

Steel for pressure vessels

Hot-rolled structural steel for simple pressure vessels has excellent properties for welding and meets all the performance requirements for pressure vessels and boilers.

Standards

Steel for pressure vessels complies with European standards EN 10028-2 : 1992 and EN 10207 : 1997 shown in tables 42 and 43 below. Former national standards and nearest related grades are also shown in these tables.

Mechanical properties

Table 44 below shows the mechanical properties for grades of steel in EN 10028-2 : 1992. The values shown for strength and elongation in this table are for test pieces taken transverse to the rolling direction; those

for the impact test are for test pieces taken in the rolling direction.

Table 45 on page 25 shows the mechanical properties for grades of steel in EN 10207 : 1997. The values shown in this table are for test pieces taken in the rolling direction.

Chemical composition

Steel for pressure vessels meets the requirements of the cast analysis in the standards, as shown in tables 46 and 47 on page 25.

Dimensions

The width and thickness limits are shown in tables 48 and 49 on page 26.

Table 42: Standards

European	National			
EN 10028-2 : 1992	UK	Germany	France	Italy
Grade	BS 1501	DIN 17155	NFA 36-205	UNI 5869
P235GH	360-161	H I	A37CP	Fe360 1KW
P265GH	430-161	H II	A42CP	Fe410 1KW

Table 43: Standards

European	National	
EN 10207 : 1997	Germany	France
Grade		
P235S	H I	A37AP/E24.4P
P265S	H II	A42AP/E28.4P

Table 44: Mechanical properties: EN 10028-2 : 1992

Grade	R_{eL} (N/mm ²)	R_m (N/mm ²)	A (%)			Impact test	
	Min	Min-max	Min			Temp	Min energy
			$L_0 = 80\text{mm}$		$L_0 = 5.65\sqrt{S_0}$	°C	J
			$2 < t \leq 2.5$	$2.5 < t < 3$	$3 \leq t \leq 20$		
P235GH	235	360-480	19	20	25	0	27
P265GH	265	410-530	17	18	23	0	27

Note: Material thickness, t , is in millimetres.

Table 45: Mechanical properties: EN 10207 : 1997

Grade	R_{eL} (N/mm ²)	R_m (N/mm ²)	A (%)			Impact test	
	Min	Min-max	Min			Temp	Min energy
			$L_0 = 80\text{mm}$		$L_0 = 5.65\sqrt{S_0}$	°C	J
			$2 < t \leq 2.5$	$2.5 < t < 3$	$3 \leq t \leq 20$		
P235S	235	360-480	20	21	26	-20	28
P265S	265	410-530	17	18	22	-20	28

Note: Material thickness, t, is in millimetres.

Table 46: Chemical composition: EN 10028-2 : 1992

Grade	C	Mn	P	S	Si	Al-total	Nb	Ti	V
	Max	Min-max	Max	Max	Max	Min	Max	Max	Max
P235GH	0.16	0.40-1.20	0.030	0.025	0.350	0.020	0.010	0.030	0.020
P265GH	0.20	0.50-1.40	0.030	0.025	0.400	0.020	0.010	0.030	0.020

Note: Values are in weight percentages.

Table 47: Chemical composition: EN 10207 : 1997

Grade	C	Mn	P	S	Si	Al-total
	Max	Min-max	Max	Max	Max	Min
P235S	0.16	0.40-1.20	0.035	0.030	0.350	0.020
P265S	0.20	0.50-1.50	0.035	0.030	0.400	0.020

Note: Values are in weight percentages.

Table 48: Dimensions: Mill finish				
Thickness		Width		
		Min	Max	
>	≤		P235GH P235S	P265GH P265S
1.47	1.49	700	1300	-
1.49	1.50	700	1320	1170
1.50	1.53	700	1330	1250
1.53	1.57	700	1352	1250
1.57	1.60	700	1382	1250
1.60	1.70	700	1425	1425
1.70	1.80	700	1480	1425
1.80	2.00	700	1555	1442
2.00	2.20	700	1705	1592
2.20	2.40	700	1819	1730
2.40	2.60	700	1924	1806
2.60	2.70	700	2028	1882
2.70	2.80	700	2070	1920
2.80	3.00	700	2070	1958
3.00	3.20	700	2070	2034
3.20	3.50	700	2070	2070
3.50	3.65	700	2070	2070
3.65	4.00	700	2070	2070
4.00	4.40	700	2070	2070
4.40	5.00	700	2070	2070
5.00	5.60	700	2070	2070
5.60	12.70	700	2070	2070
12.70	20.00	700	2070	2070

Note: Dimensions are in millimetres.

Table 49: Dimensions: Pickled				
Thickness		Width		
		Min	Max	
>	≤		P235GH P235S	P265GH P265S
1.50	1.53	735	1330	1250
1.53	1.57	735	1352	1250
1.57	1.60	735	1382	1250
1.60	1.70	735	1425	1425
1.70	1.80	735	1480	1425
1.80	2.00	735	1555	1442
2.00	2.20	735	1705	1592
2.20	2.40	735	1819	1730
2.40	2.60	735	1924	1806
2.60	2.70	735	2028	1882
2.70	2.80	735	2070	1920
2.80	3.00	735	2070	1958
3.00	3.20	735	2070	2034
3.20	3.47	735	2070	2070
3.47	3.65	735	2070	2070
3.65	4.00	735	2070	2070
4.00	4.40	735	2070	2070
4.40	4.83	735	2070	2070
4.83	5.00	735	2000	2000
5.00	5.25	750	1904	1904
5.25	5.50	750	1818	1818
5.50	5.80	750	1724	1724
5.80	6.00	750	1574	1574

Note: Dimensions are in millimetres.