EN10028-2

FLAT PRODUCTS MADE OF STEELS FOR PRESSURE PURPOSES
Part 2: Non-alloy and alloy steels with specified elevated temperature properties.

EN10028-2 standard provides high temperature performance of alloy steel and non-alloy steel delivery standard. EN10028-2 standard main steel grade: EN10028-2 P235GH, P265GH, P295GH, P355GH, 16MO3.

Standard: EN10028-2
Grade :P235GH,P265GH,P295GH,P355GH,16MO3.
Thickness : 8mm -360mm
Width : 1000mm-4000mm
Length : 1000mm-20000mm
MOQ: 1 PC
Product type : Steel plate

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Delivery time : Promptly (Stock) or 10-40 days (Production)
Stock : Available
MTC: Available
Delivery condition: According to the customers

Table 1 — Chemical composition (cast analysis) [a]

Steel grade		% by mass														
name	number	C	Si	Mn	P max.	S max.	Al_{total}	N	Cr	Cu[b]	Mo	Nb	Ni	Ti max.	V	Others
P235GH	1.0345	≤ 0,16	≤ 0,35	0,60[c] to 1,20	0,025	0,015	≥ 0,020	≤ 0,012[d]	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,020	≤ 0,30	0,03	≤ 0,02	
P265GH	1.0425	≤ 0,20	≤ 0,40	0,80[c] to 1,40	0,025	0,015	≥ 0,020	≤ 0,012[d]	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,020	≤ 0,30	0,03	≤ 0,02	
P295GH	1.0481	0,08 to 0,20	≤ 0,40	0,90[c] to 1,50	0,025	0,015	≥ 0,020	≤ 0,012[d]	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,020	≤ 0,30	0,03	≤ 0,02	Cr+Cu+Mo+
P355GH	1.0473	0,10 to 0,22	≤ 0,60	1,10 to 1,70	0,025	0,015	≥ 0,020	≤ 0,012[d]	≤ 0,30	≤ 0,30	≤ 0,08	≤ 0,020	≤ 0,30	0,03	≤ 0,02	Ni: ≤ 0,70
16Mo3	1.5415	0,12 to 0,20	≤ 0,35	0,40 to 0,90	0,025	0,010	[e]	≤ 0,012	≤ 0,30	≤ 0,30	0,25 to 0,35	-	≤ 0,30	-	-	-
18MnMo4-5	1.5414	≤ 0,20	≤ 0,40	0,90 to 1,50	0,015	0,005	[e]	≤ 0,012	≤ 0,30	≤ 0,30	0,45 to 0,60	-	≤ 0,30	-	-	-
20MnMoNi4-5	1.6311	0,15 to 0,23	≤ 0,40	1,00 to 1,50	0,020	0,010	[e]	≤ 0,012	≤ 0,20	≤ 0,20	0,45 to 0,60	-	0,40 to 0,80	-	≤ 0,02	-
15NiCuMoNb5-6-4	1.6368	≤ 0,17	0,25 to 0,50	0,80 to 1,20	0,025	0,010	≥ 0,015	≤ 0,020	≤ 0,30	0,50 to 0,80	0,25 to 0,50	0,015 to 0,045	1,00 to 1,30	-	-	-
13CrMo4-5	1.7335	0,08 to 0,18	≤ 0,35	0,40 to 1,00	0,025	0,010	[e]	≤ 0,012	0,70[f] to 1,15	≤ 0,30	0,40 to 0,60	-	-	-	-	-
13CrMoSi5-5	1.7336	≤ 0,17	0,50 to 0,80	0,40 to 0,65	0,015	0,005	[e]	≤ 0,012	1,00 to 1,50	≤ 0,30	0,45 to 0,65	-	≤0,30	-	-	-
10CrMo9-10	1.7380	0,08 to 0,14[g]	≤ 0,50	0,40 to 0,80	0,020	0,010	[e]	≤ 0,012	2,00 to 2,50	≤ 0,30	0,90 to 1,10	-	-	-	-	-
12CrMo9-10	1.7375	0,10 to 0,15	≤ 0,30	0,30 to 0,80	0,015	0,010	0,010 to 0,040	≤ 0,012	2,00 to 2,50	≤ 0,25	0,90 to 1,10	-	≤ 0,30	-	-	-
X12CrMo5	1.7362	0,10 to 0,15	≤ 0,50	0,30 to 0,60	0,020	0,005	[e]	≤ 0,012	4,00 to 6,00	≤ 0,30	0,45 to 0,65	-	≤ 0,30	-	-	-
13CrMoV9-10	1.7703	0,11 to 0,15	≤ 0,10	0,30 to 0,60	0,015	0,005	[e]	≤ 0,012	2,00 to 2,50	≤ 0,20	0,90 to 1,10	≤ 0,07	≤ 0,25	0,03	0,25 to 0,35	≤ 0,002 B ≤ 0,015Ca
12CrMoV12-10	1.7767	0,10 to 0,15	≤ 0,15	0,30 to 0,60	0,015	0,005	[e]	≤ 0,012	2,75 to 3,25	≤ 0,25	0,90 to 1,10	≤ 0,07[h]	≤ 0,25	0,03[h]	0,20 to 0,30	≤ 0,003B[h] ≤ 0,015Ca[h]
X10CrMoVNb9-1	1.4903	0,08 to 0,12	≤ 0,50	0,30 to 0,60	0,020	0,005	≤ 0,040	0,030 to 0,070	8,00 to 9,50	≤ 0,30	0,85 to 1,05	0,06 to 0,10	≤ 0,30	-	0,18 to 0,25	-

