TABLE A2.1 *Continued*

Designation (Nominal Depth in Inches and Weight in Pounds per Linear Foot)	Area A, in.^{2}	Depth d, in.	Flange		Web Thickness t_w, in.[A]	Designation [Nominal Depth in Millimetres and Mass in Kilograms per Metre]	Area A, mm^2	Depth d, mm	Flange		Web Thickness t_w, mm[A]
			Width b_f, in.	Thickness t_f, in.[A]					Width b_f, mm	Thickness, t_f, mm[A]	
× 24	7.08	7.93	6.495	0.400	0.245	× 35.9	4 570	201	165	10.2	6.2
W8 × 21	6.16	8.28	5.270	0.400	0.250	W200 × 31.3	3 970	210	134	10.2	6.4
× 18	5.26	8.14	5.250	0.330	0.230	× 26.6	3 390	207	133	8.4	5.8
W8 × 15	4.44	8.11	4.015	0.315	0.245	W200 × 22.5	2 860	206	102	8.0	6.2
× 13	3.84	7.99	4.000	0.255	0.230	× 19.3	2 480	203	102	6.5	5.8
× 10	2.96	7.89	3.940	0.205	0.170	× 15.0	1 910	200	100	5.2	4.3
W6 × 25	7.34	6.38	6.080	0.455	0.320	W150 × 37.1	4 740	162	154	11.6	8.1
× 20	5.87	6.20	6.020	0.365	0.260	× 29.8	3 790	157	153	9.3	6.6
× 15	4.43	5.99	5.990	0.260	0.230	× 22.5	2 860	152	152	6.6	5.8
W6 × 16	4.74	6.28	4.030	0.405	0.260	W150 × 24.0	3 060	160	102	10.3	6.6
× 12	3.55	6.03	4.000	0.280	0.230	× 18.0	2 290	153	102	7.1	5.8
× 9	2.68	5.90	3.940	0.215	0.170	× 13.5	1 730	150	100	5.5	4.3
× 8.5	2.52	5.83	3.940	0.195	0.170	× 13.0	1 630	148	100	4.9	4.3
W5 × 19	5.54	5.15	5.030	0.430	0.270	W130 × 28.1	3 590	131	128	10.9	6.9
× 16	4.68	5.01	5.000	0.360	0.240	× 23.8	3 040	127	127	9.1	6.1
W4 × 13	3.83	4.16	4.060	0.345	0.280	W100 × 19.3	2 470	106	103	8.8	7.1

[A] Actual flange and web thicknesses vary due to mill rolling practices; however, permitted variations for such dimensions are not addressed.

12. Permitted Variations in Dimensions and Weight [Mass]

12.1 One cubic foot of rolled steel is assumed to weigh 490 lb. One cubic metre of rolled steel is assumed to have a mass of 7850 kg.

12.2 *Plates*—The permitted variations for dimensions and weight [mass] shall not exceed the applicable limits in Tables 1 to 15 [Annex A1, Tables A1.1 to A1.15] inclusive.

12.3 *Shapes:*

W6 x 8.5 Wt. Range = 8.29<-->8.76#

W6 x 9 Wt. Range = 8.78<-->9.27#

12.3.3 *Shapes Having One Dimension of the Cross Section 3 in. [75 mm] or Greater (Structural-Size Shapes)*—The cross-sectional area or weight [mass] of each shape shall not vary more than 2.5 % from the theoretical or specified amounts except for shapes with a nominal weight of less than 100 lb/ft, in which the variation shall range from– 2.5 % to +3.0 % from the theoretical cross-sectional area or the specified nominal weight [mass].

12.4 *Sheet Piling*—The weight [mass] of each steel sheet pile shall not vary more than 2.5 % from the theoretical or specified weight [mass]. The length of each steel sheet pile shall be not less than the specified length, and not more than 5 in. [125 mm] over the specified length.

12.5 *Hot-Rolled Bars*—The permitted variations in dimensions shall not exceed the applicable limits in Tables 26 to 31 [Annex A1, Tables A1.26 to A1.31] inclusive.

12.6 *Conversion of Permitted Variations from Fractions of an Inch to Decimals*—Permitted variations in dimensions for products covered by this specification are generally given as fractions of an inch and these remain the official permitted variations, where so stated. If the material is to be measured by equipment reporting dimensions as decimals, conversion of permitted variations from fractions of an inch to decimals shall be made to three decimal places; using the rounding method prescribed in Practice E29.

13. Retests

13.1 If any test specimen shows defective machining or develops flaws, the manufacturer or processor shall have the option of discarding it and substituting another test specimen.

13.2 If the percentage of elongation of any tension test specimen is less than that specified and any part of the fracture is more than ¾ in. [20 mm] from the center of the gage length of a 2-in. [50-mm] specimen or is outside the middle half of the gage length of an 8-in. [200-mm] specimen, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

13.3 Except as provided in 13.3.1, if the results from an original tension specimen fails to meet the specified requirements, but are within 2 ksi [14 MPa] of the required tensile strength, within 1 ksi [7 MPa] of the required yield strength or yield point, or within 2 percentage points of the required elongation, a retest shall be permitted to replace the failing test. A retest shall be performed for the failing original test, with the specimen being randomly selected from the heat. If the results of the retest meet the specified requirements, the heat or lot shall be approved.

13.3.1 For structural products that are tested as given in Table C, both tests from each coil tested to qualify a heat are required to meet all mechanical property requirements. Should either test fail to do so, then that coil shall not be used to qualify the heat; however, the portion of that individual coil that is bracketed by acceptable tests (see 11.4.2.3) is considered to be qualified.

13.4 Quenched and tempered steel plates shall be subject to any additional retest requirements contained in the applicable product specification.

13.5 When the full-section option of 11.3.3 is used and the elongation falls below the specified requirement, the manufacturer or processor shall have the option of making another test using a test specimen permitted in 11.5.2.

14. Test Reports

14.1 Test reports for each heat supplied are required and they shall report the following:

14.1.1 The applicable product specification designation, including year-date and whichever of grade, class, and type are specified in the purchase order, to which the structural product is furnished.

14.1.2 The heat number, heat analysis (see 7.1), and nominal sizes.

NOTE 8—If the amount of copper, chromium, nickel, molybdenum, or silicon is less than 0.02 %, the heat analysis for that element may be reported as <0.02 %. If the amount of columbium or vanadium is less than 0.008 %, the heat analysis for that element may be reported as <0.008 %.

14.1.3 For structural products that are tested as given in Table B, two tension test results appropriate to qualify the shipment (see 11.4), except that only one tension test result need be reported if the shipment consists of a single piece or plate-as-rolled.

14.1.3.1 In reporting elongation values, both the percentage increase and the original gage length shall be stated.

14.1.3.2 Yield to tensile ratio when such a requirement is contained in the product specification.

14.1.4 For structural products that are required to be heat treated, either by the applicable product specification or by the purchase order, all heat treatments, including temperature ranges and times at temperature, unless the purchaser and the supplier have agreed to the supply of a heat treatment procedure in place of the actual temperatures and times.

14.1.4.1 Subcritical heat treatment to soften thermally cut edges need not be reported, except for structural products having a specified minimum tensile strength of 95 ksi [655 MPa] or higher, unless such subcritical heating is accomplished at temperatures at least 75°F [40°C] lower than the minimum tempering