

Umschlüsselungstabelle

Flat products made of steels for pressure purposes							Mechanical properties and letter codes acc. Europ. Standard							
Non-alloy steels with specified elevated temperature properties														
EN 10028-2	DIN 17155	ASTM	NF A36-205 NF A36-206	BS 1501 P. 1	UNI 5907	Mater. No.	Tensile strength [Mpa]	RP ₀₂ yield point values at elevated temperatures:						
								Steel grade	100 °C	200 °C	300 °C	400 °C	500 °C	
P235GH	HI	A285Gr. A; A515Gr.r55, Gr.60; A516Gr.55,	A37AP, CP	151-360; 161-360; 164-360	FeE235	10345	360-480							
P265GH	HI1	A285Gr.rB; A515G.r60; A516Gr.60; A662Gr.A	A42AP, CP	151-400; 161-400; 164-400	Fe410KG, KW , KT	10425	410-530	P235GH	190	170	130	110		
P295GH	17Mn4	A515Gr. 70; A516Gr. 70; A662Gr. B	A48AP, CP	224-460	FeE295	10481	460-580	P265GH	215	195	155	130		
P355GH	19Mn6	A299; A455; A515Gr.70; A516Gr.70; A612	A52AP, CP	224-490	FeE355-2	10473	510-650	P295GH	250	225	185	155		Yield strength [MPa]
16Mo3	15Mo3	A204Gr.A, Gr.B, Gr.C	15D3	243B		15415	440-590	P355GH	290	255	215	180		275
13CrMo4-5	13CrMo4-4	A387Gr.11, Gr.12	15CD4-05	620; 621		17335	440-590	16Mo3		215	170	150	140	300
10CrMo9-10	10CrMo9-10	A387Gr.22	10CD9-10	622/515		17380	480-630	13CrMo4-5		230	205	180	165	310
11CrMo9-10		A387Gr.22		622/690		17383	520-670	10CrMo9-10		245	220	200	180	
Weldable fine-grain steels, normalized								11CRM09-10			235	215	195	
EN 10028-3	DIN 17102	ASTM	NF A36-207	BS 1501 P.1	UNI 5907	Mater No.	Tensile strength [MPa]	P= pressure vessel steel; N= normalized; H= high operating temperature; L= low operating temperature; G= unalloyed steel; Q= quenched and tempered						
P275N	StE285	A516Gr.60; A662Gr.A		224-400A	FeE285KG, KW	10486	390-510	RP ₀₂ yield point values at elevated temperatures:						
P275NH	WStE285	A516Gr.60		224-400B	FeE285KG, KW	10487		Steel grade	100 °C	150 °C	200 °C	300 °C	400 °C	
P275NL1	TStE285	A516Gr.60; A529; A662Gr.A		224-400A	FeE285KT	10488								
P275NL2	EStE285			224-400A		11104								
P355N	StE355	A516Gr.70; A737Gr. B; A738Gr.A, Gr.C	A510AP	225-490A	FeE355KG, KW	10562		P275NH	245	226	196	147	108	

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P355NH	WStE355		A510AP	225-490B	FeE355-2, FeE355KG, KW	10565
P355NL1	TStE355	A299	A510FP	225-490A	FeE355-3, FeE355KT	10566
P355NI2	EStE355			225-490A	FeE355-3	11106
P460N	StE460	A612; A737Gr.C	A590AP		FeE460KG, KW	18905
P460NH	WStE460	A612	A590AP		FeE460KG, KW	18935
P460NL1	TStE460	A612; A737Gr.C	A590FP		FeE460KT	18915
P460NL2	EStE460					18918

490-630	P355NH	304	284	245	216	167
	P460NH	402	373	333	216	167

Impact energy:

Steel grade	transverse T [°C]	transverse Kv [J]	longitudinal T [°C]	longitudinal Kv [J]
P...N, NH	0	27	-20	40
P...NL1	-20	27	-40	34
P...NL2	-50	27	-50	30

Impact energy:

