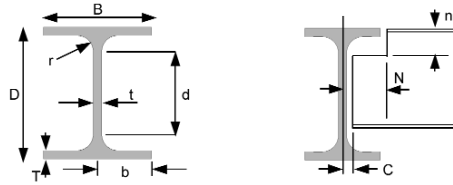


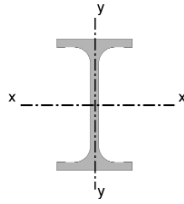
Wide Flange Beams



Imperial Units

| Size | Designation | | Area of Sect. | Depth of Sect. | Width of Sect. | Thickness | | Root Radius | Depth between Fillets | Ratios for Local Buckling | | Dimensions for Detailing | | | |
|----------------------------|----------------|------|-----------------|----------------|----------------|-----------|------|-------------|-----------------------|---------------------------|---------|--------------------------|-----|----|-------|
| | Mass Per Metre | | | | | Flange | Web | | | Flange b/T | Web d/t | Clearance C | End | | Notch |
| | | | | | | | | | | | | | mm | mm | |
| in (mm) | lb/ft | kg/m | cm ² | mm | mm | mm | mm | mm | mm | | | mm | mm | mm | |
| W4 4 X 4 (102 x 102) | 13 | 19.4 | 25 | 105.7 | 103.1 | 8.8 | 7.1 | 6.4 | 75.5 | 5.88 | 10.6 | 6 | 58 | 15 | |
| W5 5 x 3 (127 x 76) | 9 | 13.0 | 17 | 127.0 | 76.2 | 7.6 | 4.2 | 6.4 | 99.1 | 5.01 | 23.6 | 4 | 46 | 14 | |
| W5 5 x 5 (127 x 127) | 16 | 23.8 | 30 | 127.3 | 127.0 | 9.1 | 6.1 | 7.6 | 93.8 | 6.95 | 15.4 | 5 | 70 | 17 | |
| | 19 | 28.3 | 36 | 130.8 | 127.8 | 10.9 | 6.9 | 7.6 | 93.7 | 5.85 | 13.7 | 5 | 70 | 19 | |
| W6 6 x 3 1/2 (152 x 89) | 11 | 16.0 | 20 | 152.4 | 88.9 | 7.7 | 4.6 | 6.4 | 124.3 | 5.77 | 27.0 | 4 | 52 | 14 | |
| W6 6 x 4 (152 x 102) | 9 | 13.4 | 17 | 149.9 | 100.1 | 5.5 | 4.3 | 6.4 | 126.3 | 9.17 | 29.2 | 4 | 58 | 12 | |
| | 12 | 17.9 | 23 | 153.2 | 101.6 | 7.1 | 5.8 | 6.4 | 126.3 | 7.14 | 21.6 | 5 | 58 | 13 | |
| | 16 | 23.8 | 31 | 159.5 | 102.4 | 10.3 | 6.6 | 6.4 | 126.2 | 4.98 | 19.1 | 5 | 58 | 17 | |
| W6 6 x 6 (152 x 152) | 15 | 22.3 | 28 | 152.1 | 152.1 | 6.6 | 5.8 | 6.4 | 126.2 | 11.5 | 21.7 | 5 | 83 | 13 | |
| | 15.7 | 23.0 | 30 | 152.4 | 152.4 | 6.8 | 6.1 | 6.4 | 126.1 | 11.21 | 20.7 | 5 | 83 | 13 | |
| | 20 | 29.8 | 38 | 157.5 | 152.9 | 9.3 | 6.6 | 6.4 | 126.3 | 8.25 | 19.1 | 5 | 83 | 16 | |
| | 25 | 37.2 | 47 | 162.1 | 154.4 | 11.6 | 8.1 | 6.4 | 126.3 | 6.68 | 15.5 | 6 | 83 | 18 | |
| W7 7 x 4 (178 x 102) | 13 | 19.0 | 24 | 177.8 | 101.6 | 7.9 | 4.7 | 7.6 | 146.8 | 6.43 | 31.2 | 4 | 58 | 16 | |
| W8 8 x 4 (203 x 102) | 10 | 14.9 | 19 | 200.4 | 100.1 | 5.2 | 4.3 | 7.6 | 174.7 | 9.61 | 40.4 | 4 | 58 | 13 | |
| | 13 | 19.4 | 25 | 202.9 | 101.6 | 6.5 | 5.8 | 7.6 | 174.7 | 7.84 | 29.9 | 5 | 58 | 14 | |
| | 15 | 22.3 | 29 | 206.0 | 102.0 | 8.0 | 6.2 | 7.6 | 174.8 | 6.38 | 28.1 | 5 | 58 | 16 | |
| | 15.5 | 23.0 | 29 | 203.2 | 101.6 | 9.3 | 5.2 | 7.6 | 169.4 | 5.46 | 32.6 | 5 | 58 | 17 | |
| W8 8 x 5 1/4 (203 x 133) | 17 | 25.3 | 32 | 203.2 | 133.4 | 7.8 | 5.8 | 7.6 | 172.4 | 8.55 | 29.5 | 5 | 74 | 15 | |
| | 18 | 26.8 | 34 | 206.8 | 133.4 | 8.4 | 5.8 | 7.6 | 174.8 | 7.96 | 29.9 | 5 | 74 | 16 | |
| | 20 | 30.0 | 38 | 206.8 | 133.8 | 9.6 | 6.3 | 7.6 | 172.4 | 6.97 | 27.4 | 5 | 74 | 17 | |
| | 21 | 31.3 | 40 | 210.3 | 133.9 | 10.2 | 6.4 | 7.6 | 174.7 | 6.59 | 27.5 | 5 | 74 | 18 | |
| W8 8 x 6 1/2 (203 x 165) | 24 | 35.7 | 46 | 201.4 | 165.0 | 10.2 | 6.2 | 10.2 | 160.7 | 8.12 | 25.8 | 5 | 89 | 20 | |
| | 28 | 41.7 | 53 | 204.7 | 166.0 | 11.8 | 7.2 | 10.2 | 160.7 | 7.03 | 22.2 | 6 | 89 | 22 | |
| W8 8 x 8 (203 x 203) | 31 | 46.1 | 59 | 203.2 | 203.1 | 11.1 | 7.2 | 10.2 | 160.7 | 9.19 | 22.2 | 6 | 108 | 21 | |
| | 35 | 52.1 | 66 | 206.2 | 203.7 | 12.6 | 7.9 | 10.2 | 160.7 | 8.10 | 20.4 | 6 | 108 | 23 | |
| | 40 | 59.5 | 76 | 209.6 | 205.0 | 14.2 | 9.1 | 10.2 | 160.8 | 7.21 | 17.6 | 7 | 108 | 24 | |
| | 48 | 71.4 | 91 | 215.9 | 206.0 | 17.4 | 10.2 | 10.2 | 160.7 | 5.92 | 15.8 | 7 | 108 | 28 | |
| | 58 | 86.3 | 110 | 222.2 | 208.8 | 20.6 | 13.0 | 10.2 | 160.7 | 5.08 | 12.4 | 8 | 108 | 31 | |
| | 67 | 99.7 | 127 | 228.6 | 210.3 | 23.8 | 14.5 | 10.2 | 160.7 | 4.43 | 11.1 | 9 | 108 | 34 | |
| W10 10 x 4 (254 x 102) | 12 | 17.9 | 23 | 250.7 | 100.6 | 5.3 | 4.8 | 7.6 | 224.8 | 9.44 | 46.5 | 4 | 58 | 13 | |
| | 15 | 22.3 | 28 | 253.7 | 101.6 | 6.9 | 5.8 | 7.6 | 224.7 | 7.41 | 38.5 | 5 | 58 | 14 | |
| | 17 | 25.3 | 32 | 256.8 | 101.9 | 8.4 | 6.1 | 7.6 | 224.8 | 6.08 | 36.9 | 5 | 58 | 16 | |
| | 19 | 28.3 | 36 | 260.1 | 102.1 | 10.0 | 6.4 | 7.6 | 224.8 | 5.09 | 35.4 | 5 | 58 | 18 | |
| W10 10 x 5 3/4 (254 x 146) | 21 | 31.3 | 40 | 251.5 | 146.1 | 8.6 | 6.1 | 7.6 | 219.1 | 8.49 | 35.9 | 5 | 80 | 16 | |
| | 22 | 32.7 | 42 | 258.3 | 146.0 | 9.1 | 6.1 | 7.6 | 224.8 | 7.99 | 36.8 | 5 | 80 | 17 | |
| | 25 | 37.2 | 47 | 256 | 146.4 | 10.9 | 6.4 | 7.6 | 219.0 | 6.72 | 34.2 | 5 | 80 | 19 | |
| | 26 | 38.7 | 49 | 262.4 | 146.6 | 11.2 | 6.6 | 7.6 | 224.8 | 6.56 | 34.1 | 5 | 80 | 19 | |
| | 29 | 43.0 | 55 | 259.6 | 147.3 | 12.7 | 7.3 | 7.6 | 219.0 | 5.80 | 30.0 | 6 | 80 | 20 | |
| | 30 | 44.6 | 57 | 265.9 | 147.6 | 13.0 | 7.6 | 7.6 | 224.8 | 5.70 | 29.5 | 6 | 80 | 21 | |
| W10 10 x 8 (254 x 203) | 33 | 49.1 | 63 | 247.4 | 202.2 | 11.1 | 7.4 | 12.7 | 199.9 | 9.15 | 27.1 | 6 | 107 | 24 | |
| | 39 | 58.0 | 74 | 252.0 | 202.8 | 13.5 | 8.0 | 12.7 | 199.7 | 7.53 | 25.0 | 6 | 107 | 26 | |
| | 45 | 67.0 | 86 | 256.5 | 203.7 | 15.8 | 8.9 | 12.7 | 199.6 | 6.47 | 22.5 | 6 | 107 | 28 | |
| W10 10 x 10 (254 x 254) | 49 | 72.9 | 93 | 253.5 | 254.0 | 14.2 | 8.6 | 12.7 | 199.7 | 8.93 | 23.1 | 6 | 133 | 27 | |
| | 54 | 80.4 | 102 | 256.3 | 254.8 | 15.6 | 9.4 | 12.7 | 199.7 | 8.16 | 21.2 | 7 | 133 | 28 | |

