17.1	87.5	25.3	0.268	142
	4.0	7.97	10.1	103	40.7	3.18	2.00	22.8	16.3	28.8	19.1	97.7	28.0	0.266	126
	5.0	9.70	12.4	121	47.4	3.12	1.96	26.8	18.9	34.4	22.7	116	32.7	0.263	103
100 x 40	3.0	6.13	7.81	92.3	21.7	3.44	1.67	18.5	10.8	23.7	12.4	59.0	19.4	0.270	163
	4.0	7.97	10.1	116	26.7	3.38	1.62	23.1	13.3	30.3	15.7	74.5	24.0	0.266	126
	5.0	9.70	12.4	136	30.8	3.31	1.58	27.1	15.4	36.1	18.5	87.9	27.9	0.263	103
100 x 50	3.0	6.60	8.41	106	36.1	3.56	2.07	21.3	14.4	26.7	16.4	88.6	25.0	0.290	152
	4.0	8.59	10.9	134	44.9	3.50	2.03	26.8	18.0	34.1	20.9	113	31.3	0.286	116
	5.0	10.5	13.4	158	52.5	3.44	1.98	31.6	21.0	40.8	25.0	135	36.8	0.283	95.4
	6.0	12.3	15.6	179	58.7	3.38	1.94	35.8	23.5	46.9	28.5	154	41.4	0.279	81.5
100 x 60	3.0	7.07	9.01	121	54.6	3.66	2.46	24.1	18.2	29.6	20.8	122	30.6	0.310	141
	3.5	8.16	10.4	137	61.9	3.63	2.44	27.4	20.6	33.8	23.8	139	34.8	0.306	123
	4.0	9.22	11.7	153	68.7	3.60	2.42	30.5	22.9	37.9	26.6	156	38.7	0.306	108
	5.0	11.3	14.4	181	80.8	3.55	2.37	36.2	26.9	45.6	31.9	188	45.8	0.303	88.7
	6.0	13.2	16.8	205	91.2	3.49	2.33	41.1	30.4	52.5	36.6	216	51.9	0.299	75.7
100 x 80	3.0	8.01	10.2	149	106	3.82	3.22	29.8	26.4	35.4	30.4	196	41.9	0.350	125
	4.0	10.5	13.3	189	134	3.77	3.17	37.9	33.5	45.6	39.2	254	53.4	0.346	95.4
	5.0	12.8	16.4	226	160	3.72	3.12	45.2	39.9	55.1	47.2	308	63.7	0.343	77.9
120 x 40	3.0	7.07	9.01	148	25.8	4.05	1.69	24.7	12.9	32.2	14.6	74.6	23.5	0.310	141
	4.0	9.22	11.7	187	31.9	3.99	1.65	31.1	15.9	41.2	18.5	94.2	29.2	0.306	108
	5.0	11.3	14.4	221	36.9	3.92	1.60	36.8	18.5	49.4	22.0	111	34.1	0.303	88.7
120 x 60	3.0	8.01	10.2	189	64.4	4.30	2.51	31.5	21.5	39.2	24.2	156	37.1	0.350	125
	3.5	9.26	11.8	216	73.1	4.28	2.49	35.9	24.4	44.9	27.7	179	42.2	0.348	1080
	4.0	10.5	13.3	241	81.2	4.25	2.47	40.1	27.1	50.5	31.1	201	47.0	0.346	95.4
	5.0	12.8	16.4	287	96.0	4.19	2.42	47.8	32.0	60.9	37.4	242	55.8	0.343	77.9
	6.0	15.1	19.2	328	109	4.13	2.38	54.7	36.3	70.6	43.1	280	63.6	0.339	66.2
120 x 80	3.0	8.96	11.4	230	123	4.49	3.29	38.4	30.9	46.2	35.0	255	50.8	0.390	112
	4.0	11.7	14.9	295	157	4.44	3.24	49.1	39.3	59.8	45.2	331	64.9	0.386	85.2
	5.0	14.4	18.4	353	188	4.39	3.20	58.9	46.9	72.4	54.7	402	77.8	0.383	69.4
	6.0	17.0	21.6	406	215	4.33	3.15	67.7	53.8	84.3	63.5	469	89.4	0.379	58.9
	8.0	21.4	27.2	476	252	4.18	3.04	79.3	62.9	102	76.9	584	108	0.366	46.8
140 x 80	3.0	9.90	12.6	334	141	5.15	3.35	47.8	35.3	58.2	39.6	317	59.7	0.430	101
	4.0	13.0	16.5	430	180	5.10	3.30	61.4	45.1	75.5	51.3	412	76.5	0.426	77.0
	5.0	16.0	20.4	517	216	5.04	3.26	73.9	54.0	91.8	62.2	501	91.8	0.423	62.6
	6.0	18.9	24.0	597	248	4.98	3.21	85.3	62.0	107	72.4	584	106	0.419	53.0
	8.0	23.9	30.4	708	293	4.82	3.10	101	73.3	131	88.4	731	129	0.406	41.8
	10.0	28.7	36.6	804	330	4.69	3.01	115	82.6	152	103	851	147	0.397	34.8
150 x 100	4.0	14.9	18.9	595	319	5.60	4.10	79.3	63.7	95.7	72.5	662	105	0.486	67.2
	5.0	18.3	23.4	719	384	5.55	4.05	95.9	76.8	117	88.3	809	127	0.483	54.5
	6.0	21.7	27.6	835	444	5.50	4.01	111	88.8	137	103	948	147	0.479	46.1
	8.0	27.7	35.2	1008	536	5.35	3.90	134	107	169	128	1206	182	0.466	36.
	10.0	33.4	42.6	1162	614	5.22	3.80	155	123	199	150	1426	211	0.457	29.9
160 x 80	5.0	17.5	22.4	722	244	5.68	3.30	90.2	61.0	113	69.7	601	106	0.463	57.0
	6.0	20.7	26.4	836	281	5.62	3.26	105	70.2	132	81.3	702	122	0.459	48.2
	8.0	26.4	33.6	1001	335	5.46	3.16	125	83.7	163	100	882	150	0.446	37.9
180 x 80	4.0	15.5	19.7	802	227	6.37	3.39	89.1	56.7	112	63.5	578	100	0.506	64.5
	5.0	19.1	24.4	971	272	6.31	3.34	108	68.1	137	77.2	704	120	0.503	52.3
	6.0	22.6	28.8	1128	314	6.25	3.30	125	78.5	160	90.2	823	139	0.499	44.2
	8.0	28.9	36.8	1362	377	6.08	3.20	151	94.1	198	111	1036	170	0.486	34.6
	10.0	35.0	44.6	1570	429	5.94	3.10	174	107	234	131	1214	196	0.477	28.6