Tensile strength [MPa]	Yield strength [MPa]	T [°C]	transverse Kv [J]	longitudinal Kv [J]
490-640	355	-80	27	40
640-610	355	-60	27	40
490-610	355	-60	27	40
490-640	355	-100	27	40
530-710	390	-120	27	40
680-820	585	-170	27	40
640-840	490	-196	27	40
680-820	585	-196	80	100

Nickel alloy steels with specified low temperature properties

EN 10028-4	DIN 17280	ASTM	NF A36-208	BS	UNI	Mater. No
11MnNi5-3	11MnNi5-3		0,5Ni285			16212
13MnNi6-3	13MnNi6-3		10N2-355			16217
15NiMn6	14NiMn6		15Ni6-355			16228
12Ni14	10Ni14	A203Gr.D, Gr.E, Gr.F	3,5Ni355	503		15637
12Ni19	12Ni19		5Ni			15680
X7NiMo6	X7NiMo6		9Ni585			16349
X8Ni9	X8Ni9	A353; A553Type1	9Ni490	510		15662
X7Ni9				510		15663

Weldable fine grain steels, quenched and tempered

EN 10028-6	DIN	ASTM	NF	BS	UNI	Mater. No
P355Q						18866
P355QH						18867
P355QL1						18868
P355QL2						18869
P460Q		A537Cl.2, Cl.3				18870
P460QH						18871
P460QL1						18872
P460QL2						18864
P500Q						18873
P500QH						18874
P500QL1						18875
P500QL2						18865
P690Q		A517Gr.B; Gr.F; Gr.H; Gr.Q				18879

Tensile strength [MPa]	RP _{0.2} yield point values at elevated temperatures:					
	Steel grade	100 °C	150 °C	200 °C	250 °C	300 °C
490-630	P355QH	310	285	260	235	215
	P460QH	425	405	380	360	340
	P500QH	470	450	420	400	380
	P690QH	645	615	595	575	570

Impact energy transverse:

T [°C]/K[J]	-60	-40	-20	0	20
P...Q, QH			27	40	60
P...QL1		27	40	60	
P...QL2	27	40	60	80	

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P690QH						18880	770-940
P690QL1						18881	
P690QL2						18888	

Flat products made of steels for structural purposes						
Hot rolled products of non-alloy steels						
EN 10025	DIN 17102	ATSM	NF A35-501	BS 4360	UNI 7070	Mater. No
S185	St33		A33	15HR, HS	Fe320	10035
S235JR	St37-2	A36; A283Gr.C	E24-2	40B	Fe360B	10037
S235JRG2	RSt 37-2			40B		10038
S235J0	St37-3U		E24-3	40C	Fe360C	10114
S235J2G3	St37-3N	A284Gr.C, Gr.D;	E24-4	40D	Fe360D	10116
S235J2G4			E24-4			10117
S275JR	St44-2	A283Gr.D	E28-2	43B	Fe430B	10044
S275J0	St44-3U	A572G.r42	E28-3	43C	Fe439C	10143
S275J2G3	St44-3N	A572Gr.42; A573Gr.70	E28-4	43D	Fe430D	10144
S275J2G4			E28-4			10145
S355JR			E36-2	50B	Fe510B	10045
S355J0	St52-3U	A572Gr.50	E36-3	50C	Fe510C	10553
S355J2G3	St52-3N	A572Gr.50		50D	Fe510D	10570
S355J2G4						10577
S355K2G3			E36-4	50DD	Fe510DD	10595
S355K2G4						10596
E295	St50-2		A50-2		Fe490	10050
E335	St60-2		A60-2		Fe590	10060
E360	St70-2		A70-2		Fe690	10070
Structural steels with improved atmospheric corrosion resistance						
EN 10155	SEW 087	ASME	NF A35-502	BS 4360	UNI	Mater. No
S235J0W			E24W-3			18958
S235J2W	WTSt37-3		E24W-4			18961
S355J0W			E36W-B3	WR50B		18959
S355J2G1W	WTSt52-3	A588Gr.A, Gr.B, Gr.C, Gr.K	E36W-B4	WR50C		18965
S355K2G1W						18967
Hot-rolled products in weldable fine grain structural steels, normalized						