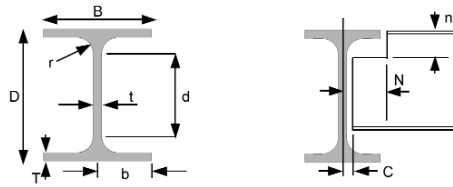
Wide Flange Beams



Imperial Units

| Designation | | Surface | | Second | | Radius | | Elastic | | Plastic | | Buckling | Torsional | Warping | Torsional |
|----------------------------|----------------|----------------|----------------|-----------------|-----------------|----------|----------|-----------------|-----------------|-----------------|-----------------|----------|------------|-----------------|-----------------|
| Size | Mass Per Metre | Area per Metre | Moment of Area | | of Gyration | | Modulus | | Modulus | | Parameter u | Index x | Constant H | Constant J | |
| | | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | | | | | |
| in (mm) | lb/ft | kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ³ | cm ³ | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ |
| W4 4 x 4 (102 x 102) | 13 | 19.4 | 0.60 | 472 | 160 | 4.4 | 2.5 | 89 | 31 | 103 | 48 | 0.836 | 10.9 | 0.00377 | 6.29 |
| W5 5 x 3 (127 x 76) | 9 | 13.0 | 0.54 | 473 | 56 | 5.3 | 1.8 | 74 | 15 | 84 | 23 | 0.892 | 16.6 | 0.00200 | 2.77 |
| W5 5 x 5 (127 x 127) | 16 | 23.8 | 0.74 | 892 | 312 | 5.4 | 3.2 | 140 | 49 | 158 | 75 | 0.842 | 13.0 | 0.0109 | 8.00 |
| | 19 | 28.3 | 0.75 | 1093 | 380 | 5.5 | 3.3 | 167 | 60 | 190 | 91 | 0.845 | 11.2 | 0.0137 | 13.1 |
| W6 6 x 3 1/2 (152 x 89) | 11 | 16.0 | 0.64 | 831 | 90 | 6.4 | 2.1 | 109 | 20 | 123 | 31 | 0.888 | 19.9 | 0.00473 | 3.45 |
| W6 6 x 4 (152 x 102) | 9 | 13.4 | 0.68 | 683 | 91 | 6.3 | 2.3 | 91 | 18 | 102 | 28 | 0.859 | 21.8 | 0.00477 | 2.43 |
| | 12 | 17.9 | 0.69 | 918 | 125 | 6.3 | 2.3 | 120 | 25 | 136 | 38 | 0.869 | 20.4 | 0.00665 | 3.76 |
| | 16 | 23.8 | 0.70 | 1338 | 185 | 6.6 | 2.5 | 168 | 36 | 191 | 56 | 0.897 | 16.0 | 0.0103 | 8.56 |
| W6 6 x 6 (152 x 152) | 15 | 22.3 | 0.89 | 1209 | 387 | 6.5 | 3.7 | 159 | 51 | 176 | 78 | 0.838 | 21.5 | 0.0205 | 4.20 |
| | 16 | 23.0 | 0.89 | 1251 | 402 | 6.5 | 3.7 | 164 | 53 | 183 | 80 | 0.837 | 20.8 | 0.0213 | 4.65 |
| | 20 | 29.8 | 0.90 | 1723 | 553 | 6.7 | 3.8 | 219 | 72 | 244 | 110 | 0.847 | 16.3 | 0.0304 | 10.0 |
| | 25 | 37.2 | 0.91 | 2224 | 710 | 6.9 | 3.9 | 274 | 92 | 310 | 140 | 0.848 | 13.4 | 0.0402 | 19.2 |
| W7 7 x 4 (178 x 102) | 13 | 19.0 | 0.74 | 1357 | 138 | 7.5 | 2.4 | 153 | 27 | 171 | 42 | 0.889 | 22.6 | 0.00998 | 4.38 |
| W8 8 x 4 (203 x 102) | 10 | 14.9 | 0.78 | 1284 | 87 | 8.2 | 2.1 | 128 | 17 | 145 | 27 | 0.867 | 36.3 | 0.00832 | 1.78 |
| | 13 | 19.4 | 0.79 | 1647 | 114 | 8.2 | 2.1 | 162 | 22 | 187 | 35 | 0.861 | 29.0 | 0.0110 | 3.63 |
| | 15 | 22.3 | 0.79 | 1999 | 142 | 8.4 | 2.2 | 194 | 28 | 222 | 44 | 0.869 | 25.2 | 0.0139 | 5.68 |
| | 16 | 23.0 | 0.79 | 2091 | 163 | 8.5 | 2.4 | 206 | 32 | 232 | 49 | 0.890 | 22.5 | 0.0153 | 6.9 |
| W8 8 x 5 1/4 (203 x 133) | 17 | 25.3 | 0.92 | 2351 | 309 | 8.5 | 3.1 | 231 | 46 | 259 | 71 | 0.876 | 25.5 | 0.02950 | 6.08 |
| | 18 | 26.8 | 0.92 | 2606 | 332 | 8.7 | 3.1 | 252 | 50 | 282 | 77 | 0.880 | 23.0 | 0.0327 | 8.22 |
| | 20 | 30.0 | 0.92 | 2888 | 384 | 8.7 | 3.2 | 279 | 57 | 313 | 88 | 0.882 | 21.5 | 0.0373 | 10.21 |
| | 21 | 31.3 | 0.93 | 3133 | 407 | 8.9 | 3.2 | 298 | 61 | 334 | 93 | 0.885 | 20.8 | 0.0408 | 11.8 |
| W8 8 x 6 1/2 (203 x 165) | 24 | 35.7 | 1.03 | 3446 | 761 | 8.7 | 4.1 | 342 | 92 | 379 | 141 | 0.876 | 19.2 | 0.0696 | 14.5 |
| | 28 | 41.7 | 1.04 | 4080 | 901 | 8.8 | 4.1 | 399 | 109 | 445 | 166 | 0.875 | 16.8 | 0.0838 | 22.4 |
| W8 8 x 8 (203 x 203) | 31 | 46.1 | 1.19 | 4576 | 1544 | 8.8 | 5.1 | 450 | 152 | 498 | 231 | 0.847 | 17.6 | 0.143 | 22.4 |
| | 35 | 52.1 | 1.19 | 5266 | 1772 | 8.9 | 5.2 | 511 | 174 | 568 | 264 | 0.849 | 15.8 | 0.166 | 32.1 |
| | 40 | 59.5 | 1.20 | 6096 | 2043 | 9.0 | 5.2 | 582 | 199 | 652 | 303 | 0.848 | 14.1 | 0.195 | 46.7 |
| | 48 | 71.4 | 1.22 | 7652 | 2537 | 9.2 | 5.3 | 709 | 246 | 803 | 375 | 0.853 | 11.9 | 0.250 | 81.7 |
| | 58 | 86.3 | 1.24 | 9471 | 3125 | 9.3 | 5.3 | 852 | 299 | 980 | 457 | 0.850 | 10.2 | 0.318 | 139 |
| | 67 | 99.7 | 1.25 | 11313 | 3687 | 9.4 | 5.4 | 990 | 351 | 1150 | 536 | 0.852 | 9.00 | 0.387 | 211 |
| W10 10 x 4 (254 x 102) | 12 | 17.9 | 0.88 | 2241 | 91 | 9.9 | 2.0 | 179 | 18 | 207 | 29 | 0.851 | 44.0 | 0.0137 | 2.28 |
| | 15 | 22.3 | 0.89 | 2866 | 120 | 10.0 | 2.1 | 226 | 24 | 262 | 38 | 0.855 | 35.8 | 0.0183 | 4.33 |
| | 17 | 25.3 | 0.90 | 3409 | 148 | 10.3 | 2.1 | 265 | 29 | 306 | 46 | 0.865 | 31.3 | 0.0229 | 6.49 |
| | 19 | 28.3 | 0.90 | 4005 | 179 | 10.5 | 2.2 | 308 | 35 | 353 | 55 | 0.873 | 27.4 | 0.0279 | 9.68 |
| W10 10 x 5 3/4 (254 x 146) | 21 | 31.3 | 1.06 | 4428 | 448 | 10.5 | 3.3 | 352 | 61 | 395 | 94 | 0.879 | 29.5 | 0.0660 | 8.66 |
| | 22 | 32.7 | 1.08 | 4917 | 475 | 10.8 | 3.4 | 381 | 65 | 426 | 100 | 0.882 | 28.9 | 0.0737 | 9.96 |
| | 25 | 37.2 | 1.07 | 5548 | 571 | 10.8 | 3.5 | 433 | 78 | 485 | 119 | 0.889 | 24.3 | 0.0857 | 15.5 |
| | 26 | 38.7 | 1.08 | 6006 | 588 | 11.1 | 3.5 | 458 | 80 | 513 | 123 | 0.888 | 24.3 | 0.0927 | 16.8 |
| | 29 | 43.0 | 1.08 | 6555 | 677 | 10.9 | 3.5 | 505 | 92 | 568 | 141 | 0.890 | 21.1 | 0.1032 | 24.0 |
| | 30 | 44.6 | 1.09 | 7068 | 695 | 11.1 | 3.5 | 532 | 94 | 599 | 145 | 0.888 | 21.3 | 0.111 | 25.9 |
| W10 10 x 8 (254 x 203) | 33 | 49.1 | 1.27 | 7115 | 1524 | 10.7 | 4.9 | 575 | 151 | 637 | 230 | 0.873 | 21.5 | 0.213 | 24.3 |
| | 39 | 58.0 | 1.28 | 8701 | 1873 | 10.8 | 5.0 | 691 | 185 | 768 | 281 | 0.878 | 18.2 | 0.266 | 40.6 |
| | 45 | 67.0 | 1.29 | 10322 | 2221 | 11.0 | 5.1 | 805 | 218 | 900 | 332 | 0.880 | 15.9 | 0.322 | 62.8 |
| W10 10 x 10 (254 x 254) | 49 | 72.9 | 1.48 | 11340 | 3886 | 11.0 | 6.5 | 895 | 306 | 989 | 464 | 0.849 | 17.2 | 0.556 | 57.8 |
| | 54 | 80.4 | 1.49 | 12603 | 4309 | 11.1 | 6.5 | 983 | 338 | 1092 | 513 | 0.849 | 15.8 | 0.624 | 75.9 |