[a] Elements not listed in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate measures shall be taken to prevent the addition from scrap or other materials used in steelmaking of these elements which may affect the mechanical properties and usability.

[b] •• A lower maximum copper content and/or a maximum sum of copper and tin content, e.g. Cu + 6 Sn ≤ 0,33%, may be agreed upon at the time of enquiry and order, e.g. with regard to hot formability for the grades where only a maximum copper content is specified.

[c] For product thicknesses < 6 mm, a minimum manganese content of 0,20 % lower than specified is permitted.

[d] A ratio $\frac{Al}{N} \geq 2$ shall apply.

[e] The Al content of the cast shall be determined and given in the inspection document.

[f] •• If resistance to pressurized hydrogen is of importance, a minimum content of 0,80% Cr may be agreed upon at the time of enquiry and order.

[g] •• For product thicknesses greater than 150 mm, a maximum content of 0,17% C may be agreed upon at the time of enquiry and order.

[h] This grade may be produced with additions of either Ti + B or Nb + Ca. The following minimum contents shall apply: ≥ 0,015 % Ti and ≥ 0,001 % B in the case of additions of Ti + B, ≥ 0,015 % Nb and ≥ 0,0005 % Ca in the case of additions of Nb + Ca.

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Table 3 — Mechanical properties (applicable to the transverse direction)[a]

Steel grade		Usual delivery condition[b,c]	Product thickness t	Tensile properties at room temperature			Impact energy KV J min. at a temperature in °C of		
				Yield strength R_{eH}	Tensile strength R_m	Elongation after fracture A	- 20	0	+ 20
name	number		mm	MPa min.	MPa	% min.			
P235GH	1.0345	+N[d]	≤ 16	235	360 to 480	24	27	34	40
			16 < t ≤ 40	225					
			40 < t ≤ 60	215					
			60 < t ≤ 100	200					
			100 < t ≤ 150	185	350 to 480				
			150 < t ≤ 250	170	340 to 480				
P265GH	1.0425	+N[d]	≤ 16	265	410 to 530	22	27	34	40
			16 < t ≤ 40	255					
			40 < t ≤ 60	245					
			60 < t ≤ 100	215					
			100 < t ≤ 150	200	400 to 530				
			150 < t ≤ 250	185	390 to 530				
P295GH	1.0481	+N[d]	≤ 16	295	460 to 580	21	27	34	40
			16 < t ≤ 40	290					
			40 < t ≤ 60	285					
			60 < t ≤ 100	260					
			100 < t ≤ 150	235	440 to 570				
			150 < t ≤ 250	220	430 to 570				
P355GH	1.0473	+N[d]	≤ 16	355	510 to 650	20	27	34	40
			16 < t ≤ 40	345					
			40 < t ≤ 60	335					
			60 < t ≤ 100	315	490 to 630				
			100 < t ≤ 150	295	480 to 630				
			150 < t ≤ 250	280	470 to 630				
16Mo3	1.5415	+N[e]	≤ 16	275	440 to 590	22	f	f	31
			16 < t ≤ 40	270					
			40 < t ≤ 60	260					
			60 < t ≤ 100	240	430 to 560				
			100 < t ≤ 150	220	420 to 570				
			150 < t ≤ 250	210	410 to 570				
18MnMo4-5	1.5414	+NT	≤ 60	345	510 to 650	20	27	34	40
			60 < t ≤ 150	325					
		+QT	150 < t ≤ 250	310	480 to 620				
20MnMoNi4-5	1.6311	+QT	≤ 40	470	590 to 750	18	27	40	50
			40 < t ≤ 60	460	590 to 730				
			60 < t ≤ 100	450	570 to 710				
			100 < t ≤ 150	440					
			150 < t ≤ 250	400	560 to 700				
15NiCuMoNb 5-6-4	1.6368	+NT	≤ 40	460	610 to 780	16	27	34	40
			40 < t ≤ 60	440					
			60 < t ≤ 100	430	600 to 760				
		+NT or +QT	100 < t ≤ 150	420	590 to 740				
		+QT	150 < t ≤ 200	410	580 to 740				