Dimensjoner, masse og statiske verdier

KF HUP
NS-EN 10 219-2
Rektangulære



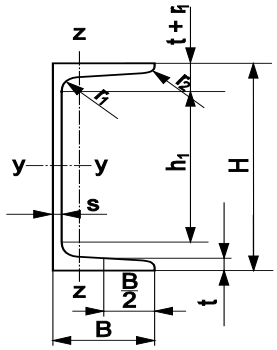
Kaldformede hulprofiler

Dimensjon	Tykk-else	Masse (7,85kg/dm^3)	Tver-snitts-areal	Annet arealmoment		Treghetsradius		Elastisk tversnitts-modul		Plastisk tverrsnitts-modul		Torsjonskonstanter		Utvendig overflate pr. m.lengde	Nominell lengde pr. tonn
												Annet areal-moment for torsjon	Elastisk tverrsnitts-areal for torsjon		
HxB mm	T mm	M kg/m	A cm^2	Ixx cm^4	Ixy cm^4	ixx cm	iyy cm	Welxx cm^3	Welyy cm^3	Wplxx cm^3	Wplyy cm^3	It cm^4	Ct cm^3	As m^2/m	m
180 x 100	4.0	16.8	21.3	926	374	6.59	4.18	103	74.8	126	84.0	845	127	0.546	59.7
	5.0	20.7	26.4	1124	452	6.53	4.14	125	90.4	154	103	1045	154	0.543	48.3
	6.0	24.5	31.2	1310	524	6.48	4.10	146	105	181	120	1227	179	0.539	40.8
	8.0	31.4	40.0	1598	637	6.32	3.99	178	127	226	150	1565	222	0.526	31.8
	10.0	38.1	48.6	1859	736	6.19	3.89	207	147	268	177	1859	260	0.517	26.2
200 x 100	4.0	18.0	22.9	1200	411	7.23	4.23	120	82.2	148	91.7	985	142	0.586	55.5
	5.0	22.3	28.4	1459	497	7.17	4.19	146	99.4	181	112	1206	172	0.583	44.9
	6.0	26.4	33.6	1703	577	7.12	4.14	170	115	213	132	1417	200	0.579	37.9
	8.0	33.9	43.2	2091	705	6.95	4.04	209	141	267	165	1811	250	0.566	29.5
	10.0	41.3	52.6	2444	818	6.82	3.94	244	164	318	195	2154	292	0.557	24.2
200 x 120	4.0	19.3	24.5	1353	618	7.43	5.02	135	103	164	115	1345	172	0.626	51.9
	5.0	23.8	30.4	1649	750	7.37	4.97	165	125	201	141	1652	210	0.623	42.0
	6.0	28.3	36.0	1929	874	7.32	4.93	193	146	237	166	1947	245	0.619	35.4
	8.0	36.5	46.4	2386	1079	7.17	4.82	239	180	298	209	2507	308	0.606	27.4
	10.0	44.4	56.6	2806	1262	7.04	4.72	281	210	356	250	3007	364	0.597	22.5
200 x 150	4.0	21.2	26.9	1584	1021	7.67	6.16	158	136	187	154	1942	219	0.686	47.3
	5.0	26.2	33.4	1935	1245	7.62	6.11	193	166	230	189	2391	267	0.683	38.2
	6.0	31.1	39.6	2268	1457	7.56	6.06	227	194	271	223	2826	313	0.679	32.1
	8.0	40.2	51.2	2829	1816	7.43	5.95	283	242	344	283	3665	396	0.666	24.9
	10.0	49.1	62.6	3348	2143	7.31	5.85	335	286	413	339	4428	471	0.657	20.4
250 x 150	5.0	30.1	38.4	3304	1508	9.28	6.27	264	201	320	225	3285	337	0.783	33.2
	6.0	35.8	45.6	3886	1768	9.23	6.23	311	236	378	266	3886	396	0.779	27.9
	8.0	46.5	59.2	4886	2219	9.08	6.12	391	296	482	340	5050	504	0.766	21.5
	10.0	57.0	72.6	5825	2634	8.96	6.02	466	351	582	409	6121	602	0.757	17.6
	12.0	66.0	84.1	6458	2925	8.77	5.90	517	390	658	463	7088	684	0.738	15.2
	12.5	68.3	87.0	6633	3002	8.73	5.87	531	400	678	477	7315	704	0.736	14.6
300 x 100	6.0	35.8	45.6	4777	842	10.2	4.30	318	168	411	188	2403	306	0.779	27.9
	8.0	46.5	59.2	5978	1045	10.0	4.20	399	209	523	238	3080	385	0.766	21.5
	10.0	57.0	72.6	7106	1224	9.90	4.11	474	245	631	285	3681	455	0.757	17.6
	12.5	68.3	87.0	8010	1374	9.59	3.97	534	275	732	330	4292	521	0.736	14.6
300 x 200	6.0	45.2	57.6	7370	3962	11.3	8.29	491	396	588	446	8115	651	0.979	22.1
	8.0	59.1	75.2	9389	5042	11.2	8.19	626	504	757	574	10627	838	0.966	16.9
	10.0	72.7	92.6	11313	6058	11.1	8.09	754	606	921	698	12987	1012	0.957	13.8
	12.0	84.8	108	12788	6854	10.9	7.96	853	685	1056	801	15236	1167	0.938	11.8
	12.5	88.0	112	13179	7060	10.8	7.94	879	706	1091	828	15768	1204	0.936	11.4
400 x 200	8.0	71.6	91.2	18974	6517	14.4	8.45	949	652	1173	728	15820	1133	1.17	14.0
	10.0	88.4	113	23003	7864	14.3	8.36	1150	786	1434	888	19368	1373	1.16	11.3
	12.0	104	132	26248	8977	14.1	8.24	1312	898	1656	1027	22782	1591	1.14	9.6
	12.5	108	137	27100	9260	14.1	8.22	1355	926	1714	1062	23594	1644	1.14	9.30

Varmvalsede kanalstål, UNP

Statiske verdier iflg NS 1911
Toleranser i flg NS-EN 10 279

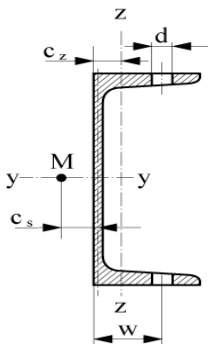
Innvendig skrå flensflater:
8 % ved profiler med h ≤ 300 mm
5% ved profiler med h > 300 mm



Beteg-nelse	Masse kg/m[1)]	Mål i mm						Tverr-snitt mm^2 x10^3	Overflate		I_t mm^4 x10^3	I_w mm^6 x10^6	Profilfaktor i (m^{-1}) A_m/V og A_p/V			
		H	B	s	t	r	h_1 [2)]		m^2/m	m^2/t						
UNP 30	4,27	30	33	5	7	3,5	1	0,544	0,174	40,7	9,12	4,36	320	232	259	171
UNP 40	4,87	40	35	5	7	3,5	11	0,621	0,199	40,9	10,0	11,9	320	242	264	185
UNP 50	5,59	50	38	5	7	3,5	20	0,712	0,232	41,5	11,2	27,8	326	247	272	194
UNP 60	5,07	60	30	6	6	3	29	0,646	0,215	42,4	9,39	21,9	333	279	286	232
UNP 65	7,09	65	42	5,5	7,5	4	33	0,903	0,273	38,5	16,1	77,3	302	237	256	190
UNP 80	8,64	80	45	6	8	4	46	1,10	0,312	36,1	21,6	168	284	227	244	186
UNP 100	10,6	100	50	6	8,5	4,5	64	1,35	0,372	35,1	28,1	414	277	223	239	186
UNP 120	13,4	120	55	7	9	4,5	82	1,70	0,434	32,4	41,5	900	253	206	220	174
UNP 140	16,0	140	60	7	10	5	98	2,04	0,489	30,6	56,8	1800	239	196	210	167
UNP 160	18,8	160	65	7,5	10,5	5,5	115	2,40	0,546	29,0	73,9	3260	227	187	200	160
UNP 180	22,0	180	70	8	11	5,5	133	2,80	0,611	27,8	95,5	5570	216	179	191	154
UNP 200	25,3	200	75	8,5	11,5	6	151	3,22	0,661	26,1	119	9070	205	171	182	148
UNP 220	29,4	220	80	9	12,5	6,5	167	3,74	0,718	24,4	160	14600	192	160	170	139
UNP 240	33,2	240	85	9,5	13	6,5	184	4,23	0,775	23,3	197	22100	183	154	163	134
UNP 260	37,9	260	90	10	14	7	200	4,83	0,834	22,0	255	33300	172	145	154	126
UNP 280	41,8	280	95	10	15	7,5	216	5,33	0,890	21,3	310	48500	167	140	149	123
UNP 300	46,2	300	100	10	16	8	232	5,88	0,950	20,6	374	69100	162	136	145	119
UNP 320	59,5	320	100	14	17,5	8,75	246	7,58	0,982	16,5	667	96100	130	111	117	98
UNP 350	60,6	350	100	14	16	8	282	7,73	1,05	17,3	612	114000	135	117	122	104
UNP 380	63,1	380	102	13,5	16	8	312	8,04	1,11	17,7	591	146000	139	120	126	107
UNP 400	71,8	400	110	14	18	9	324	9,15	1,18	16,5	816	221000	129	111	117	99

1) Når partier ved levering fra lager ikke blir veid, brukes ved fakturering konvensjonell handelsvekt som er ca 2% høyere enn tabellverdiene.