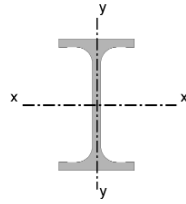
Wide Flange Beams



Imperial Units

| Size | Designation | | Area of Sect. | Depth of Sect. | Width of Sect. | Thickness | | Root Radius | Depth between Fillets | Ratios For Local Buckling | | Dimensions for Detailing | | | | | | |
|----------------------------|----------------|-------------|-----------------------|----------------|----------------|-----------|-----------|-------------|-----------------------|---------------------------|-----------|--------------------------|-----------|------------|-----------|-------------|-------|---|
| | Mass Per Metre | A | | | | D | B | | | T | t | r | d | Flange b/T | Web d/t | Clearance C | Notch | |
| | | | | | | | | | | | | | | | | | N | n |
| in (mm) | lb/ft | kg/m | cm² | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | | | |
| W10 10 x 10 (254 x 254) | 60 | 89.3 | 114 | 259.6 | 256.0 | 17.3 | 10.7 | 12.7 | 199.7 | 7.41 | 18.7 | 7 | 133 | 30 | | | | |
| | 68 | 101.2 | 129 | 264.2 | 257.3 | 19.6 | 11.9 | 12.7 | 199.7 | 6.58 | 16.7 | 8 | 133 | 32 | | | | |
| | 72 | 107.0 | 137 | 266.7 | 258.3 | 20.5 | 13.0 | 12.7 | 200.3 | 6.30 | 15.4 | 9 | 133 | 33 | | | | |
| | 77 | 114.6 | 146 | 269.2 | 258.8 | 22.1 | 13.5 | 12.7 | 199.6 | 5.86 | 14.8 | 9 | 133 | 35 | | | | |
| | 88 | 131.0 | 167 | 275.3 | 260.7 | 25.2 | 15.4 | 12.7 | 199.6 | 5.18 | 13.0 | 10 | 133 | 38 | | | | |
| | 89 | 132.0 | 169 | 276.4 | 261 | 25.3 | 15.6 | 12.7 | 200.4 | 5.16 | 12.8 | 10 | 133 | 38 | | | | |
| | 100 | 148.8 | 190 | 281.9 | 262.6 | 28.5 | 17.3 | 12.7 | 199.6 | 4.62 | 11.6 | 11 | 133 | 41 | | | | |
| W12 12 x 4 (305 x 102) | 14 | 20.8 | 27 | 302.5 | 100.8 | 5.7 | 5.1 | 7.6 | 275.8 | 8.81 | 54.3 | 5 | 58 | 13 | | | | |
| | 16 | 23.8 | 30 | 304.5 | 101.3 | 6.7 | 5.6 | 7.6 | 275.8 | 7.53 | 49.3 | 5 | 58 | 14 | | | | |
| | 16.5 | 25.0 | 31 | 304.8 | 101.6 | 6.8 | 5.8 | 7.6 | 276.0 | 7.47 | 47.6 | 5 | 58 | 14 | | | | |
| | 19 | 28.3 | 36 | 308.9 | 101.7 | 8.9 | 6.0 | 7.6 | 275.9 | 5.72 | 46.2 | 5 | 58 | 17 | | | | |
| | 22 | 32.7 | 42 | 312.7 | 102.4 | 10.8 | 6.6 | 7.6 | 275.9 | 4.74 | 41.8 | 5 | 58 | 18 | | | | |
| W12 12 x 5 (305 x 127) | 25 | 37.0 | 47 | 303.8 | 123.5 | 10.7 | 7.2 | 7.6 | 267.2 | 5.77 | 37.1 | 6 | 68 | 18 | | | | |
| | 28 | 42.0 | 53 | 306.6 | 124.3 | 12.1 | 8.0 | 7.6 | 267.2 | 5.14 | 33.4 | 6 | 68 | 20 | | | | |
| | 32.0 | 48.0 | 61 | 310.4 | 125.2 | 14.0 | 8.9 | 7.6 | 267.2 | 4.47 | 30.0 | 6 | 68 | 22 | | | | |
| W12 12 x 6 1/2 (305 x 165) | 26 | 38.7 | 49 | 310.4 | 164.8 | 9.7 | 5.8 | 7.6 | 275.9 | 8.54 | 47.2 | 5 | 89 | 17 | | | | |
| | 27 | 40.0 | 51 | 303.8 | 165.1 | 10.2 | 6.1 | 7.6 | 268.2 | 8.09 | 44.0 | 5 | 90 | 18 | | | | |
| | 30 | 44.6 | 57 | 313.4 | 165.6 | 11.2 | 6.6 | 7.6 | 275.8 | 7.41 | 41.8 | 5 | 90 | 19 | | | | |
| | 31 | 46.0 | 59 | 307.1 | 165.7 | 11.8 | 6.7 | 7.6 | 268.3 | 7.02 | 40.0 | 5 | 90 | 19 | | | | |
| | 35 | 52.1 | 67 | 317.5 | 166.6 | 13.2 | 7.6 | 7.6 | 275.8 | 6.31 | 36.2 | 6 | 89 | 21 | | | | |
| | 36 | 54.0 | 68 | 310.9 | 166.8 | 13.7 | 7.7 | 7.6 | 268.3 | 6.09 | 34.8 | 6 | 90 | 21 | | | | |
| W12 12 x 8 (305 x 203) | 40 | 59.5 | 76 | 303.3 | 203.3 | 13.1 | 7.5 | 15.2 | 246.7 | 7.77 | 32.9 | 6 | 108 | 28 | | | | |
| | 45 | 67.0 | 85 | 306.3 | 204.3 | 14.6 | 8.5 | 15.2 | 246.7 | 7.00 | 29.0 | 6 | 108 | 30 | | | | |
| | 50 | 74.4 | 95 | 309.6 | 205.2 | 16.3 | 9.4 | 15.2 | 246.7 | 6.31 | 26.2 | 7 | 108 | 31 | | | | |
| W12 12 x 10 (305 x 254) | 53 | 78.9 | 100 | 306.3 | 253.9 | 14.6 | 8.8 | 15.2 | 246.7 | 8.70 | 28.2 | 6 | 133 | 30 | | | | |
| | 58 | 86.3 | 110 | 309.6 | 254.3 | 16.3 | 9.1 | 15.2 | 246.7 | 7.82 | 27.0 | 7 | 133 | 31 | | | | |
| W12 12 x 12 (305 x 305) | 65 | 96.7 | 123 | 307.8 | 304.8 | 15.4 | 9.9 | 15.2 | 246.7 | 9.92 | 24.9 | 7 | 157 | 31 | | | | |
| | 72 | 107.1 | 136 | 311.2 | 305.8 | 17.0 | 10.9 | 15.2 | 246.8 | 8.98 | 22.6 | 7 | 157 | 32 | | | | |
| | 79 | 117.6 | 150 | 314.5 | 306.8 | 18.7 | 11.9 | 15.2 | 246.8 | 8.22 | 20.7 | 8 | 157 | 34 | | | | |
| | 87 | 129.5 | 165 | 318.3 | 308.0 | 20.6 | 13.1 | 15.2 | 246.8 | 7.49 | 18.9 | 9 | 157 | 36 | | | | |
| | 92 | 137.0 | 174 | 320.4 | 308.7 | 21.7 | 13.8 | 15.2 | 246.6 | 7.11 | 17.9 | 9 | 157 | 37 | | | | |
| | 96 | 142.9 | 182 | 322.8 | 308.9 | 22.9 | 14.0 | 15.2 | 246.7 | 6.76 | 17.7 | 9 | 157 | 38 | | | | |
| | 106 | 157.7 | 201 | 327.4 | 310.4 | 25.2 | 15.5 | 15.2 | 246.7 | 6.17 | 15.9 | 10 | 157 | 40 | | | | |
| | 120 | 178.6 | 228 | 333.2 | 312.9 | 28.1 | 18.0 | 15.2 | 246.7 | 5.57 | 13.7 | 11 | 157 | 43 | | | | |
| | 133 | 198.0 | 252 | 339.9 | 314.1 | 31.4 | 19.2 | 15.2 | 246.7 | 5.00 | 12.8 | 12 | 157 | 47 | | | | |
| | 136 | 202.4 | 258 | 340.6 | 315.0 | 31.8 | 20.1 | 15.2 | 246.7 | 4.96 | 12.3 | 12 | 157 | 47 | | | | |
| | 152 | 226.2 | 289 | 348.2 | 317.0 | 35.6 | 22.1 | 15.2 | 246.7 | 4.46 | 11.2 | 13 | 157 | 51 | | | | |
| | 161 | 240.0 | 305 | 352.6 | 317.9 | 37.7 | 23.0 | 15.2 | 246.8 | 4.22 | 10.7 | 14 | 157 | 53 | | | | |
| | 170 | 253.0 | 323 | 356.4 | 319.3 | 39.6 | 24.4 | 15.2 | 246.8 | 4.03 | 10.1 | 14 | 157 | 55 | | | | |
| | 190 | 282.8 | 360 | 365.3 | 321.8 | 44.1 | 26.9 | 15.2 | 246.8 | 3.65 | 9.2 | 15 | 157 | 59 | | | | |
| | 210 | 312.5 | 399 | 373.6 | 324.9 | 48.3 | 30.0 | 15.2 | 246.7 | 3.37 | 8.2 | 17 | 157 | 63 | | | | |
| 230 | 342.3 | 437 | 382.3 | 327.5 | 52.6 | 32.6 | 15.2 | 246.7 | 3.11 | 7.6 | 18 | 157 | 68 | | | | | |

