

Welded Steel Boiler Tubing A-178

TABLE 1 Chemical Requirements

Element	Composition, %		
	Grade A, Low-Carbon Steel	Grade C, Medium-Carbon Steel	Grade D, Carbon-Manganese Steel
Carbon	0.06-0.18	0.35 max	0.27 max
Manganese	0.27-0.63	0.80 max	1.00-1.50
Phosphorus, max	0.035	0.035	0.030
Sulfur, max	0.035	0.035	0.015
Silicon			0.10 min.

TABLE 2 Tensile Requirements

	Grade C	Grade D
Tensile strength, in, ksi (MPa)	60 (415)	70 (485)
Yield strength, min, ksi (MPa)	37 (255)	40 (275)
Elongation in 2in. or 50 mm, min, %	30	30
For longitudinal strip tests a deduction for each 1/32-in. (0.8) decrease in wall thickness below 5/16 in. (8 mm) from the basic minimum elongation of the following percentage points shall be made.	1.50 ^A	1.50 ^A

^A See Table 3 for the computed minimum values.

TABLE 3 Minimum Elongation Values

Wall Thickness		Elongation in 2in. or 50 mm, min, % ^A
in.	mm	
5/16 (0.312)	8	30
9/32 (0.281)	7.2	29
1/4 (0.250)	6.4	27
7/32 (0.219)	5.6	26
3/16 (0.188)	4.8	24
5/32 (0.156)	4	22
1/8 (0.125)	3.2	21
3/32 (0.094)	2.4	20
1/16 (0.062)	1.6	18

^A Calculated elongation requirements shall be rounded to the nearest whole number.

Condenser Tube A-214

Chemical Composition

The steel shall conform to the following requirements as to chemical composition.

Carbon, max %	0.18
Manganese, %	0.27 to 0.63
Phosphorus, max, %	0.035
Sulfur, max, %	0.035