2) Avrundet nedover



Beteg-nelse	For bøyningsakse								c_z	c_s	Flenshull		Klasser i.h.h.t NS-EN 1993-1-1	
	y - y				z - z						Avst.	Diam.	Bare bøyning y-y akse	Bare trykk
	I_y mm^4 x10^6	$W_{el.y}$ mm^3 x10^3	i_y mm	$W_{pl.y}$ mm^3 x10^3	I_z mm^4 x10^6	$W_{el.z}$ mm^3 x10^3	i_z mm	$W_{pl.z}$ mm^3 x10^3	mm	mm	w mm	d mm	S355	S355
UNP 30	0,064	4,26	10,8	5,06	0,0533	2,68	9,9	4,57	13,1	12,6	20	-	-	-
UNP 40	0,141	7,05	15,0	8,40	0,0668	3,08	10,4	4,55	13,3	13,4	20	-	-	-
UNP 50	0,264	10,6	19,2	12,6	0,0912	3,75	11,3	6,96	13,7	14,5	20	-	-	-
UNP 60	0,316	10,5	22,1	12,5	0,0451	2,16	8,4	4,27	9,1	8,9	18	-	-	-
UNP 65	0,575	17,7	25,2	21,0	0,141	5,07	12,5	9,63	14,2	15,6	25	-	-	-
UNP 80	1,060	26,5	31,0	31,8	0,194	6,36	13,3	12,2	14,5	16,2	25	13	1	1
UNP 100	2,060	41,2	39,1	49,0	0,293	8,49	14,7	16,5	15,5	18,1	30	13	1	1
UNP 120	3,640	60,7	46,2	72,6	0,432	11,1	15,9	21,5	16,0	18,8	30	17/13	1	1
UNP 140	6,050	86,4	54,5	103	0,627	14,8	17,5	28,8	17,5	21,2	35	17	1	1
UNP 160	9,250	116	62,1	138	0,853	18,3	18,9	35,8	18,4	22,5	35	21/17	1	1
UNP 180	13,50	150	69,5	179	1,14	22,4	20,2	43,7	19,2	23,8	40	21	1	1
UNP 200	19,10	191	77,0	228	1,48	27,0	21,4	52,7	20,1	25,1	40	23/21	1	1
UNP 220	26,90	245	84,8	292	1,97	33,6	23,0	65,4	21,4	26,9	45	23	1	1
UNP 240	36,00	300	92,2	358	2,48	39,6	24,2	76,8	22,3	28,1	45	25/23	1	1
UNP 260	48,20	371	99,9	442	3,17	47,7	25,6	92,9	23,6	30,0	50	25	1	1
UNP 280	62,80	448	109	532	3,99	57,2	27,4	111	25,3	32,4	50	25	1	1
UNP 300	80,30	535	117	632	4,95	67,8	29,0	131	27,0	35,1	55	28	1	1
UNP 320	108,7	679	121	826	5,97	80,6	28,1	153	26,0	31,0	57	28	1	1
UNP 350	128,4	734	129	918	5,70	75,0	27,2	143	24,0	28,5	57	28	1	1
UNP 380	157,6	829	140	1014	6,15	78,7	27,7	150	23,8	30,0	60	28	1	1
UNP 400	203,5	1020	149	1236	8,46	102	30,4	194	26,5	33,6	60	28	1	1

I = annet arealmoment

W_{el} = tverrsnittsmodul

i = treghetsradius

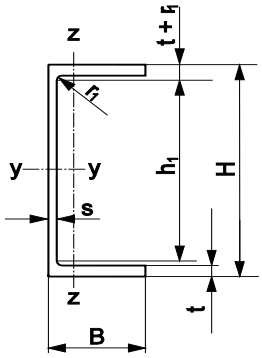
I_w = hvelvingsmotstand

I_t = annet arealmoment for torsjon

W_{pl} = plastisk tverrsnittsmodul

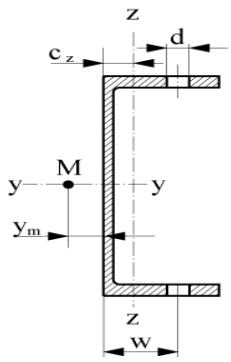
Varmvalsede kanalstål med parallelle flenser, UPE

Dimensjoner etter DIN 1026-2
Toleranser iflg NS-EN 10279



Beteg-nelse	Masse kg/m[1)]	Mål i mm					Tverr-snitt mm^2	Overflate m^2/m	I_t mm^4 x10^3	I_w mm^6 x10^6	Profilfaktor i (m^{-1}) A_m/V og A_p/V			
		H	B	s	t	r_1								
UPE 80	7,9	80	50	4	7	10	1010	0,343	14,7	238	341	258	291	209
UPE 100	9,82	100	55	4,5	7,5	10	1250	0,402	20,1	569	322	248	278	204
UPE 120	12,1	120	60	5	8	12	1540	0,46	29	1199	298	233	259	195
UPE 140	14,5	140	65	5	9	12	1840	0,52	40,5	2340	282	223	247	187
UPE 160	17	160	70	5,5	9,5	12	2170	0,579	52	4184	267	212	235	180
UPE 180	19,7	180	75	5,5	10,5	12	2510	0,639	69,9	7165	254	203	224	173
UPE 200	22,8	200	80	6	11	13	2900	0,697	88,9	11570	240	193	213	165
UPE 220	26,6	220	85	6,5	12	13	3390	0,756	121	18460	223	180	198	155
UPE 240	30,2	240	90	7	12,5	15	3850	0,813	151	27780	211	171	188	148
UPE 270	35,2	270	95	7,5	13,5	15	4480	0,892	199	45570	199	163	178	142
UPE 300	44,4	300	100	9,5	15	15	5660	0,968	315	75510	171	141	153	124
UPE 330	53,2	330	105	11	16	18	6780	1,043	452	116400	154	128	138	113
UPE 360	61,2	360	110	12	17	18	7790	1,121	585	172400	144	121	130	107
UPE 400	72,2	400	115	13,5	18	18	9190	1,218	791	266400	132	112	120	100

1) Når partier ved levering fra lager ikke blir veid, brukes ved fakturering konvensjonell handelsvekt som er ca 2% høyere enn tabellverdiene.



Beteg-nelse	For bøyningsakse								c_z	y_m	Flenshull		Klasser i.h.h.t NS-EN 1993-1-1			
	y - y				z - z						Avst.	Diam.	Bare bøyning y-y akse		Bare trykk	
	I_y mm^4 $x10^3$	$W_{el.y}$ mm^3 $x10^3$	i_y mm	$W_{pl.y}$ mm^3 $x10^3$	I_z mm^4 $x10^3$	$W_{el.z}$ mm^3 $x10^3$	i_z mm	$W_{pl.z}$ mm^3 $x10^3$	mm	mm	w mm	d mm	S355	S460	S355	S460
UPE 80	1070	26,8	32,6	31,2	254	7,98	15,9	14,1	18,17	37,1	30	13	1	1	1	1
UPE 100	2070	41,4	40,7	48	382	10,6	17,5	18,9	19,06	39,3	35	13	1	2	1	2
UPE 120	3640	60,6	48,6	70,3	554	13,8	19	24,8	19,83	41,2	35	17/13	1	2	1	2
UPE 140	5990	85,6	57,1	98,8	787	18,2	20,7	32,6	21,73	45,4	40	17	1	2	1	2
UPE 160	9110	114	64,8	132	1070	22,6	22,2	40,7	22,7	47,6	40	21/17	1	2	1	2
UPE 180	13530	150	73,4	173	1440	28,6	23,9	51,3	24,68	51,9	45	21	1	1	1	2
UPE 200	19090	191	81,1	220	1870	34,4	25,4	62,2	25,6	54,1	45	23/21	1	2	1	2
UPE 220	26820	244	89	281	2460	42,5	27	76,9	27,03	57	50	23	1	1	1	2
UPE 240	35990	300	96,7	347	3110	50,1	28,4	90,8	27,92	59,1	50	25/23	1	2	1	2
UPE 270	52550	389	108	451	4010	60,7	29,9	110	28,93	61,4	55	25	1	1	2	3
UPE 300	78230	522	118	613	5380	75,6	30,8	137	28,87	60,3	60	28	1	1	1	2
UPE 330	110080	667	127	792	6810	89,7	31,7	162	29	60	65	28	1	1	1	2
UPE 360	148250	824	138	982	8440	105	32,9	189	29,7	61,2	70	28	1	1	1	2
UPE 400	209810	1049	151	1263	10450	123	33,7	221	29,77	60,6	75	28	1	1	1	2

I = annet arealmoment

W_{el} = tverrsnittsmodul

i = treghetsradius

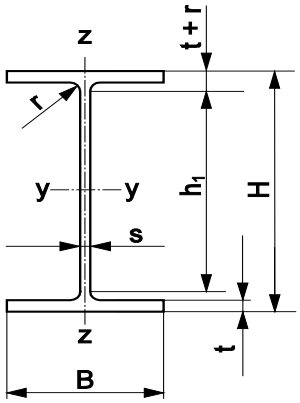
I_w = hvelvingsmotstand

I_t = annet arealmoment for torsjon

W_{pl} = plastisk tverrsnittsmodul

Varmvalsede IPE-bjelker

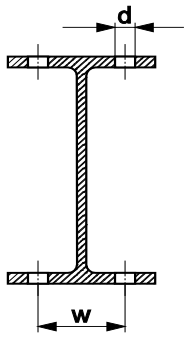
Dimensjoner etter EURONORM 19
Statiske verdier iflg NS-EN 10 034