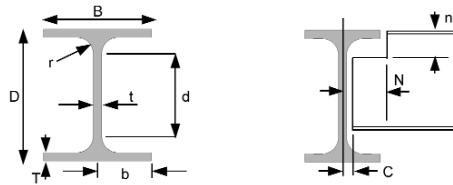
Wide Flange Beams



Imperial Units

| Designation | | Surface Area per Metre | Second Moment of Area | | Radius of Gyration | | Elastic Modulus | | Plastic Modulus | | Buckling Parameter u | Torsional Index x | Warping Constant H | Torsional Constant J | |
|----------------------------|----------------|------------------------|-----------------------|-----------------|--------------------|----------|-----------------|-----------------|-----------------|-----------------|----------------------|-------------------|--------------------|----------------------|-------|
| Size | Mass Per Metre | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | | | | | |
| in (mm) | lb/ft kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ² | cm ² | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ | |
| W10 10 x 10 (254 x 254) | 60 | 89.3 | 1.50 | 14184 | 4833 | 11.2 | 6.5 | 1093 | 378 | 1222 | 573 | 0.848 | 14.4 | 0.709 | 103 |
| | 68 | 101.2 | 1.51 | 16394 | 5558 | 11.3 | 6.6 | 1241 | 432 | 1398 | 657 | 0.849 | 12.9 | 0.832 | 148 |
| | 72 | 107.0 | 1.52 | 17499 | 5894 | 11.3 | 6.6 | 1312 | 456 | 1484 | 695 | 0.848 | 12.4 | 0.893 | 173 |
| | 77 | 114.6 | 1.52 | 18952 | 6391 | 11.4 | 6.6 | 1408 | 494 | 1599 | 752 | 0.849 | 11.6 | 0.976 | 213 |
| | 88 | 131.0 | 1.54 | 22209 | 7436 | 11.5 | 6.7 | 1613 | 570 | 1850 | 869 | 0.850 | 10.3 | 1.16 | 314 |
| | 89 | 132.0 | 1.54 | 22552 | 7506 | 11.6 | 6.7 | 1632 | 575 | 1872 | 877 | 0.850 | 10.3 | 1.183 | 321 |
| | 100 | 148.8 | 1.56 | 25902 | 8598 | 11.7 | 6.7 | 1838 | 655 | 2127 | 999 | 0.851 | 9.3 | 1.38 | 452 |
| | 112 | 166.7 | 1.57 | 29744 | 9805 | 11.9 | 6.8 | 2062 | 741 | 2406 | 1132 | 0.869 | 8.8 | 1.62 | 575 |
| W12 12 x 4 (305 x 102) | 14 | 20.8 | 0.98 | 3686 | 98 | 11.7 | 1.9 | 244 | 19 | 286 | 31 | 0.842 | 50.8 | 0.0216 | 2.93 |
| | 16 | 23.8 | 0.99 | 4274 | 117 | 11.9 | 2.0 | 281 | 23 | 329 | 37 | 0.846 | 45.0 | 0.0260 | 4.27 |
| | 17 | 25.0 | 0.99 | 4365 | 119 | 11.8 | 2.0 | 286 | 24 | 336 | 38 | 0.844 | 44.1 | 0.0265 | 4.57 |
| | 19 | 28.3 | 1.00 | 5401 | 157 | 12.3 | 2.1 | 350 | 31 | 405 | 49 | 0.860 | 37.2 | 0.0352 | 7.51 |
| | 22 | 32.7 | 1.01 | 6502 | 194 | 12.5 | 2.2 | 416 | 38 | 481 | 60 | 0.866 | 31.6 | 0.0442 | 12.2 |
| W12 12 x 5 (305 x 127) | 25 | 37.0 | 1.07 | 7127 | 337 | 12.3 | 2.7 | 469 | 55 | 538 | 86 | 0.871 | 29.9 | 0.0724 | 14.55 |
| | 28 | 42.0 | 1.08 | 8124 | 389 | 12.4 | 2.7 | 530 | 63 | 609 | 98 | 0.871 | 26.8 | 0.0843 | 20.65 |
| | 32 | 48.0 | 1.09 | 9473 | 460 | 12.5 | 2.8 | 610 | 73 | 704 | 116 | 0.874 | 23.5 | 0.1010 | 30.85 |
| W12 12 x 6 1/2 (305 x 165) | 26 | 38.7 | 1.26 | 8498 | 720 | 13.1 | 3.8 | 548 | 87 | 609 | 134 | 0.887 | 33.8 | 0.163 | 12.5 |
| | 27 | 40.0 | 1.24 | 8516 | 766 | 12.9 | 3.9 | 561 | 93 | 624 | 142 | 0.888 | 31.3 | 0.165 | 14.5 |
| | 30 | 44.6 | 1.26 | 9918 | 847 | 13.2 | 3.9 | 633 | 102 | 706 | 157 | 0.888 | 29.5 | 0.193 | 19.0 |
| | 31 | 46.0 | 1.25 | 9900 | 896 | 13.0 | 3.9 | 645 | 108 | 719 | 165 | 0.890 | 27.4 | 0.195 | 21.8 |
| | 35 | 52.1 | 1.27 | 11864 | 1019 | 13.3 | 3.9 | 747 | 122 | 838 | 188 | 0.889 | 25.3 | 0.236 | 30.8 |
| | 36 | 54.0 | 1.26 | 11659 | 1061 | 13.1 | 3.9 | 750 | 127 | 841 | 195 | 0.891 | 23.9 | 0.234 | 33.8 |
| W12 12 x 8 (305 x 203) | 40 | 59.5 | 1.38 | 12898 | 1834 | 13.0 | 4.9 | 851 | 180 | 942 | 276 | 0.890 | 22.7 | 0.386 | 39.6 |
| | 45 | 67.0 | 1.39 | 14572 | 2078 | 13.1 | 4.9 | 952 | 203 | 1060 | 311 | 0.889 | 20.6 | 0.442 | 54.6 |
| | 50 | 74.4 | 1.40 | 16399 | 2345 | 13.2 | 5.0 | 1059 | 229 | 1186 | 350 | 0.889 | 18.8 | 0.505 | 74.1 |
| W12 12 x 10 (305 x 254) | 53 | 78.9 | 1.58 | 17700 | 3986 | 13.3 | 6.3 | 1156 | 314 | 1276 | 477 | 0.876 | 20.4 | 0.848 | 65.6 |
| | 58 | 86.3 | 1.59 | 19791 | 4460 | 13.4 | 6.4 | 1279 | 351 | 1415 | 533 | 0.879 | 18.6 | 0.960 | 87.3 |
| W12 12 x 12 (305 x 305) | 65 | 96.7 | 1.79 | 22169 | 7258 | 13.4 | 7.7 | 1440 | 476 | 1587 | 722 | 0.850 | 19.3 | 1.55 | 90.7 |
| | 72 | 107.1 | 1.80 | 24847 | 8117 | 13.5 | 7.7 | 1597 | 531 | 1768 | 806 | 0.850 | 17.6 | 1.76 | 122 |
| | 79 | 117.6 | 1.81 | 27579 | 8992 | 13.6 | 7.8 | 1754 | 586 | 1951 | 890 | 0.851 | 16.2 | 1.97 | 160 |
| | 87 | 129.5 | 1.82 | 30809 | 10025 | 13.7 | 7.8 | 1936 | 651 | 2164 | 990 | 0.851 | 14.9 | 2.22 | 212 |
| | 92 | 137.0 | 1.82 | 32743 | 10648 | 13.7 | 7.8 | 2044 | 690 | 2292 | 1049 | 0.851 | 14.2 | 2.38 | 249 |
| | 96 | 142.9 | 1.83 | 34665 | 11239 | 13.8 | 7.9 | 2148 | 728 | 2413 | 1106 | 0.853 | 13.6 | 2.53 | 285 |
| | 106 | 157.7 | 1.84 | 38850 | 12547 | 13.9 | 7.9 | 2373 | 808 | 2684 | 1230 | 0.853 | 12.4 | 2.87 | 380 |
| | 120 | 178.6 | 1.86 | 44561 | 14349 | 14.0 | 7.9 | 2675 | 917 | 3053 | 1399 | 0.851 | 11.2 | 3.34 | 537 |
| | 133 | 198.0 | 1.87 | 50862 | 16238 | 14.2 | 8.0 | 2993 | 1034 | 3438 | 1577 | 0.854 | 10.2 | 3.86 | 735 |
| | 136 | 202.4 | 1.87 | 51790 | 16562 | 14.2 | 8.0 | 3041 | 1052 | 3501 | 1606 | 0.852 | 10.1 | 3.95 | 771 |
| | 152 | 226.2 | 1.89 | 59609 | 18909 | 14.4 | 8.1 | 3424 | 1193 | 3975 | 1823 | 0.853 | 9.17 | 4.62 | 1074 |
| | 161 | 240.0 | 1.90 | 64152 | 20220 | 14.5 | 8.1 | 3639 | 1272 | 4243 | 1945 | 0.854 | 8.74 | 5.01 | 1270 |
| | 170 | 253.0 | 1.92 | 68494 | 21535 | 14.6 | 8.2 | 3844 | 1349 | 4502 | 2064 | 0.854 | 8.37 | 5.40 | 1480 |
| | 190 | 282.8 | 1.94 | 78768 | 24528 | 14.8 | 8.3 | 4313 | 1524 | 5099 | 2335 | 0.855 | 7.66 | 6.33 | 2031 |
| | 210 | 312.5 | 1.96 | 89266 | 27655 | 15.0 | 8.3 | 4779 | 1702 | 5703 | 2613 | 0.855 | 7.08 | 7.32 | 2693 |
| 230 | 342.3 | 1.98 | 100550 | 30871 | 15.2 | 8.4 | 5260 | 1885 | 6331 | 2897 | 0.855 | 6.60 | 8.39 | 3488 | |