Tensile strength [MPa]
290-510
340-470
410-560
490-630
470-610
570-710
670-830

Impact energy longitudinal:		
T [°C]	27 J	40 J
20	JR	KR
0	J0	K0
-20	J2	K2
-40	J4	K4

S= structural steel; E= steel for engineering purpose

G2= unkilld not permitted supply condition as chosen by the manufacturer, unless otherwise agreed; G3= killed with nitrogen fixing agents supply condition normalized or normalizing rolled; G4= killed with nitrogen fixing agents supply condition as chosen by the manufacturer

V= weather resistant; G1= supply condition normalized or normalizing rolled

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EN10113-2	DIN 17102	ATSM	NF A36-201	BS 4360	UNI	Mater. No	Tensile strength [MPa]	Impact energy:					
S275N	StE285	A662Gr.A			FeE275KGN	10490	370-510	Kv [J] / T [°C]	transverse N	transverse NL	longitudinal N	longitudinal NL	
S275NL	TStE285	A662Gr.A		40EE	FeE275KTN	10491		20	31	40	55	63	
S355N	StE355	A588; A662Gr.B; A633D	E355R		FeE355KGN	10545	470-630	0	27	34	47	55	
S355NL	TStE355	A662Gr.B; A633Gr.D	E355FP	50EE	FeE355KTN	10546		-20	20	27	40	47	
S420N	StE420	A537; A633Gr.E; A737Gr.C	E420R			18902	520-680	-40		20		31	
S420NL	TStE420	A633Gr.E; A737Gr.C	E420FP			18912							
S460N	StE460	A572Gr.65; A633Gr.E	E460R		FE460KGN	18901	550-720						
S460NL	TStE460	A633Gr.E	E460FP	55EE	FeE460KTN	18903							
Hot-rolled products in weldable fine grain structural steels, thermomechanically rolled													
EN 10113-3	SEW 083 (EN 10113-3)	ASTM	NF	BS	UNI	Mater. No	Tensile strength [MPa]	Impact energy:					
S275M					FeE275KGNM	18818	360-510	Kv [J] / T [°C]	transverse M	transverse ML	longitudinal M	longitudinal ML	
S275ML					FeE275KTNM	18819		20	31	40	55	63	
S355M	BStE355TM				FeE355KGNM	18823	450-610	0	27	34	47	55	
S355ML	BStE355TM				FeE355KTNM	18834		0	27	34	47	55	
S420M	BStE420TM					18825	500-660	-20	20	27	40	47	
S420ML	BStE420TM					18836		-40		20		31	
S460M	BStE460TM				FeE460KGNM	18827	530-720						
S460ML	BStE460TM				FeE460KTNM	18838							
Plates made of high yield strength structural steel in the quenched and tempered condition													
EN 10137-2	SEW 090	ASTM	NF A36-204	BS 4360	UNI	Mater. No	Tensile strength [MPa]	Impact energy:					
S460Q	StE460V		E460T-II			18908	550-720	transverse / T [°C]	0	-20	-40	-60	
S460QL	TStE460V		55F			18906		S...Q	30	27	0	0	
S460QL1	EStE460V					18916		S...QL	35	30	27	0	
S500Q	StE500V		E500T-II			18924		S...QL1	40	35	30	27	
S500QL	TStE500V					18909							

M= thermomechanically rolled; N= normalized; L= Low operating temperature

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S500QL1	EStE500V					18984	590-770	longitudinal					
								/ T [°C]	0	-20	-40	-60	
S690Q	StE690V	A514Gr.B ,Gr.F, Gr.H, Gr.Q, Gr.S	E690T-II			18931	770-940	S...Q	40	30	0	0	
S690QL	TStE690V					18928		S...QL	50	40	30	0	
S690QL1	EStE960V					18988		S...QL1	60	50	40	30	
S960Q	StE960V		E960T-II			18941	980-1150	Q= quenched and tempered; L= low operating temperature					
S960QL	TStE960V					18933							