Beteg-nelse	Masse kg/m[1)]	Mål i mm						Tverr-snitt mm^2 x10^3	Overflate		Profilfaktor i (m^{-1}) A_m/V og A_p/V			
		H	B	s	t	r	h_1 [2)]		m^2/m	m^2/t				
IPE 80	6	80	46	3,8	5,2	5	59	0,764	0,328	54,8	430	329	370	269
IPE 100	8,1	100	55	4,1	5,7	7	74	1,03	0,400	49,5	389	301	335	247
IPE 120	10,4	120	64	4,4	6,3	7	93	1,32	0,475	45,6	359	278	310	230
IPE 140	12,9	140	73	4,7	6,9	7	112	1,64	0,551	42,6	335	259	290	215
IPE 160	15,8	160	82	5,0	7,4	9	127	2,01	0,623	39,4	309	240	268	200
IPE 180	18,8	180	91	5,3	8,0	9	146	2,39	0,698	37,1	292	226	254	188
IPE 200	22,4	200	100	5,6	8,5	12	159	2,85	0,768	34,3	269	210	234	175
IPE 220	26,2	220	110	5,9	9,2	12	177	3,34	0,848	32,4	253	197	221	164
IPE 240	30,7	240	120	6,2	9,8	15	190	3,91	0,922	30,0	235	184	204	153
IPE 270	36,1	270	135	6,6	10,2	15	219	4,59	1,04	28,8	226	176	197	147
IPE 300	42,2	300	150	7,1	10,7	15	248	5,38	1,16	27,5	215	167	187	139
IPE 330	49,1	330	160	7,5	11,5	18	271	6,26	1,25	25,5	199	156	174	131
IPE 360	57,1	360	170	8,0	12,7	18	298	7,27	1,35	23,6	185	145	162	122
IPE 400	66,3	400	180	8,6	13,5	21	331	8,45	1,47	22,2	174	137	152	116
IPE 450	77,6	450	190	9,4	14,6	21	378	9,88	1,61	20,7	163	129	143	110
IPE 500	90,7	500	200	10,2	16,0	21	426	11,6	1,74	19,2	150	120	132	103
IPE 550	106	550	210	11,1	17,2	24	467	13,4	1,88	17,7	140	113	124	97
IPE 600	122	600	220	12,0	19,0	24	514	15,6	2,01	16,6	129	105	115	91

1) Når partier ved levering fra lager ikke blir veid, brukes ved fakturering konvensjonell handelsvekt som er ca 2% høyere enn tabellverdiene.

2) Avrundet nedover



Beteg-nelse	For bøyningsakse								I_t	I_w	Flenshull		Klasser i.h.h.t NS-EN 1993-1-1			
	y - y				z - z								Bare bøyning y-y akse		Bare trykk	
	I_y mm^4 $x10^6$	$W_{el.y}$ mm^3 $x10^3$	i_y mm	$W_{pl.y}$ mm^3 $x10^3$	I_z mm^4 $x10^6$	$W_{el.z}$ mm^3 $x10^3$	i_z mm	$W_{pl.z}$ mm^3 $x10^3$	mm^4 $x10^3$	mm^6 $x10^9$	Avst. w mm	Diam. d mm	S355	S460	S355	S460
IPE 80	0,801	20,0	32,4	23,2	0,085	3,69	10,5	5,50	7,0	0,118	26	-	1	-	1	-
IPE 100	1,71	34,2	40,7	39,4	0,159	5,79	12,4	8,62	12,1	0,351	30	-	1	-	1	-
IPE 120	3,18	53,0	49,0	60,8	0,277	8,65	14,5	12,9	17,4	0,890	36	-	1	1	1	1
IPE 140	5,41	77,3	57,4	88,4	0,449	12,3	16,5	18,4	24,5	1,981	40	-	1	1	1	2
IPE 160	8,69	109	65,8	124	0,683	16,7	18,4	24,9	36,2	3,959	44	13	1	1	1	2
IPE 180	13,2	146	74,2	166	1,01	22,2	20,5	33,1	48,0	7,431	50	13	1	1	2	3
IPE 200	19,4	194	82,1	220	1,42	28,5	22,4	42,5	70,2	12,99	56	13	1	1	2	3
IPE 220	27,7	252	91,1	286	2,05	37,3	24,8	55,7	91,0	22,67	60	17	1	1	2	4
IPE 240	38,9	324	99,7	366	2,84	47,3	26,9	70,6	129	37,39	68	17	1	1	2	4
IPE 270	57,9	429	112	484	4,20	62,2	30,2	93,0	160	70,58	72	21/17	1	1	3	4
IPE 300	83,6	557	125	628	6,04	80,5	33,5	120	202	125,9	80	23	1	1	4	4
IPE 330	117,7	713	137	804	7,88	98,5	35,5	147	283	199,1	86	25/23	1	1	4	4
IPE 360	162,7	904	150	1020	10,4	123	37,9	184	375	313,6	90	25	1	1	4	4
IPE 400	231,3	1160	165	1308	13,2	146	39,5	219	514	490	96	28/25	1	1	4	4
IPE 450	337,4	1500	185	1702	16,8	176	41,2	264	671	791	106	28	1	1	4	4
IPE 500	482,0	1930	204	2200	21,4	214	43,1	320	897	1249	110	28	1	1	4	4
IPE 550	671,2	2440	223	2780	26,7	254	44,5	379	1240	1884	116	28	1	1	4	4
IPE 600	920,8	3070	243	3520	33,9	308	46,6	460	1660	2846	120	28	1	1	4	4

I = annet arealmoment

W_{el} = tverrsnittsmodul

i = treghetsradius

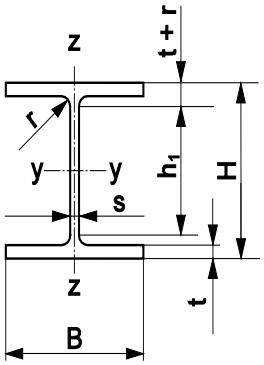
I_w = hvelvingsmotstand

I_t = annet arealmoment for torsjon

W_{pl} = plastisk tverrsnittsmodul

Varmvalsede HE-A-bjelker

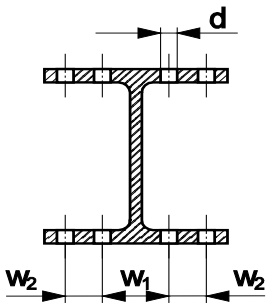
Dimensjoner etter EURONORM 53
Statiske verdier iflg. NS-EN 10 034



Betegnelse	Masse kg/m[1)]	Mål i mm						Tverr-snitt $mm^2 x10^3$	Overflate		Profilfaktor i (m^{-1}) A_m/V og A_p/V			
		H	B	s	t	r	h_1 [2)]		m^2/m	m^2/t				
HE 100 A	16,7	96	100	5	8	12	56	2,12	0,561	33,6	265	184	217	137
HE 120 A	19,9	114	120	5	8	12	74	2,53	0,677	34,1	267	185	220	137
HE 140 A	24,7	133	140	5,5	8,5	12	92	3,14	0,794	32,2	252	173	208	129
HE 160 A	30,4	152	160	6	9	15	104	3,88	0,906	29,8	230	160	189	119
HE 180 A	35,5	171	180	6	9,5	15	122	4,53	1,02	28,9	225	155	185	115
HE 200 A	42,3	190	200	6,5	10	18	134	5,38	1,14	26,8	211	145	174	107
HE 220 A	50,5	210	220	7	11	18	152	6,43	1,26	24,9	196	133	161	99
HE 240 A	60,3	230	240	7,5	12	21	164	7,68	1,37	22,7	178	122	147	91
HE 260 A	68,2	250	260	7,5	12,5	24	177	8,68	1,48	21,8	170	117	140	87
HE 280 A	76,4	270	280	8	13	24	196	9,73	1,60	21,0	164	113	135	84
HE 300 A	88,3	290	300	8,5	14	27	208	11,2	1,72	19,4	152	104	126	78
HE 320 A	97,6	310	300	9	15,5	27	225	12,4	1,76	18,0	141	98	117	74
HE 340 A	105	330	300	9,5	16,5	27	243	13,3	1,79	17,1	134	94	111	71
HE 360 A	112	350	300	10	17,5	27	261	14,3	1,83	16,4	128	91	107	70
HE 400 A	125	390	300	11	19	27	298	15,9	1,91	15,3	120	86	101	67
HE 450 A	140	440	300	11,5	21	27	344	17,8	2,01	14,4	112	83	96	66
HE 500 A	155	490	300	12	23	27	390	19,8	2,11	13,6	106	80	91	64
HE 550 A	166	540	300	12,5	24	27	438	21,2	2,21	13,3	104	79	90	65
HE 600 A	178	590	300	13	25	27	486	22,6	2,31	13,0	102	78	88	65
HE 650 A	190	640	300	13,5	26	27	534	24,2	2,41	12,7	99	77	87	65
HE 700 A	204	690	300	14,5	27	27	582	26,0	2,50	12,3	96	76	84	64
HE 800 A	224	790	300	15	28	30	674	28,6	2,70	12,0	94	76	83	65
HE 900 A	252	890	300	16	30	30	770	32,0	2,90	11,5	90	74	81	64
HE 1000 A	272	990	300	16,5	31	30	868	34,7	3,10	11,4	89	74	80	65

1) Når partier ved levering fra lager ikke blir veid, brukes ved fakturering konvensjonell handelsvekt som er ca 2% høyere enn tabellverdiene.