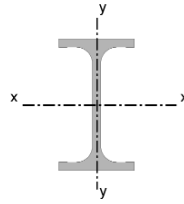
Wide Flange Beams



Imperial Units

| Size | Designation | | Area of Sect. | Depth of Sect. | Width of Sect. | Thickness | | Root Radius | Depth between Fillets | Ratios For Local Buckling | | Dimensions for Detailing | | | | | | |
|----------------------------|-------------------------|-------|-----------------|----------------|----------------|-----------|------|-------------|-----------------------|---------------------------|------|--------------------------|-----|------------|---------|-------------|-------|-------|
| | Mass Per Metre | A | | | | D | B | | | T | t | r | d | Flange b/T | Web d/t | Clearance C | Notch | |
| | | | | | | | | | | | | | | | | | End | Notch |
| in (mm) | lb/ft | kg/m | cm ² | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | | |
| W12 12 x 12 (305 x 305) | 252 | 375.0 | 478 | 391.4 | 330.3 | 57.2 | 35.4 | 15.2 | 246.7 | 2.89 | 7.0 | 20 | 157 | 72 | | | | |
| | 279 | 415.2 | 529 | 402.6 | 333.8 | 62.7 | 38.9 | 15.2 | 246.7 | 2.66 | 6.3 | 21 | 157 | 78 | | | | |
| | 305 | 453.9 | 578 | 414.5 | 336.2 | 68.7 | 41.3 | 15.2 | 246.7 | 2.45 | 6.0 | 23 | 157 | 84 | | | | |
| | 336 | 500.0 | 637 | 427.2 | 340.0 | 75.1 | 45.1 | 15.2 | 246.7 | 2.26 | 5.5 | 25 | 157 | 90 | | | | |
| W14 14 x 5 (356 x 127) | 22 | 32.7 | 42 | 349.0 | 127.0 | 8.5 | 5.8 | 10.2 | 311.6 | 7.46 | 53.4 | 5 | 71 | 19 | | | | |
| | 26 | 38.7 | 50 | 353.3 | 127.6 | 10.7 | 6.5 | 10.2 | 311.6 | 5.98 | 48.1 | 5 | 71 | 21 | | | | |
| W14 14 x 6 3/4 (356 x 171) | 30 | 44.6 | 57 | 351.5 | 170.9 | 9.8 | 6.9 | 10.2 | 311.5 | 8.74 | 45.4 | 5 | 92 | 20 | | | | |
| | 34 | 50.6 | 65 | 355.1 | 171.3 | 11.6 | 7.2 | 10.2 | 311.6 | 7.41 | 43.0 | 6 | 92 | 22 | | | | |
| | 38 | 56.6 | 72 | 358.1 | 172.0 | 13.1 | 7.9 | 10.2 | 311.5 | 6.57 | 39.6 | 6 | 92 | 23 | | | | |
| | 45 | 67.0 | 86 | 364 | 173.2 | 15.7 | 9.1 | 10.2 | 312.2 | 5.52 | 34.3 | 7 | 92 | 26 | | | | |
| W14 14 x 8 (356 x 203) | 43 | 64.0 | 81 | 347.0 | 203.1 | 13.5 | 7.8 | 15.2 | 289.7 | 7.54 | 37.4 | 6 | 108 | 29 | | | | |
| | 48 | 71.4 | 91 | 350.3 | 204.0 | 15.1 | 8.6 | 15.2 | 289.7 | 6.75 | 33.5 | 6 | 108 | 30 | | | | |
| | 53 | 78.9 | 101 | 356.6 | 204.7 | 16.8 | 9.4 | 15.2 | 292.7 | 6.11 | 31.1 | 7 | 108 | 32 | | | | |
| W14 14 x 10 (356 x 254) | 61 | 90.8 | 119 | 385.8 | 253.9 | 16.4 | 9.5 | 15.2 | 322.6 | 7.75 | 33.9 | 7 | 132 | 32 | | | | |
| | 68 | 101.2 | 129 | 356.6 | 254.9 | 18.3 | 10.5 | 15.2 | 289.6 | 6.97 | 27.5 | 7 | 132 | 33 | | | | |
| | 74 | 110.1 | 141 | 359.9 | 255.8 | 19.9 | 11.4 | 15.2 | 289.6 | 6.41 | 25.3 | 8 | 132 | 35 | | | | |
| | 82 | 122.0 | 155 | 363.5 | 257.3 | 21.7 | 13.0 | 15.2 | 289.7 | 5.92 | 22.4 | 8 | 132 | 37 | | | | |
| W14 14 x 14 1/2 (356x368) | 87 | 129.0 | 165 | 355.6 | 368.3 | 17.5 | 10.7 | 15.2 | 290.2 | 10.52 | 27.1 | 7 | 189 | 33 | | | | |
| | 90 | 133.9 | 171 | 356.1 | 368.8 | 18.0 | 11.2 | 15.2 | 289.6 | 10.23 | 25.9 | 8 | 189 | 33 | | | | |
| | 99 | 147.3 | 188 | 359.7 | 370.0 | 19.8 | 12.3 | 15.2 | 289.7 | 9.34 | 23.5 | 8 | 189 | 35 | | | | |
| | 103 | 153.0 | 196 | 362.0 | 370.2 | 20.7 | 12.6 | 15.2 | 290.2 | 8.94 | 23.0 | 8 | 189 | 36 | | | | |
| | 109 | 162.2 | 207 | 363.7 | 371.0 | 21.8 | 13.3 | 15.2 | 289.6 | 8.49 | 21.7 | 9 | 189 | 37 | | | | |
| | 119 | 177.0 | 226 | 368.3 | 372.1 | 23.8 | 14.5 | 15.2 | 290.3 | 7.82 | 20.0 | 9 | 189 | 39 | | | | |
| | 120 | 178.6 | 228 | 367.8 | 372.6 | 23.9 | 15.0 | 15.2 | 289.6 | 7.80 | 19.3 | 9 | 189 | 39 | | | | |
| | 132 | 196.4 | 250 | 372.4 | 374.0 | 26.2 | 16.4 | 15.2 | 289.7 | 7.15 | 17.7 | 10 | 189 | 41 | | | | |
| | 136 | 202.0 | 258 | 374.7 | 374.4 | 27.0 | 16.8 | 15.2 | 290.3 | 6.93 | 17.3 | 10 | 189 | 42 | | | | |
| | W14 14 x 16 (356 x 406) | 145 | 215.8 | 275 | 375.4 | 393.7 | 27.7 | 17.3 | 15.2 | 289.6 | 7.11 | 16.8 | 11 | 198 | 43 | | | |
| 158 | | 235.0 | 315 | 381.0 | 395.0 | 32.2 | 18.5 | 15.2 | 286.2 | 6.13 | 15.5 | 11 | 198 | 47 | | | | |
| 159 | | 236.6 | 302 | 380.5 | 395.4 | 30.2 | 18.9 | 15.2 | 289.6 | 6.54 | 15.3 | 11 | 198 | 45 | | | | |
| 176 | | 261.9 | 334 | 386.6 | 397.5 | 33.3 | 21.1 | 15.2 | 289.7 | 5.97 | 13.7 | 13 | 198 | 48 | | | | |
| 193 | | 287.2 | 366 | 393.2 | 399.0 | 36.6 | 22.6 | 15.2 | 289.6 | 5.45 | 12.8 | 13 | 198 | 52 | | | | |
| 211 | | 314.0 | 400 | 399.3 | 401.3 | 39.6 | 24.9 | 15.2 | 289.7 | 5.06 | 11.6 | 14 | 198 | 55 | | | | |
| 228 | | 340.0 | 433 | 406.4 | 403 | 42.9 | 26.5 | 15.2 | 290.2 | 4.70 | 11.0 | 15 | 198 | 58 | | | | |
| 233 | | 346.7 | 441 | 407.4 | 403.3 | 43.7 | 27.2 | 15.2 | 289.6 | 4.62 | 10.7 | 16 | 198 | 59 | | | | |
| 257 | | 382.5 | 488 | 416.1 | 406.3 | 48.0 | 29.8 | 15.2 | 289.7 | 4.23 | 9.7 | 17 | 198 | 63 | | | | |
| 264 | | 393.0 | 501 | 419.1 | 407 | 49.2 | 30.6 | 15.2 | 290.3 | 4.14 | 9.5 | 17 | 198 | 64 | | | | |
| 283 | | 421.1 | 537 | 425.2 | 409.2 | 52.6 | 32.8 | 15.2 | 289.6 | 3.89 | 8.8 | 18 | 198 | 68 | | | | |
| 311 | | 462.8 | 590 | 434.8 | 412.2 | 57.4 | 35.8 | 15.2 | 289.6 | 3.59 | 8.1 | 20 | 198 | 73 | | | | |
| 314 | | 467.0 | 595 | 436.6 | 412.4 | 58.0 | 35.9 | 15.2 | 290.2 | 3.56 | 8.1 | 20 | 198 | 73 | | | | |
| 342 | | 509.0 | 649 | 445.5 | 415.5 | 62.7 | 39.1 | 15.2 | 289.6 | 3.31 | 7.4 | 22 | 198 | 78 | | | | |
| 370 | 550.6 | 702 | 455.2 | 418.5 | 67.6 | 42.0 | 15.2 | 289.7 | 3.10 | 6.9 | 23 | 198 | 83 | | | | | |
| 398 | 592.3 | 755 | 464.6 | 421.4 | 72.3 | 45.0 | 15.2 | 289.7 | 2.92 | 6.4 | 24 | 198 | 87 | | | | | |