Table 3 (concluded)

Steel grade		Usual delivery condition[b,c]	Product thickness t	Tensile properties at room temperature			Impact energy KV J min.		
				Yield strength R_{eH}	Tensile strength R_m	Elongation after fracture A			
name	number		mm	MPa min.	MPa	% min.	at a temperature in °C of		
							-20	0	+20
13CrMo4-5	1.7335	+NT	≤ 16	300	450 to 600	19	[f]	[f]	31
			16 < t ≤ 60	290					
			60 < t ≤ 100	270	440 to 590		[f]	[f]	27
		+NT or +QT	100 < t ≤ 150	255	430 to 580		[f]	[f]	[f]
		+QT	150 < t ≤ 250	245	420 to 570				
13CrMoSi5-5	1.7336	+NT	≤ 60	310	510 to 690	20	[f]	27	34
			60 < t ≤ 100	300	480 to 660				
		+QT	≤ 60	400	510 to 690		27	34	40
			60 < t ≤ 100	390	500 to 680				
			100 < t ≤ 250	380	490 to 670				
10CrMo9-10	1.7380	+NT	≤ 16	310	480 to 630	18	[f]	[f]	31
			16 < t ≤ 40	300					
			40 < t ≤ 60	290					
		+NT or +QT	60 < t ≤ 100	280	470 to 620	17	[f]	[f]	27
		+QT	100 < t ≤ 150	260	460 to 610				
			150 < t ≤ 250	250	450 to 600				
12CrMo9-10	1.7375	+ NT or +QT	≤ 250	355	540 to 690	18	27	40	70
X12CrMo5	1.7362	+NT	≤ 60	320	510 to 690	20	27	34	40
			60 < t ≤ 150	300	480 to 660				
		+QT	150 < t ≤ 250	300	450 to 630				
13CrMoV9-10	1.7703	+ NT	≤ 60	455	600 to 780	18	27	34	40
			60 < t ≤ 150	435	590 to 770				
		+ QT	150 < t ≤ 250	415	580 to 760				
12CrMoV12-10	1.7767	+NT	≤ 60	455	600 to 780	18	27	34	40
			60 < t ≤ 150	435	590 to 770				
		+QT	150 < t ≤ 250	415	580 to 760				
X10CrMoVNb 9-1	1.4903	+NT	≤ 60	445	580 to 760	18	27	34	40
			60 < t ≤ 150	435	550 to 730				
		+QT	150 < t ≤ 250	435	520 to 700				

[a] •• For product thicknesses > 250 mm (except for grades 12CrMo9-10 and 15NiCuMoNb5-6-4) property values may be agreed.

[b] +N = normalized; +NT = normalized and tempered; +QT = quenched and tempered

[c] •• For product thicknesses, where the usual delivery condition is +NT, higher strength and impact energy values may be agreed for the delivery condition +QT.

[d] See 8.2.2.

[e] This steel may also be supplied in the +NT condition at the discretion of the manufacturer.

[f] •• A value may be agreed at the time of enquiry and order.

We are a professional EN10028-2 steel stockist and supplier. We can supply different product type and grades of EN10028-2 . If you have any need of THE steel please do not hesitate to contact us .

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