2) Avrundet nedover



Betegnelse	For bøyningsakse								I_t	I_w	Flenshull			Klasser i.h.h.t NS-EN 1993-1-1			
	y - y				z - z						Avstand		Diam.	Bare bøyning y-y akse		Bare trykk	
	I_y mm^4 x10^6	$W_{el.y}$ mm^3 x10^3	i_y mm	$W_{pl.y}$ mm^3 x10^3	I_z mm^4 x10^6	$W_{el.z}$ mm^3 x10^3	i_z mm	$W_{pl.z}$ mm^3 x10^3	mm^4 x10^3	mm^6 x10^9	w_1 mm	w_2 mm	d mm	S355	S460	S355	S460
HE 100 A	3,49	72,8	40,6	83	1,34	26,8	25,1	40,0	52,6	2,581	56	-	13	1	1	1	1
HE 120 A	6,06	106	48,9	119	2,31	38,5	30,2	57,6	60,2	6,472	66	-	17	1	2	1	2
HE 140 A	10,3	155	57,3	173	3,89	55,6	35,2	83,3	81,6	15,06	76	-	21	2	3	2	3
HE 160 A	16,7	220	65,7	246	6,16	76,9	39,8	115	123	31,41	86	-	23	2	3	2	3
HE 180 A	25,1	294	74,5	324	9,25	103	45,2	154	149	60,21	100	-	25	3	3	3	3
HE 200 A	36,9	389	82,8	430	13,4	134	49,8	200	211	108,0	110	-	25	3	3	3	3
HE 220 A	54,1	515	91,7	568	19,5	178	55,1	266	286	193,3	120	-	25	3	3	3	3
HE 240 A	77,6	675	101	744	27,7	231	60,0	346	417	328,5	94	35	25	3	3	3	3
HE 260 A	104,5	836	110	920	36,7	282	65,0	423	526	516,4	100	40	25	3	3	3	3
HE 280 A	136,7	1010	119	1112	47,6	340	70,0	510	624	785,4	110	45	25	3	4	3	4
HE 300 A	182,6	1260	127	1384	63,1	421	74,9	630	856	1200	120	45	28	3	3	3	3
HE 320 A	229,3	1480	136	1628	69,9	466	74,9	698	1080	1512	120	45	28	3	3	3	3
HE 340 A	276,9	1680	144	1850	74,4	496	74,6	743	1280	1824	120	45	28	3	3	3	3
HE 360 A	330,9	1890	152	2080	78,9	526	74,3	788	1490	2177	120	45	28	2	3	2	3
HE 400 A	450,7	2310	168	2560	85,6	571	73,4	855	1900	2942	120	45	28	1	3	2	3
HE 450 A	637,2	2900	189	3220	94,7	631	72,9	945	2450	4148	120	45	28	1	1	2	3
HE 500 A	869,7	3550	210	3940	103,7	691	72,4	1035	3100	5643	120	45	28	1	1	3	4
HE 550 A	1119	4150	230	4620	108,2	721	71,5	1080	3530	7189	120	45	28	1	1	4	4
HE 600 A	1412	4790	250	5360	112,7	751	70,5	1125	3990	8978	120	45	28	1	1	4	4
HE 650 A	1752	5470	269	6140	117,2	782	69,7	1170	4500	11027	120	45	28	1	1	4	4
HE 700 A	2153	6240	288	7040	121,8	812	68,4	1215	5150	13352	120	45	28	1	1	4	4
HE 800 A	3034	7680	326	8700	126,4	843	66,5	1260	5990	18290	130	40	28	1	1	4	4
HE 900 A	4221	9480	363	10820	135,5	903	65,0	1350	7390	24962	130	40	28	1	1	4	4
HE 1000 A	5538	11190	400	12820	140,0	934	63,5	1395	8250	32074	130	40	28	1	2	4	4

I = annet arealmoment

W_{el} = tverrsnittsmodul

i = treghetsradius

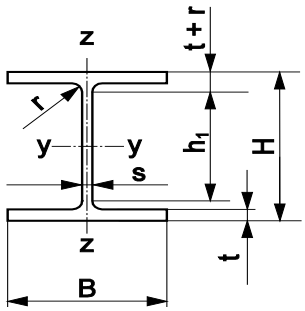
I_w = hvelvingsmotstand

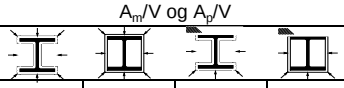
I_t = annet arealmoment for torsjon

W_{pl} = plastisk tverrsnittsmodul

Varmvalsede HE-B-bjelker

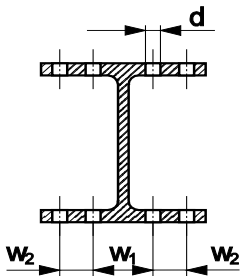
Dimensjoner etter EURONORM 53
Statiske verdier iflg NS-EN 10 034



Betegnelse	Masse kg/m[1)]	Mål i mm						Tverr-snitt mm^2 x10^3	Overflate		Profilfaktor i (m^{-1}) A_m/V og A_p/V			
		H	B	s	t	r	h_1 [2)]		m^2/m	m^2/t				
HE 100 B	20,4	100	100	6	10	12	56	2,6	0,567	27,8	218	153	179	115
HE 120 B	26,7	120	120	6,5	11	12	74	3,4	0,686	25,7	201	141	166	105
HE 140 B	33,7	140	140	7	12	12	92	4,3	0,805	23,9	187	130	154	97
HE 160 B	42,6	160	160	8	13	15	104	5,43	0,918	21,5	169	117	139	88
HE 180 B	51,2	180	180	8,5	14	15	122	6,53	1,04	20,3	157	110	130	82
HE 200 B	61,3	200	200	9	15	18	134	7,81	1,15	18,8	147	102	121	76
HE 220 B	71,5	220	220	9,5	16	18	152	9,1	1,27	17,8	139	96	115	72
HE 240 B	83,2	240	240	10	17	21	164	10,6	1,38	16,6	130	90	107	67
HE 260 B	93	260	260	10	17,5	24	177	11,8	1,5	16,1	126	87	104	65
HE 280 B	103	280	280	10,5	18	24	196	13,1	1,62	15,7	123	85	102	63
HE 300 B	117	300	300	11	19	27	208	14,9	1,73	14,8	116	80	95	60
HE 320 B	127	320	300	11,5	20,5	27	225	16,1	1,77	13,9	109	76	91	58
HE 340 B	134	340	300	12	21,5	27	243	17,1	1,81	13,4	105	74	88	57
HE 360 B	142	360	300	12,5	22,5	27	261	18,1	1,85	13	102	73	85	56
HE 400 B	155	400	300	13,5	24	27	298	19,8	1,93	12,4	97	70	82	55
HE 450 B	171	450	300	14	26	27	344	21,8	2,03	11,8	91	68	77	55
HE 500 B	187	500	300	14,5	28	27	390	23,9	2,12	11,4	88	67	76	54
HE 550 B	199	550	300	15	29	27	438	25,4	2,22	11,2	87	66	75	55
HE 600 B	212	600	300	15,5	30	27	486	27	2,32	11	85	66	74	55
HE 650 B	225	650	300	16	31	27	534	28,6	2,42	10,8	84	66	74	55
HE 700 B	241	700	300	17	32	27	582	30,6	2,52	10,5	82	65	72	55
HE 800 B	262	800	300	17,5	33	30	674	33,4	2,71	10,3	81	65	72	56
HE 900 B	291	900	300	18,5	35	30	770	37,1	2,91	10	78	64	70	56
HE 1000 B	314	1000	300	19	36	30	868	40	3,11	9,9	77	65	70	57

1) Når partier ved levering fra lager ikke blir veid, brukes ved fakturering konvensjonell handelsvekt som er ca 2% høyere enn tabellverdiene.