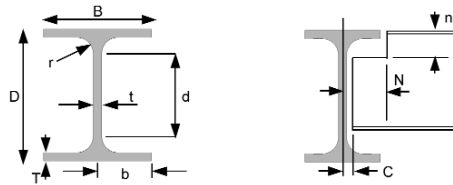
Wide Flange Beams



Imperial Units

| Designation | | Surface Area per Metre | Second Moment of Area | | Radius of Gyration | | Elastic Modulus | | Plastic Modulus | | Buckling Parameter u | Torsional Index x | Warping Constant H | Torsional Constant J | |
|-----------------------------|----------------|------------------------|-----------------------|-----------------|--------------------|----------|-----------------|-----------------|-----------------|-----------------|----------------------|-------------------|--------------------|----------------------|-------|
| Size | Mass Per Metre | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | | | | | |
| in (mm) | lb/ft kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ³ | cm ³ | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ | |
| W12 12 x 12 (305 x 305) | 252 | 375.0 | 2.01 | 113120 | 34436 | 15.4 | 8.5 | 5780 | 2085 | 7016 | 3209 | 0.856 | 6.17 | 9.62 | 4487 |
| | 279 | 415.2 | 2.04 | 129577 | 39038 | 15.7 | 8.6 | 6437 | 2339 | 7890 | 3604 | 0.857 | 5.73 | 11.3 | 5953 |
| | 305 | 453.9 | 2.07 | 147604 | 43692 | 16.0 | 8.7 | 7122 | 2599 | 8807 | 4006 | 0.860 | 5.36 | 13.1 | 7720 |
| | 336 | 500.0 | 2.10 | 168980 | 49395 | 16.3 | 8.8 | 7911 | 2906 | 9879 | 4484 | 0.861 | 5.01 | 15.3 | 10097 |
| W14 14 x 5 (356 x 127) | 22 | 32.7 | 1.18 | 8286 | 291 | 14.1 | 2.6 | 475 | 46 | 544 | 72 | 0.865 | 42.4 | 0.0845 | 8.66 |
| | 26 | 38.7 | 1.19 | 10209 | 371 | 14.3 | 2.7 | 578 | 58 | 660 | 91 | 0.873 | 35.4 | 0.109 | 14.9 |
| W14 14 x 6 3/4 (356 x 171) | 30 | 44.6 | 1.36 | 12092 | 815 | 14.6 | 3.8 | 688 | 95 | 775 | 147 | 0.876 | 36.7 | 0.238 | 15.8 |
| | 34 | 50.6 | 1.36 | 14137 | 970 | 14.8 | 3.9 | 796 | 113 | 894 | 174 | 0.882 | 32.1 | 0.286 | 23.7 |
| | 38 | 56.6 | 1.37 | 16035 | 1111 | 14.9 | 3.9 | 896 | 129 | 1008 | 199 | 0.885 | 28.7 | 0.331 | 33.2 |
| | 45 | 67.0 | 1.39 | 19536 | 1362 | 15.1 | 4.0 | 1073 | 157 | 1213 | 243 | 0.886 | 24.4 | 0.413 | 55.7 |
| W14 14 x 8 (356 x 203) | 43 | 64.0 | 1.46 | 17820 | 1882 | 14.8 | 4.8 | 1027 | 185 | 1141 | 284 | 0.891 | 25.8 | 0.524 | 43.7 |
| | 48 | 71.4 | 1.47 | 20176 | 2141 | 14.9 | 4.8 | 1152 | 210 | 1286 | 322 | 0.891 | 23.3 | 0.602 | 60.5 |
| | 53 | 78.9 | 1.49 | 22966 | 2400 | 15.1 | 4.9 | 1288 | 234 | 1443 | 360 | 0.892 | 21.5 | 0.693 | 80.9 |
| W14 14 x 10 (356 x 254) | 61 | 90.8 | 1.74 | 32483 | 4473 | 16.5 | 6.1 | 1684 | 352 | 1867 | 538 | 0.889 | 23.7 | 1.53 | 92.3 |
| | 68 | 101.2 | 1.69 | 30072 | 5054 | 15.3 | 6.3 | 1687 | 397 | 1878 | 605 | 0.886 | 19.4 | 1.45 | 126 |
| | 74 | 110.1 | 1.69 | 33117 | 5569 | 15.3 | 6.3 | 1840 | 435 | 2058 | 665 | 0.886 | 18.0 | 1.61 | 161 |
| | 82 | 122.0 | 1.70 | 36710 | 6175 | 15.4 | 6.3 | 2020 | 480 | 2273 | 734 | 0.884 | 16.6 | 1.80 | 211 |
| W14 14 x 14 1/2 (356 x 368) | 87 | 129.0 | 2.14 | 40298 | 14576 | 15.6 | 9.4 | 2267 | 792 | 2485 | 1198 | 0.843 | 19.8 | 4.17 | 154 |
| | 90 | 133.9 | 2.14 | 41576 | 15080 | 15.6 | 9.4 | 2335 | 818 | 2565 | 1238 | 0.842 | 19.2 | 4.31 | 169 |
| | 99 | 147.3 | 2.15 | 46240 | 16731 | 15.7 | 9.4 | 2571 | 904 | 2838 | 1370 | 0.842 | 17.7 | 4.83 | 223 |
| | 103 | 153.0 | 2.15 | 48636 | 17511 | 15.8 | 9.5 | 2687 | 946 | 2970 | 1433 | 0.844 | 17.0 | 5.10 | 252 |
| | 109 | 162.2 | 2.16 | 51542 | 18597 | 15.8 | 9.5 | 2834 | 1003 | 3143 | 1519 | 0.843 | 16.2 | 5.43 | 296 |
| | 119 | 177.0 | 2.17 | 57110 | 20447 | 15.9 | 9.5 | 3101 | 1099 | 3455 | 1667 | 0.844 | 15.0 | 6.07 | 382 |
| | 120 | 178.6 | 2.17 | 57288 | 20600 | 15.9 | 9.5 | 3115 | 1106 | 3475 | 1678 | 0.842 | 14.9 | 6.09 | 390 |
| | 132 | 196.4 | 2.18 | 63720 | 22824 | 16.0 | 9.6 | 3422 | 1221 | 3838 | 1853 | 0.843 | 13.7 | 6.84 | 511 |
| | 136 | 202.0 | 2.19 | 66335 | 23633 | 16.0 | 9.6 | 3541 | 1262 | 3978 | 1917 | 0.843 | 13.4 | 7.14 | 561 |
| W14 14 x 16 (356 x 406) | 145 | 215.8 | 2.26 | 71244 | 28180 | 16.1 | 10.1 | 3796 | 1432 | 4264 | 2172 | 0.832 | 13.0 | 8.52 | 632 |
| | 158 | 235.0 | 2.28 | 82959 | 33095 | 16.2 | 10.3 | 4355 | 1676 | 4931 | 2542 | 0.834 | 11.3 | 10.07 | 962 |
| | 159 | 236.6 | 2.28 | 79162 | 31168 | 16.2 | 10.2 | 4161 | 1577 | 4702 | 2394 | 0.833 | 12.0 | 9.56 | 822 |
| | 176 | 261.9 | 2.29 | 89041 | 34856 | 16.3 | 10.2 | 4606 | 1754 | 5244 | 2667 | 0.833 | 11.0 | 10.9 | 1101 |
| | 193 | 287.2 | 2.31 | 99800 | 38762 | 16.5 | 10.3 | 5076 | 1943 | 5815 | 2956 | 0.834 | 10.1 | 12.3 | 1449 |
| | 211 | 314.0 | 2.33 | 110549 | 42721 | 16.6 | 10.3 | 5537 | 2129 | 6387 | 3243 | 0.834 | 9.45 | 13.8 | 1854 |
| | 228 | 340.0 | 2.35 | 122516 | 46853 | 16.8 | 10.4 | 6029 | 2325 | 6997 | 3543 | 0.836 | 8.85 | 15.5 | 2340 |
| | 233 | 346.7 | 2.35 | 125015 | 47826 | 16.8 | 10.4 | 6137 | 2372 | 7136 | 3616 | 0.836 | 8.69 | 15.8 | 2477 |
| | 257 | 382.5 | 2.37 | 141538 | 53747 | 17.0 | 10.5 | 6803 | 2646 | 7975 | 4038 | 0.837 | 8.02 | 18.2 | 3292 |
| | 264 | 393.0 | 2.38 | 146701 | 55368 | 17.1 | 10.5 | 7001 | 2721 | 8225 | 4154 | 0.837 | 7.87 | 18.9 | 3545 |
| | 283 | 421.1 | 2.40 | 159799 | 60147 | 17.2 | 10.6 | 7516 | 2940 | 8887 | 4492 | 0.837 | 7.42 | 20.9 | 4336 |
| | 311 | 462.8 | 2.42 | 180062 | 67134 | 17.5 | 10.7 | 8283 | 3257 | 9877 | 4983 | 0.838 | 6.90 | 23.9 | 5655 |
| | 314 | 467.0 | 2.42 | 183115 | 67934 | 17.5 | 10.7 | 8388 | 3295 | 10009 | 5040 | 0.839 | 6.86 | 24.3 | 5817 |
| | 342 | 509.0 | 2.45 | 203840 | 75179 | 17.7 | 10.8 | 9151 | 3619 | 11011 | 5543 | 0.840 | 6.41 | 27.5 | 7401 |
| | 370 | 550.6 | 2.47 | 226555 | 82743 | 18.0 | 10.9 | 9954 | 3954 | 12068 | 6063 | 0.841 | 6.04 | 31.1 | 9255 |
| | 398 | 592.3 | 2.50 | 249786 | 90378 | 18.2 | 10.9 | 10753 | 4289 | 13130 | 6583 | 0.842 | 5.73 | 34.8 | 11350 |

