



STEELS TABLE

CHEMICAL ANALYSIS AND MECHANICAL PROPERTIES

NORM	GRADE	CHEMICAL ELEMENTS (% on mass)																Yield strength (Mpa)	Tensile strength (Mpa)	Elongation %
		C		Mn		Si		P	S	Cr		Mo		V		Ni	Cu			
		min.	max.	min.	max.	min.	max.	max.	max.	min.	max.	min.	max.	min.	max.	max.	max.			
ASTM A106 ASME SA 106	A	-	0.25	0.27	0.93	-	0.10	0.035	0.035	-	0.40	-	0.15	-	0.08	0.40	0.40	205	330	35
	B	-	0.30	0.29	1.06	-	0.10	0.035	0.035	-	0.40	-	0.15	-	0.08	0.40	0.40	240	415	30
	C	-	0.35	0.29	1.06	-	0.10	0.035	0.035	-	0.40	-	0.15	-	0.08	0.40	0.40	275	485	30
ASTM A 335 ASME SA 335	P1	0.10	0.20	0.30	0.80	0.10	0.50	0.025	0.025	-	-	0.44	0.65	-	-	-	-	205	380	30
	P2	0.10	0.20	0.30	0.61	0.10	0.30	0.025	0.025	0.50	0.81	0.44	0.65	-	-	-	-	205	380	30
	P5	-	0.15	0.30	0.60	-	0.50	0.025	0.025	4.00	6.00	0.45	0.65	-	-	-	-	205	415	30
	P9	-	0.15	0.30	0.60	0.25	1.00	0.025	0.025	8.00	10.00	0.90	1.10	-	-	-	-	205	415	30
	P11	0.05	0.15	0.30	0.60	0.50	1.00	0.025	0.025	1.00	1.50	0.44	0.65	-	-	-	-	205	415	30
	P12	0.05	0.15	0.30	0.61	-	0.50	0.025	0.025	0.80	1.25	0.44	0.65	-	-	-	-	220	415	30
	P15	0.05	0.15	0.30	0.60	1.15	1.65	0.025	0.025	-	-	0.44	0.65	-	-	-	-	205	415	30
	P21	0.05	0.15	0.30	0.60	-	0.50	0.025	0.025	2.65	3.35	0.80	1.06	-	-	-	-	205	415	30
	P22	0.05	0.15	0.30	0.60	-	0.50	0.025	0.025	1.90	2.60	0.87	1.13	-	-	-	-	205	415	30
	P91*	0.08	0.12	0.30	0.60	0.20	0.50	0.020	0.010	8.00	9.50	0.85	1.05	0.18	0.25	0.40	-	415	585	20
P92"	0.07	0.13	0.30	0.60	-	0.50	0.020	0.010	8.50	9.50	0.30	0.60	0.15	0.25	0.40	-	440	620	20	
EN 10216-2	P195GH (+N) ¹	-	0.13	-	0.70	-	0.35	0.025	0.020	-	0.30	-	0.08	-	0.02	0.30	0.30	T ≤ 16 195	320-440	27
	P235GH (+N) ¹	-	0.16	-	1.20	-	0.35	0.025	0.020	-	0.30	-	0.08	-	0.02	0.30	0.30	T ≤ 16 235	360-500	25
																		16 < T ≤ 40 225		
40 < T ≤ 60 215																				
EN 10217-2	P265GH (+N) ¹	-	0.20	-	1.40	-	0.40	0.025	0.020	-	0.30	-	0.08	-	0.02	0.30	0.30	T ≤ 16 265	410-570	23
																		16 < T ≤ 40 255		
																		40 < T ≤ 60 245		

Note: the impact test is optional for tubes according to EN 10216-2 and EN 10217-2, therefore it has to be explicitly required in the purchase order (Min. 28 J at - 10° C or Min. 40 J at 0°C on the longitudinal sample). The yield strength, tensile strength and elongation values stated in the table here above are the minimum requirements foreseen by the norm, that does not foresee maximum values.

T=tube w.t. in mm - the minimum elongation values refer to longitudinal samples.

* 0.030 ≤ N ≤ 0.070, Al ≤ 0.020, 0.060 ≤ Cb ≤ 0.10, Ti ≤ 0.010, Zr ≤ 0.010 (% on mass).

" 0.030 ≤ N ≤ 0.070, Al ≤ 0.020, 0.040 ≤ Cb ≤ 0.090, 1.50 ≤ W ≤ 2.00, 0.001 ≤ B ≤ 0.006, Ti ≤ 0.010, Zr ≤ 0.010 (% on mass).

¹ Al ≥ 0.020, Nb ≤ 0.010, Ti ≤ 0.030, Cr + Cu + Mo + Ni ≤ 0.70 (% on mass).