2) Avrundet nedover



Beteg-nelse	For bøyningsakse								I_t	I_w	Flenshull			Klasser i.h.h.t NS-EN 1993-1-1			
	y - y				z - z						Avstand		Diam.	Bare bøyning y-y akse		Bare trykk	
	I_y	$W_{el.y}$	i_y	$W_{pl.y}$	I_z	$W_{el.z}$	i_z	$W_{pl.z}$			w_1	w_2	d				
	mm^4	mm^3	mm	mm^3	mm^4	mm^3	mm	mm^3	mm^4	mm^6	mm	mm	mm	S355	S460	S355	S460
	$x10^6$	$x10^3$		$x10^3$	$x10^6$	$x10^3$		$x10^3$	$x10^3$	$x10^9$							
HE 100 B	4,5	88,9	41,6	104	1,67	33,5	25,3	50	92,9	3,375	56	-	13	1	1	1	1
HE 120 B	8,64	144	50,4	165	3,18	52,9	30,6	79,2	139	9,41	66	-	17	1	1	1	1
HE 140 B	15,1	216	59,3	246	5,5	78,5	35,8	118	201	22,48	76	-	21	1	1	1	1
HE 160 B	24,9	311	67,8	354	8,89	111	40,5	166	314	47,94	86	-	23	1	1	1	1
HE 180 B	38,3	426	76,6	482	13,6	151	45,7	227	423	93,75	100	-	25	1	1	1	1
HE 200 B	57	570	85,4	642	20	200	50,7	300	595	171,1	110	-	25	1	1	1	1
HE 220 B	80,9	736	94,3	828	28,4	258	55,9	387	768	295,4	120	-	25	1	1	1	1
HE 240 B	112,6	938	103	1054	39,2	327	60,8	490	1030	486,9	96	35	25	1	1	1	1
HE 260 B	149,2	1150	112	1282	51,3	395	65,8	592	1240	753,7	106	40	25	1	2	1	2
HE 280 B	192,7	1380	121	1534	65,9	471	70,9	706	1440	1130	110	45	25	1	2	1	2
HE 300 B	251,7	1680	130	1868	85,6	571	75,8	855	1860	1688	120	45	28	1	3	1	3
HE 320 B	308,2	1930	138	2140	92,4	616	75,7	923	2260	2069	120	45	28	1	2	1	2
HE 340 B	366,6	2160	146	2400	96,9	646	75,3	968	2580	2454	120	45	28	1	1	1	1
HE 360 B	431,9	2400	155	2680	101,4	676	74,9	1013	2930	2883	120	45	28	1	1	1	1
HE 400 B	576,8	2880	171	3240	108,2	721	74	1080	3570	3817	120	45	28	1	1	1	1
HE 450 B	798,9	3550	191	3980	117,2	781	73,3	1170	4420	5258	120	45	28	1	1	1	2
HE 500 B	1072	4290	212	4820	126,2	842	72,7	1260	5400	7018	120	45	28	1	1	2	2
HE 550 B	1367	4970	232	5600	130,8	872	71,7	1305	6020	8856	120	45	28	1	1	2	3
HE 600 B	1710	5700	252	6420	135,3	902	70,8	1350	6690	10965	120	45	28	1	1	3	4
HE 650 B	2106	6480	271	7320	139,8	932	69,9	1395	7410	13363	120	45	28	1	1	3	4
HE 700 B	2569	7340	290	8320	144,4	963	68,7	1440	8330	16064	126	45	28	1	1	4	4
HE 800 B	3591	8980	328	10220	149	994	66,8	1485	9490	21840	130	40	28	1	1	4	4
HE 900 B	4941	10980	365	12580	158,2	1050	65,3	1575	11400	29461	130	40	28	1	1	4	4
HE 1000 B	6447	12890	401	14860	162,8	1090	63,8	1620	12600	37637	130	40	28	1	1	4	4

I = annet arealmoment

W_{el} = tverrsnittsmodul

i = treghetsradius

I_w = hvelvingsmotstand

I_t = annet arealmoment for torsjon

W_{pl} = plastisk tverrsnittsmodul

Strekkmetall - lagerførte typer og artikler

Artikkel Nr.	Kantprofil	Type	Dimensjon BxT mm	Lysåpning	Utførelse	Stnd. lengde mm	Vekt pr. stk	
312896	UF3		12.7x0.9	1,78	Stål, ubh.	2 540	0,46	
312897	UF4		19.0x1.2	1,78	Stål, ubh.	3 810	1,45	
312898	UF7		19.0x1.2	3,3	Stål, ubh.	3 810	1,45	
312899	UF13		25.4x2.95	10,16	Stål, ubh.	3 810	4,57	
312900	UF18		19.05x1.2	6,5	Stål, ubh.	3 810	1,60	
312901	UF19		31.75x1.2	6,5	Stål, ubh.	3 810	2,52	
Artikkel Nr.	**EMC Nr.**	**Type**	**Format mm**	**Maskeåpning mm**	**Strenger BxT mm**	**Utførelse**	**Vekt pr. stk**	**% Lysåpning**
312902	4593	Vanlig TS	2440x2000	114.3x40.64	7.92x4.5	Stål, ubh.	67,16	61
312903	4593	Vanlig TS	1000X2000	114.3x40.64	7.92x4.5	Stål, ubh.	27,53	61
312904	2496	Vanlig TS	1000x2000	60.96x25.40	6.10x4.50	Stål, galv	38,04	52
312905	2496	Vanlig TS	1000x2000	60.96x25.40	6.10x4.50	Stål, ubh.	34,58	52
312906	2496	Vanlig TS	1300x2000	60.96x25.40	6.10x4.50	Stål, ubh.	44,95	52
312907	2496	Vanlig TS	2440x2000	60.96x25.40	6.10x4.50	Stål, ubh.	84,38	52
312908	1595	Vanlig LS	2440x1220	38.10x16.93	3.10x1.60	Stål, ubh.	13,60	63
312909	2491	Vanlig TS	1000x2285	60.96x25.40	6.10x3.00	Stål, ubh.	25,81	52
312910	2491	Vanlig TS	1200x2285	60.96x25.40	6.10x3.00	Stål, ubh.	30,97	52
312911	2491	Vanlig TS	1500x2285	60.96x25.40	6.10x3.00	Stål, ubh.	38,71	52
312912	2491	Vanlig TS	2000x2285	60.96x25.40	6.10x3.00	Stål, ubh.	51,61	52
312913	2074F	Flatv	1000X2000	50.80x21.77	4.32x3.00	Stål,galv	16,61	60
312914	2074F	Flatv	1200x2000	50.80x21.77	4.32x3.00	Stål, ubh.	18,12	60
312915	2074F	Flatv	1200X2000	50.80x21.77	4.32x3.00	Stål,galv	19,93	60
312916	2074F	Flatv	1200x2400	50.80x21.77	4.32x3.00	Stål, ubh.	21,74	60
312917	2074F	Flatv	1200x2400	50.80x21.77	4.32x3.00	Stål,galv	23,91	60
312918	3394F	Flatv	1220x2440	85.73x39.32	4.75X2.50	Stål, ubh.	11,83	76
312919	220	Finmask	1250x1250	5.84x3.50	0.79x0.60	Stål, ubh.	3,30	55
312920	269	Riblath	2500x600			Ribbe. Galv	1.74/2.22	
312921	N0647F	Flatv	2440x1220	38.10x16.93	2.13x1.20	Stål,galv	7,63	75
312922	N0710F	Flatv	1220x2440	85.73x39.32	4.75x3.00	Stål, ubh.	14,70	76
	N1059F	Flatv	2400x1200	76.20x33.86	5.99x4.50	Stål,galv	41,34	65
312923	1196	Vanlig LS	2440x1220	28.58x9.52	1.98x1.20	Stål, ubh.	11,67	58
312924	1280F	Flatv	2440x1220	30.48x11.72	2.36x1.20	Stål, ubh.	10,84	60
312925	1292	Vanlig TS	1220x1525	30.48x13.85	4.75x2.50	Stål, ubh.	25,00	31
312926	1576	Vanlig TS	900x2000	38.10x16.93	4.75x3.00	Stål, ubh.	23,76	44
312927	1576	Vanlig TS	1000x2000	38.10x16.93	4.75x3.00	Stål, ubh.	26,40	44
312928	1576	Vanlig TS	1200X2000	38.10x16.93	4.75x3.00	Stål, ubh.	31,68	44
312929	1576	Vanlig TS	1500x2000	38.10x16.93	4.75x3.00	Stål, ubh.	39,60	44
312930	2091	Vanlig LS	1220x2400	50.80x22.58	2.52x2.50	Stål, ubh.	13,01	78
312931	2490F	Flatv	1220x2440	60.96x23.44	5.5x4.00	Stål, ubh.	38,70	53
312932	2498	Vanlig LS	2440x1220	60.96x23.44	3.12x3.00	Stål, ubh.	18,63	73
312933	3092	Vanlig LS	1220x1830	76.20x33.86	3.58x3.00	Stål, ubh.	11,09	79
312934	3092	Vanlig LS	2440x1220	76.20x33.86	3.58x3.00	Stål, ubh.	14,79	79
312935	4898	Vanlig TS	2440x1220	121.92x33.86	9.53x4.50	Stål, ubh.	61,67	44
312936	N6664F	Flatv	1250x2500	8x5.98	1.4x0.7	Stål,galv	7,38	53
	N7367FG	Flatv	1200x2000	50.8x21.77	4.32x4.5	Stål,galv	26,54	60
	N7367FG	Flatv	1200x2400	50.8x21.77	4.32x4.5	Stål,galv	31,85	60
313341	602A	Finmask	1250x1250	5.84x3.38	1.17x0.56	Alumin	1,62	31
313342	2496A	Vanlig TS	2500x1250	60.96x25.4	5.82x4.70	Alumin	18,46	54
313343	2496A	Vanlig TS	1250x2800	60.96x25.4	5.82x4.70	Alumin	20,67	54

Belastningstabell for strekkmetall i bærende konstruksjoner.