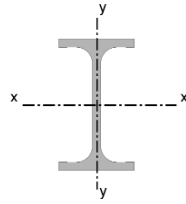
Wide Flange Beams



Imperial Units

| Size | Designation | | Area of Sect. | Depth of Sect. | Width of Sect. | Thickness | | Root Radius | Depth between Fillets | Ratios For Local Buckling | | Dimensions for Detailing | | | |
|---------|------------------------|---------------|-----------------|----------------|----------------|------------|---------|-------------|-----------------------|---------------------------|-------|--------------------------|----|-----|-----|
| | Mass Per Metre | End Clearance | | | | Flange b/T | Web d/t | | | End C | Notch | | | | |
| | | | | | | | | | | | N | n | | | |
| in (mm) | lb/ft | kg/m | cm ² | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | |
| W14 | 14 x 16 (356 x 406) | 426 | 634.0 | 808 | 474.2 | 424.1 | 77.1 | 47.6 | 15.2 | 289.6 | 2.75 | 6.1 | 26 | 198 | 92 |
| | | 455 | 677.1 | 863 | 483.1 | 427.6 | 81.5 | 51.2 | 15.2 | 289.6 | 2.62 | 5.7 | 28 | 198 | 97 |
| | | 500 | 744.1 | 948 | 497.8 | 432.1 | 88.9 | 55.6 | 15.2 | 289.6 | 2.43 | 5.2 | 30 | 198 | 104 |
| | | 550 | 818.5 | 1043 | 514.1 | 436.9 | 97.0 | 60.5 | 15.2 | 289.6 | 2.25 | 4.8 | 32 | 198 | 112 |
| | | 605 | 900.3 | 1148 | 531.4 | 442.3 | 105.7 | 65.9 | 15.2 | 289.7 | 2.09 | 4.4 | 35 | 198 | 121 |
| | | 665 | 989.6 | 1261 | 549.7 | 448.3 | 114.8 | 71.9 | 15.2 | 289.7 | 1.95 | 4.0 | 38 | 198 | 130 |
| | | 730 | 1086.0 | 1385 | 569.5 | 454.4 | 124.7 | 78.0 | 15.2 | 289.7 | 1.82 | 3.7 | 41 | 198 | 140 |
| W16 | 16 x 5 1/2 (406 x 140) | 26 | 38.7 | 50 | 398.5 | 139.7 | 8.8 | 6.4 | 10.2 | 360.6 | 7.97 | 56.8 | 5 | 77 | 19 |
| | | 31 | 46.1 | 59 | 403.4 | 140.3 | 11.2 | 7.0 | 10.2 | 360.6 | 6.27 | 51.7 | 5 | 77 | 21 |
| W16 | 16 x 7 (406 x 178) | 36 | 53.6 | 68 | 402.8 | 177.4 | 10.9 | 7.5 | 10.2 | 360.6 | 8.12 | 48.1 | 6 | 95 | 21 |
| | | 40 | 59.5 | 76 | 406.7 | 177.7 | 12.8 | 7.8 | 10.2 | 360.6 | 6.93 | 46.5 | 6 | 95 | 23 |
| | | 45 | 67.0 | 86 | 409.7 | 178.7 | 14.4 | 8.8 | 10.2 | 360.6 | 6.23 | 41.2 | 6 | 95 | 25 |
| | | 50 | 74.4 | 95 | 413.0 | 179.6 | 16.0 | 9.7 | 10.2 | 360.6 | 5.61 | 37.4 | 7 | 95 | 26 |
| | | 57 | 84.8 | 108 | 417.3 | 180.8 | 18.2 | 10.9 | 10.2 | 360.6 | 4.98 | 33.0 | 7 | 95 | 28 |
| W16 | 16 x 10 1/4 (406x260) | 67 | 99.7 | 127 | 414.8 | 260.0 | 16.9 | 10.0 | 10.2 | 360.6 | 7.70 | 36.0 | 7 | 135 | 27 |
| | | 77 | 114.6 | 146 | 419.6 | 261.5 | 19.3 | 11.6 | 10.2 | 360.6 | 6.77 | 31.2 | 8 | 135 | 30 |
| | | 89 | 132.4 | 169 | 425.4 | 263.3 | 22.2 | 13.3 | 10.2 | 360.6 | 5.92 | 27.0 | 9 | 135 | 32 |
| | | 100 | 148.8 | 190 | 431.0 | 264.8 | 25.0 | 14.9 | 10.2 | 360.6 | 5.29 | 24.3 | 9 | 135 | 35 |
| W18 | 18 x 6 (457 x 152) | 35 | 52.1 | 66 | 449.6 | 152.4 | 10.8 | 7.6 | 10.2 | 407.6 | 7.06 | 53.5 | 6 | 82 | 21 |
| | | 40 | 59.5 | 76 | 454.7 | 152.8 | 13.3 | 8.0 | 10.2 | 407.6 | 5.73 | 51.0 | 6 | 82 | 24 |
| | | 45 | 67.0 | 85 | 457.2 | 151.9 | 15.0 | 9.1 | 10.2 | 406.8 | 5.06 | 44.7 | 7 | 81 | 25 |
| | | 46 | 68.5 | 87 | 458.7 | 153.9 | 15.4 | 9.1 | 10.2 | 407.6 | 5.01 | 44.6 | 7 | 82 | 26 |
| | | 50 | 74.0 | 95 | 461.3 | 152.7 | 17.0 | 9.9 | 10.2 | 406.9 | 4.49 | 41.1 | 7 | 81 | 27 |
| | | 55 | 82.0 | 105 | 465.1 | 153.5 | 18.9 | 10.7 | 10.2 | 406.9 | 4.06 | 38.0 | 7 | 81 | 29 |
| W18 | 18 x 7 1/2 (457 x 191) | 45 | 67.0 | 86 | 453.6 | 189.9 | 12.7 | 8.5 | 10.2 | 407.8 | 7.48 | 48.0 | 6 | 101 | 23 |
| | | 50 | 74.4 | 95 | 456.9 | 190.4 | 14.5 | 9.0 | 10.2 | 407.5 | 6.57 | 45.2 | 7 | 101 | 25 |
| | | 55 | 81.9 | 105 | 460.0 | 191.3 | 16.0 | 9.9 | 10.2 | 407.6 | 5.98 | 41.1 | 7 | 101 | 26 |
| | | 60 | 89.3 | 114 | 463.3 | 191.9 | 17.7 | 10.5 | 10.2 | 407.6 | 5.44 | 38.7 | 7 | 101 | 28 |
| | | 65 | 96.7 | 123 | 466.1 | 192.8 | 19.1 | 11.4 | 10.2 | 407.6 | 5.06 | 35.7 | 8 | 101 | 29 |
| | | 66 | 98.0 | 125 | 467.4 | 192.8 | 19.6 | 11.4 | 10.2 | 407.8 | 4.92 | 35.8 | 8 | 101 | 30 |
| | | 71 | 105.7 | 134 | 469.1 | 193.9 | 20.6 | 12.6 | 10.2 | 407.6 | 4.71 | 32.4 | 8 | 101 | 31 |
| W18 | 18 x 11 (457 x 279) | 76 | 113.1 | 144 | 462.5 | 280.3 | 17.3 | 10.8 | 10.2 | 407.6 | 8.12 | 37.7 | 7 | 145 | 27 |
| | | 86 | 128.0 | 163 | 467.1 | 281.7 | 19.6 | 12.2 | 10.2 | 407.6 | 7.20 | 33.4 | 8 | 145 | 30 |
| | | 97 | 144.4 | 184 | 472.2 | 283.1 | 22.1 | 13.6 | 10.2 | 407.6 | 6.40 | 30.0 | 9 | 145 | 32 |
| | | 106 | 157.7 | 201 | 475.7 | 284.5 | 23.9 | 15.0 | 10.2 | 407.5 | 5.96 | 27.2 | 9 | 145 | 34 |
| | | 119 | 177.1 | 226 | 481.8 | 286.1 | 26.9 | 16.6 | 10.2 | 407.6 | 5.31 | 24.5 | 10 | 145 | 37 |
| W21 | 21 x 6 1/2 (533 x 165) | 44 | 65.5 | 84 | 524.8 | 165.1 | 11.4 | 8.9 | 12.7 | 476.5 | 7.22 | 53.6 | 6 | 88 | 24 |
| | | 50 | 74.7 | 95 | 529.1 | 165.9 | 13.6 | 9.7 | 12.7 | 476.5 | 6.10 | 49.4 | 7 | 88 | 26 |
| | | 57 | 84.8 | 108 | 534.9 | 166.5 | 16.5 | 10.3 | 12.7 | 476.5 | 5.04 | 46.3 | 7 | 88 | 29 |
| W21 | 21 x 8 1/4 (533 x 210) | 55 | 82.0 | 105 | 528.3 | 208.7 | 13.2 | 9.6 | 12.7 | 476.5 | 7.91 | 49.6 | 7 | 110 | 26 |
| | | 62 | 92.3 | 118 | 533.4 | 209.3 | 15.6 | 10.2 | 12.7 | 476.8 | 6.70 | 46.9 | 7 | 110 | 28 |
| | | 68 | 101.2 | 129 | 536.7 | 210.1 | 17.4 | 10.9 | 12.7 | 476.5 | 6.04 | 43.6 | 7 | 110 | 30 |

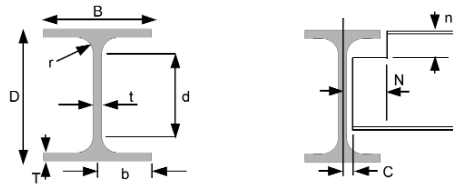
Wide Flange Beams



Imperial Units

| Designation | | Surface Area per Metre | Second Moment of Area | | Radius of Gyration | | Elastic Modulus | | Plastic Modulus | | Buckling Parameter u | Torsional Index x | Warping Constant H | Torsional Constant J | |
|-----------------------------|----------------|------------------------|-----------------------|-----------------|--------------------|----------|-----------------|-----------------|-----------------|-----------------|----------------------|-------------------|--------------------|----------------------|-------|
| Size | Mass Per Metre | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | | | | | |
| in (mm) | lb/ft kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ³ | cm ³ | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ | |
| W14 14 x 16 (356 x 406) | 426 | 634.0 | 2.52 | 274516 | 98309 | 18.4 | 11.0 | 11578 | 4636 | 14233 | 7120 | 0.843 | 5.45 | 38.8 | 13768 |
| | 455 | 677.1 | 2.55 | 299422 | 106613 | 18.6 | 11.1 | 12396 | 4987 | 15341 | 7669 | 0.843 | 5.21 | 43.0 | 16455 |
| | 500 | 744.1 | 2.59 | 341875 | 120016 | 19.0 | 11.3 | 13735 | 5555 | 17163 | 8553 | 0.844 | 4.87 | 50.2 | 21388 |
| | 550 | 818.5 | 2.63 | 392355 | 135478 | 19.4 | 11.4 | 15264 | 6202 | 19260 | 9560 | 0.846 | 4.57 | 58.9 | 27869 |
| | 605 | 900.3 | 2.67 | 450726 | 153164 | 19.8 | 11.6 | 16964 | 6926 | 21615 | 10690 | 0.848 | 4.29 | 69.4 | 36184 |
| | 665 | 989.6 | 2.72 | 518155 | 173421 | 20.3 | 11.7 | 18852 | 7737 | 24256 | 11958 | 0.849 | 4.04 | 82.0 | 46770 |
| | 730 | 1086.0 | 2.77 | 597043 | 196315 | 20.8 | 11.9 | 20967 | 8641 | 27234 | 13370 | 0.851 | 3.82 | 97.1 | 60245 |
| W16 16 x 5 1/2 (406 x 140) | 26 | 38.7 | 1.33 | 12539 | 399 | 15.9 | 2.8 | 629 | 57 | 724 | 90 | 0.859 | 47.1 | 0.15 | 10.9 |
| | 31 | 46.1 | 1.34 | 15603 | 516 | 16.3 | 3.0 | 774 | 74 | 885 | 115 | 0.868 | 38.9 | 0.20 | 19.2 |
| W16 16 x 7 (406 x 178) | 36 | 53.6 | 1.48 | 18646 | 1018 | 16.5 | 3.9 | 926 | 115 | 1048 | 178 | 0.873 | 38.5 | 0.39 | 22.7 |
| | 40 | 59.5 | 1.49 | 21580 | 1202 | 16.8 | 4.0 | 1061 | 135 | 1196 | 209 | 0.881 | 33.8 | 0.47 | 33.1 |
| | 45 | 67.0 | 1.50 | 24403 | 1367 | 16.9 | 4.0 | 1191 | 153 | 1349 | 237 | 0.880 | 30.4 | 0.53 | 46.3 |
| | 50 | 74.4 | 1.51 | 27422 | 1548 | 17.0 | 4.0 | 1328 | 172 | 1508 | 268 | 0.881 | 27.5 | 0.61 | 63.4 |
| | 57 | 84.8 | 1.52 | 31520 | 1794 | 17.1 | 4.1 | 1511 | 198 | 1724 | 309 | 0.881 | 24.5 | 0.71 | 92.2 |
| W16 16 x 10 1/4 (406 x 260) | 67 | 99.7 | 1.83 | 39726 | 4951 | 17.7 | 6.2 | 1915 | 381 | 2128 | 581 | 0.888 | 25.4 | 1.96 | 99.4 |
| | 77 | 114.6 | 1.84 | 46112 | 5758 | 17.8 | 6.3 | 2198 | 440 | 2457 | 673 | 0.887 | 22.4 | 2.31 | 149 |
| | 89 | 132.4 | 1.86 | 54058 | 6768 | 17.9 | 6.3 | 2541 | 514 | 2859 | 788 | 0.887 | 19.7 | 2.75 | 227 |
| | 100 | 148.8 | 1.87 | 61831 | 7754 | 18.0 | 6.4 | 2869 | 586 | 3246 | 899 | 0.887 | 17.7 | 3.20 | 322 |
| W18 18 x 6 (457 x 152) | 35 | 52.1 | 1.48 | 21228 | 639 | 17.9 | 3.1 | 944 | 84 | 1090 | 132 | 0.858 | 44.1 | 0.31 | 21.1 |
| | 40 | 59.5 | 1.49 | 25488 | 795 | 18.3 | 3.2 | 1121 | 104 | 1285 | 163 | 0.869 | 37.5 | 0.39 | 33.7 |
| | 45 | 67.0 | 1.49 | 28597 | 879 | 18.3 | 3.2 | 1251 | 116 | 1442 | 183 | 0.867 | 33.5 | 0.43 | 47.6 |
| | 46 | 68.5 | 1.50 | 29625 | 937 | 18.4 | 3.3 | 1292 | 122 | 1486 | 192 | 0.869 | 32.9 | 0.46 | 50.9 |
| | 50 | 74.0 | 1.50 | 32470 | 1013 | 18.5 | 3.3 | 1408 | 133 | 1624 | 209 | 0.870 | 30.0 | 0.50 | 66.8 |
| | 55 | 82.0 | 1.51 | 36253 | 1144 | 18.6 | 3.3 | 1559 | 149 | 1802 | 236 | 0.872 | 27.3 | 0.57 | 89.5 |
| W18 18 x 7 1/2 (457 x 191) | 45 | 67.0 | 1.63 | 29410 | 1452 | 18.5 | 4.1 | 1297 | 153 | 1472 | 237 | 0.872 | 37.9 | 0.71 | 37.1 |
| | 50 | 74.4 | 1.64 | 33283 | 1669 | 18.8 | 4.2 | 1457 | 175 | 1652 | 272 | 0.877 | 33.9 | 0.82 | 51.7 |
| | 55 | 81.9 | 1.65 | 37058 | 1871 | 18.8 | 4.2 | 1611 | 196 | 1832 | 304 | 0.877 | 30.9 | 0.92 | 69.3 |
| | 60 | 89.3 | 1.66 | 40938 | 2084 | 19.0 | 4.3 | 1767 | 217 | 2011 | 338 | 0.879 | 28.3 | 1.03 | 90.3 |
| | 65 | 96.7 | 1.66 | 44592 | 2281 | 19.0 | 4.3 | 1913 | 237 | 2184 | 369 | 0.879 | 26.3 | 1.14 | 114 |
| | 66 | 98.0 | 1.67 | 45772 | 2347 | 19.1 | 4.3 | 1959 | 243 | 2234 | 379 | 0.881 | 25.8 | 1.18 | 121 |
| | 71 | 105.7 | 1.67 | 48759 | 2507 | 19.0 | 4.3 | 2079 | 259 | 2383 | 404 | 0.877 | 24.4 | 1.26 | 145 |
| W18 18 x 11 (457 x 279) | 76 | 113.1 | 2.01 | 55458 | 6344 | 19.6 | 6.6 | 2398 | 453 | 2669 | 692 | 0.885 | 27.9 | 3.14 | 118 |
| | 86 | 128.0 | 2.02 | 63580 | 7295 | 19.7 | 6.7 | 2722 | 518 | 3043 | 793 | 0.885 | 24.8 | 3.65 | 171 |
| | 97 | 144.4 | 2.03 | 72706 | 8367 | 19.9 | 6.7 | 3079 | 591 | 3457 | 906 | 0.886 | 22.1 | 4.24 | 244 |
| | 106 | 157.7 | 2.04 | 79600 | 9178 | 19.9 | 6.8 | 3347 | 645 | 3775 | 991 | 0.884 | 20.5 | 4.68 | 311 |
| | 119 | 177.1 | 2.06 | 91044 | 10525 | 20.1 | 6.8 | 3779 | 736 | 4284 | 1132 | 0.885 | 18.4 | 5.44 | 442 |
| W21 21 x 6 1/2 (533 x 165) | 44 | 65.5 | 1.67 | 35093 | 861 | 20.5 | 3.2 | 1337 | 104 | 1563 | 167 | 0.847 | 47.0 | 0.57 | 32.1 |
| | 50 | 74.7 | 1.68 | 40986 | 1039 | 20.8 | 3.3 | 1549 | 125 | 1804 | 200 | 0.853 | 41.2 | 0.69 | 47.6 |
| | 57 | 84.8 | 1.69 | 48641 | 1276 | 21.2 | 3.4 | 1819 | 153 | 2107 | 243 | 0.862 | 35.5 | 0.86 | 73.8 |
| W21 21 x 8 1/4 (533 x 210) | 55 | 82.0 | 1.85 | 47522 | 2005 | 21.3 | 4.4 | 1799 | 192 | 2058 | 300 | 0.864 | 41.6 | 1.33 | 51.5 |
| | 62 | 92.3 | 1.86 | 55412 | 2392 | 21.7 | 4.5 | 2078 | 229 | 2368 | 356 | 0.871 | 36.4 | 1.60 | 76.2 |
| | 68 | 101.2 | 1.87 | 61669 | 2696 | 21.8 | 4.6 | 2298 | 257 | 2620 | 400 | 0.874 | 33.1 | 1.82 | 102 |