Hver 4. maske sveiset til bærende konstruksjoner.

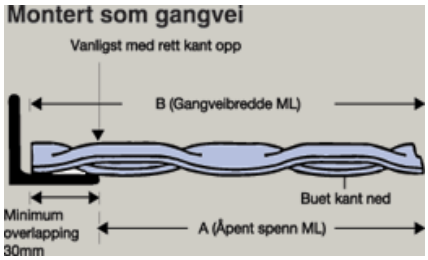
Type nr.	Største anbefalte spennvidde i mm 2)					
	A Åpent spenn (ML) Fordelt last			B Gangbredde (ML) Fordelt last		
	Kg/m^2			Kg/m^2		
	300	500	750	300	500	750
2492/stål 1)	668	548	484	732	612	548
4894/stål	1088	920	789	1152	984	853
4896/stål	606	546	485	670	610	549
4897/stål	789	606	551	853	670	615
4898/stål 1)	841	668	606	905	732	670
4899/stål	977	789	728	1041	853	792
488S 1S/rustfritt	606	546	485	670	610	615
2488S/rustfritt	668	548	484	732	612	548

1) På lager. Øvrige nr. leveres fra verk etter avtale.

2) Spennvidden **må** være i maskenes lengderetning hvor bære-evnen er størst.
Plateformat oppgis alltid med strekkmetallets lengderetning først.
(f.eks. 2440MLx1220mmMB) eller 100MLx2000mmMB)

Max nedbøyning 1/200 av spennvidde. Eksempel: 2492 med belastning
300Kg/m^2, for et åpent spenn. Anbefalt spennvidde 668mm : 200 = 3.34mm nedbøyning

Type nr.	Maske størrelse/ åpning mm	Strenger bredde x tykkelse mm	Total høyde mm ca.	Ca. Kg/m^2
2492/stål	60x25	6,1x4,5	11,5	17,0
4894/stål	121x38	13,0x6,0	21,5	32,2
4896/stål	121x34	6,35x4,5	13,0	13,2
4897/stål	121x34	7,9x4,5	15,3	16,5
4898/stål	121x34	9,5x4,5	16,5	19,8
4899/stål	121x36	9,5x6,0	18,5	25,0
488S 1S/rustfritt	121x34	6,35x5,0	13,0	15,3
2488S/rustfritt	60x25	6,1x5,0	12,0	19,6



Comparison Table for Point Load on Offshore Grating Steel Grade S235

Bearing bar grating	Free span (bearing bar)								
	Loading	600	750	900	1050	1200	1350	1500	1650
25/5 S235	D1	1,7	1,34	1,03	0,76	0,58	0,46	0,37	0,31
	D2	3,19	2,46	1,79	1,3	0,99	0,78	0,63	0,52
	D3	5,02	3,76	2,6	1,88	1,43	1,12	0,9	0,75
30/5 S235	D1	2,55	2	1,65	1,38	1,06	0,84	0,68	0,56
	D2	4,79	3,68	2,99	2,4	1,83	1,44	1,17	0,96
	D3	7,53	5,65	4,52	3,47	2,63	2,07	1,67	1,37
35/5 S235	D1	3,54	2,78	2,29	1,95	1,69	1,38	1,12	0,92
	D2	6,69	5,15	4,18	3,52	3,03	2,39	1,93	1,59
	D3	10,54	7,9	6,32	5,27	4,37	3,43	2,76	2,28
50/5 S235	D1	7,45	5,85	4,82	4,1	3,56	3,15	2,83	2,56
	D2	14,22	10,94	8,89	7,49	6,46	5,69	5,08	4,59
	D3	22,5	16,88	13,5	11,25	9,64	8,44	7,5	6,75

D1: 100x100
D2: 200x200
D3: 300x300

* Loading is based on max load each (D1)100x100, (D2)200x200 or (D3)300x300
* Based on L/200 or max deflection 10mm. NTJ suggest to use loading with max deflection not bigger than 4mm, but this will give a much bigger reduction for the load!
* 1kN = 100 kg.
* Material/steel quality is S235
* c/c for grating type TR-OSPss is 28,2x101,6mm, and it has serrated cross bar.
* Cells marked whit shades, is not recommended for ordinary use!

IMPORTANT: This calculation is absolutely MAX load's with **safety/breaking factor = 1** and this is to be used as an indication.
We **DO NOT GUARANTEE** the correctness of the results or information given in this table!

Comparison Table for Point Load on Offshore Grating Steel Grade S355

Bearing bar grating	Free span (bearing bar)								
	Loading	600	750	900	1050	1200	1350	1500	1650
25/5 S355	D1	2,33	1,49	1,03	0,76	0,58	0,46	0,37	0,31
	D2	4,14	2,6	1,79	1,3	0,99	0,78	0,63	0,52
	D3	6,23	3,83	2,6	1,88	1,43	1,12	0,9	0,75
30/5 S355	D1	3,85	2,73	1,89	1,38	1,06	0,84	0,68	0,56
	D2	7,23	4,78	3,29	2,4	1,83	1,44	1,17	0,96
	D3	11,38	7,05	4,79	3,47	2,63	2,07	1,67	1,37
35/5 S355	D1	5,35	4,2	3,11	2,28	1,75	1,38	1,12	0,92
	D2	10,11	7,77	5,44	3,97	3,03	2,39	1,93	1,59
	D3	15,92	11,69	7,94	5,75	4,37	3,43	2,76	2,28
50/5 S355	D1	11,26	8,84	7,28	6,19	5,38	4,26	3,45	2,85
	D2	21,49	16,53	13,43	11,31	9,46	7,45	6,03	4,97
	D3	33,99	25,49	20,39	16,99	13,69	10,75	8,67	7,14

D1: 100x100
D2: 200x200
D3: 300x300

* Loading is based on max load each (D1)100x100, (D2)200x200 or (D3)300x300
* Based on L/200 or max deflection 10mm. NTJ suggest to use loading with max deflection not bigger than 4mm, but this will give a much bigger reduction for the load!
* 1kN = 100 kg.
* Material/steel quality is S355
* c/c for grating type TR-OSPss is 38,2x101,6mm, and it has serrated cross bar.
* Cells marked whit shades, is not recommended for ordinary use!

IMPORTANT: This calculation is absolutely MAX load's with **safety/breaking factor = 1** and this is to be used as an indication.
We **DO NOT GUARANTEE** the correctness of the results or information given in this table!

Kaldvalsede plater - dimensjonstoleranser - EN 485-4

Tykkelsestoleranser

Platetykkelse mm		Tykkelsestoleranser for oppgitte bredde mm		
over	t.o.m.	-1000	1001 - 1250	1251 - 1600
	+- 0,04	+- 0,06	+- 0,07	
0,6	0,8	+- 0,04	+- 0,07	+- 0,08
0,8	1,0	+- 0,05	+- 0,08	+- 0,09
1,0	1,2	+- 0,05	+- 0,09	+- 0,10
1,2	1,5	+- 0,07	+- 0,11	+- 0,12
1,5	1,8	+- 0,08	+- 0,12	+- 0,13
1,8	2,0	+- 0,09	+- 0,13	+- 0,14
2,0	2,5	+- 0,10	+- 0,14	+- 0,15
2,5	3,0	+- 0,11	+- 0,15	+- 0,17
3,0	3,5	+- 0,12	+- 0,17	+- 0,19
3,5	4,0	+- 0,15	+- 0,20	+- 0,22
4,0	5,0	+- 0,18	+- 0,22	+- 0,24
5,0	6,0	+- 0,20	+- 0,24	+- 0,25

Breddetoleranse

Platetykkelse mm		Lengdetol. for oppgitte lgd. mm	
fra	t.o.m.	501-1250	1251-2000
0,5	3,0	-0 + 3	-0 + 4
3,0	6,0	-0 + 4	-0 + 5

Lengdetoleranse

Platetykkelse mm		Lengdetol. For oppgitte lgd. mm	
fra	t.o.m.	-1000	1001 - 2000
0,5	3,0	-0 + 3	-0 + 4
3,0	6,0	-0 + 4	-0 + 6

Varmvalsede plater - dimensjonstoleranser - EN 483-3

Tykkelsestoleranser

Platetykkelse mm		Tykkelsestoleranser for oppgitte bredde mm		
fra	t.o.m.	t.o.m 1250	1250 -1600	
8	10	+- 0,45	+- 0,50	
10	15	+- 0,50	+- 0,60	
15	20	+- 0,60	+- 0,70	
20	30	+- ,065	+- 0,75	

Bredde- og lengdetoleranse

Platetykkelse mm		Tykkelsestoleranser for oppgitt bredde og lengde mm			
fra	t.o.m	t.o.m. 1000	1001-2000	2001-3000	3001 t.o.m.
8	12	-0 + 6	-0 + 8	-0 + 10	-0 + 12
12	30	-0 + 7	-0 + 9	-0 + 12	-0 + 14

TILSTANDSBETEGNELSER

Beregnelse etter EN	Leveringstilstand
F	Ubehandlet (som fabrikert)
O	Mykglødet
H12	Kvarthard
H22	Kvarthard, anløpt og avspenningsglødet
H14	Halvhard
H24	Halvhard, anløpt og avspenningsglødet
H16	Trekvarthard
H26	Trekvarthard, anløpt og avspenningsglødet
H18	Hard
H28	Hard, anløpt og avspenningsglødet
H32	Kvarthard, stabilisert
H34	Halvhard, stabilisert
H36	Trekvart, stabilisert
H38	Hard, stabilisert
T1	Avkjølt fra varmebehandlingstemperatur og kaldutherdet
T3	Innherdet, hardbearbeidet og kaldutherdet
T4	Innherdet og kaldutherdet
T5	Avkjølt fra varmebehandlingstemperatur og varmeutherdet
T6	Innherdet og varmeutherdet
T8	Innherdet, hardbearbeidet og varmeutherdet
T9	Innherdet, varmeutherdet og hardbearbeidet
T10	Avkjølt fra varmebearbeidingstemperatur, varmutherdet og hardbearbeidet

H angir	kaldbearbeidet materiale
1. siffer	
H1	Bare kaldbearbeidet
H2	Kaldarbeidet og delvis tilbakeglødet (anløpt)
H3	Kaldbearbeidet og stabilisert
2. siffer	Reduksjonsgrad siste valsestikk
-2	15-20%
-4	30-35%
-6	55 %
-8	75 %
-9	90 %

Mekaniske minimumsverdier - Aluminium

Legering	Tilstand Min.	Stekkfasthet RM N/mm² Min.	Flytegrense RP0,2 N/mm² Min.	Forlengelse A5
1050A	0	65	20	35
	H14	105	85	6
1200	0	70	25	35
	H 14	115	95	6
5005	H 34	145	110	5
5052	H 22/ H 32	220	130	7
	H 24 / H 34	230	150	6
5083	H 116 / H 321	305	215	10
5754	H 22 / H 32	220	130	10
	H 14	240	190	4
	H 24 / H 34	240	160	6
6060	T 6	215	160	10
6082	T 6	295	255	8

Mekansike minimumsverdier - Skipsplater

DNV

	5754-H24/34	**5083-H116/321**
Strekkfasthet Rm min	240 N/mm2	305 N/mm2
Flytegrense Rp0,2 min.	165 N/mm2	215 N/mm2
Forlengelse A5 % min.	10 %	10 %

Kjemiske sammensetninger - Aluminium

Legering EN AW	**Si**	**Fe**	**Cu**	**Mn**	**Mg**	**Cr**	**Zn**	**Al**
1070A	0,2	0,25	0,03	0,03	0,03	-	0,07	99,7
1050 A	0,25	0,4	0,05	0,05	0,05	-	0,07	99,5
1350	0,1	0,4	0,05	0,01	-	0,01	0,05	99,5
1200	1,00 Si + Fe		0,05	0,05	-	-	0,1	99
3003	0,6	0,7	0,05 - 0,20	1,0 - 1,5	-	-	0,1	Rest
3105	0,6	0,7	0,3	0,3 - 0,8	0,2 - 0,8	0,2	0,4	"
5005	0,3	0,7	0,2	0,2	0,5 - 1,1	0,1	0,25	"
5052	0,25	0,4	0,1	0,1	2,2 - 2,8	0,15 - 0,35	0,1	"
5754	0,4	0,4	0,1	0,5	2,6 - 3,8	0,3	0,2	"
5083	0,4	0,4	0,1	0,4 - 1,0	4,0 - 4,9	0,05 - 0,25	0,25	"
6060	0,3 - 0,6	0,1 - 0,3	0,0 - 0,1	0,0 - 0,1	0,35 - 0,6	0,0 - 0,05	0,0 - 0,15	"
6082	0,7 - 1,3	0,0 - 0,5	0,0 - 0,1	0,4 - 1,0	0,6 - 1,2	0,0 - 0,25	0,0 - 0,25	"

Tekniske data metaller

	Tilstand	Legeringselement % Cu	Zn	Pb	Sn	SB	As
Loddetinn				50,00	50,00		
RZ-sinplater		0,13	99,70				
Blyblokker				99,97			
Kobberplate/bånd	Halvhard	99,50					
Kobberplate/bånd	Glødd	99,50					
Kobberskinner/bolt	Halvhard	99,90					
Messingplate	Halvhard	63,00	37,00				
Messingbolt	Hard	58,00	39,00	3,00			
Fosforbronseplate	Fjærhard	93,50			6,00		
Blyplate/bånd				99,90			

	Strekkfasthet Rm- N/mm² min.	maks	Flytegrense Rp0,2- N/mm² min.	maks	Forlengelse A5 min.	Hardhet HV min.	Smeltepunkt °C	Egenvekt gr/cm³	Elektr. motstand mm²/m	Norsk std. NS	Tysk std. DIN
Loddetinn											
RZ-sinplater	160		120		30	40	418	7,2			
Blyblokker							327	11,3			
Kobberplate/bånd	240	300	180	250	8	65	1083	8,9		16015	
Kobberplate/bånd	220	260	40	120	33	40	1083	8,9		16015	
Kobberskinner/bolt	250	290	180	250	10	75	1083	8,9			
Messingplate	360	440	240	360	20	60	900	8,4			
Messingbolt	400	550	160	420	8-35	100	880	8,5		16130	CuZn39Pb3
Fosforbronseplate	670	770	630	730	5	200	950	8,8		16306	
Blyplate/bånd						5	327	11,3			

METALLISKE MATERIALER - INSPEKSJONSDOKUMENTER NS-EN 10 204
(UTDRAG AV NS-EN 10 204, BEARBEIDET AV NORSK STÅL AS)

NS-EN 10 204 2. utgave 2005 Referanse	**Type dokument Betegnelser**	**Dokument-type kontroll og prøving**	**Dokumentinnhold**	**Dokument gjort gyldig av**
Type 2.1	Verksattest		Uten prøvningsresultater Erklæring/bekreftelse om samsvar med bestilling/ordre	Produsenten
Type 2.2	Prøverapport	Kontrolldokumenter basert på ikke-spesifikk kontroll	Med prøvningsresultater Erklæring om samsvar med bestilling/ordre, med angivelse av prøvningsresultater fra ikke-spesifikk kontroll. Kontrollen behøver ikke nødvendigvis gjøres på produkter fra den aktuelle leveransen	Produsenten
Type 3.1	Kontroll- sertifikat 3.1	Kontrolldokumenter basert på spesifikk kontroll	Med prøvningsresultater Erklæring om samsvar med bestilling/ordre, med angivelse av prøvningsresultater fra spesifikk kontroll.	Produsentens autoriserte kontrollrepresentant som er uavhengig av produksjons-avdelingen
Type 3.2	Kontroll- sertifikat 3.2			Produsentens autoriserte kontrollrepresentant som er uavhengig av produksjons-avdelingen, og av enten kjøpers autoriserte kontrollrepresentant eller av kontrollør som er angitt i offentlige forskrifter

Dokumentet ovenfor erstatter EN 10 204: 1991

Hovedendringene:

- Type 2.3 av den tidligere utgivelsen er fjernet
- Type 3.1 erstatter type 3.1.B av tidligere utgivelse
- Type 3.2 erstatter typene 3.1.A, 3.1.C og kontrollrapport 3.2 av tidligere utgivelse
- Nye definisjoner: "produsenter", "mellomledd", "produktspesifikasjon"

KORRESPONDERENDE TEGEGNELSER AV TYPE DOKUMENT

EN 10 204, 2.utg 2005 Referanse	Norsk versjon	Engelsk versjon	Tysk versjon	Fransk versjon
Type 2.1	Verksattest	Decleration of compliance with the order	Werkszbescheinigung	Attestation de conformité à la commande
Type 2.2	Prøverapport	Test report	Werkszeugnis	Relevè de contróle
Type 3.1	Kontrollsertifikat 3.1	Inspection certificate 3.1	Abnuhmeprüfzeugnis 3.1	Certificat de réception 3.1
Type 3.2	Kontrollsertifikat 3.2	Inspection certificate 3.2	Abnuhmeprüfzeugnis 3.2	Certificat de réception 3.2