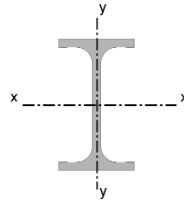
Wide Flange Beams



Imperial Units

| Size | Designation | | Area of Sect. | Depth of Sect. | Width of Sect. | Thickness | | Root Radius | Depth between Fillets | Ratios For Local Buckling | | Dimensions for Detailing | | | |
|----------------------------|----------------|-----------|-----------------|----------------|----------------|-----------|------|-------------|-----------------------|---------------------------|---------|--------------------------|-----|-------|-------|
| | Mass Per Metre | Per Metre | | | | Flange | Web | | | Flange b/T | Web d/t | Clearance C | End | | Notch |
| | | | | | | | | | | | | | End | Notch | |
| in (mm) | lb/ft | kg/m | cm ² | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | |
| W21 21 x 8 1/4 (533 x 210) | 73 | 108.6 | 139 | 539.5 | 210.7 | 18.8 | 11.6 | 12.7 | 476.5 | 5.60 | 41.2 | 8 | 110 | 32 | |
| | 82 | 122.0 | 156 | 544.6 | 211.9 | 21.3 | 12.8 | 12.7 | 476.6 | 4.97 | 37.2 | 8 | 110 | 34 | |
| | 83 | 123.5 | 157 | 544.3 | 212.2 | 21.2 | 13.1 | 12.7 | 476.5 | 5.00 | 36.4 | 9 | 110 | 34 | |
| | 93 | 138.4 | 176 | 549.1 | 213.9 | 23.6 | 14.7 | 12.7 | 476.5 | 4.53 | 32.3 | 9 | 110 | 36 | |
| W21 21 x 12 1/4 (533x311) | 101 | 150.3 | 192 | 542.5 | 312.2 | 20.3 | 12.7 | 12.7 | 476.5 | 7.68 | 37.5 | 8 | 160 | 33 | |
| | 111 | 165.2 | 211 | 546.4 | 313.4 | 22.2 | 14.0 | 12.7 | 476.6 | 7.05 | 34.1 | 9 | 160 | 35 | |
| | 122 | 181.6 | 231 | 550.7 | 314.7 | 24.4 | 15.2 | 12.7 | 476.5 | 6.45 | 31.3 | 10 | 160 | 37 | |
| | 132 | 196.4 | 250 | 554.5 | 316.0 | 26.3 | 16.5 | 12.7 | 476.5 | 6.01 | 28.9 | 10 | 160 | 39 | |
| | 147 | 218.8 | 279 | 560.3 | 317.8 | 29.2 | 18.3 | 12.7 | 476.5 | 5.44 | 26.1 | 11 | 160 | 42 | |
| W24 24 x 7 (610 x 178) | 55 | 81.9 | 105 | 598.7 | 177.9 | 12.8 | 10.0 | 12.7 | 547.6 | 6.93 | 54.6 | 7 | 94 | 26 | |
| | 61 | 91.0 | 116 | 602.5 | 178.4 | 15.0 | 10.6 | 12.7 | 547.1 | 5.95 | 51.6 | 7 | 94 | 28 | |
| | 62 | 92.3 | 118 | 603.0 | 178.8 | 15.0 | 10.9 | 12.7 | 547.6 | 5.96 | 50.1 | 7 | 94 | 28 | |
| W24 24 x 9 (610 x 229) | 68 | 101.2 | 129 | 602.7 | 227.7 | 14.9 | 10.5 | 12.7 | 547.6 | 7.66 | 52.0 | 7 | 119 | 28 | |
| | 76 | 113.1 | 144 | 607.6 | 228.3 | 17.3 | 11.2 | 12.7 | 547.7 | 6.61 | 49.0 | 8 | 119 | 30 | |
| | 84 | 125.0 | 159 | 612.1 | 229.1 | 19.6 | 11.9 | 12.7 | 547.6 | 5.86 | 45.9 | 8 | 119 | 32 | |
| | 94 | 139.9 | 179 | 617.5 | 230.3 | 22.2 | 13.1 | 12.7 | 547.7 | 5.18 | 41.9 | 9 | 119 | 35 | |
| W24 24 x 12 (610 x 305) | 100 | 147.0 | 191 | 609.6 | 304.8 | 19.7 | 11.9 | 17.8 | 534.6 | 7.74 | 44.9 | 8 | 156 | 38 | |
| | 120 | 179.0 | 228 | 617.5 | 307 | 23.6 | 14.1 | 17.8 | 534.7 | 6.50 | 37.9 | 9 | 156 | 41 | |
| | 160 | 238.0 | 304 | 633 | 311.5 | 31.4 | 18.6 | 17.8 | 534.6 | 4.96 | 28.7 | 11 | 156 | 49 | |
| W24 24 x 12 3/4 (610x324) | 104 | 154.8 | 198 | 611.1 | 323.8 | 19.1 | 12.7 | 12.7 | 547.6 | 8.50 | 43.1 | 8 | 166 | 32 | |
| | 117 | 174.1 | 222 | 616.2 | 325.1 | 21.6 | 14.0 | 12.7 | 547.6 | 7.53 | 39.2 | 9 | 166 | 34 | |
| | 131 | 194.9 | 249 | 621.8 | 326.5 | 24.4 | 15.4 | 12.7 | 547.6 | 6.70 | 35.6 | 10 | 166 | 37 | |
| | 146 | 217.3 | 277 | 628.4 | 327.7 | 27.7 | 16.5 | 12.7 | 547.6 | 5.92 | 33.2 | 10 | 166 | 40 | |
| | 162 | 241.1 | 308 | 635.0 | 329.1 | 31.0 | 17.9 | 12.7 | 547.6 | 5.31 | 30.6 | 11 | 166 | 44 | |
| W27 27 x 10 (686 x 254) | 84 | 125.0 | 160 | 678.4 | 253.0 | 16.3 | 11.7 | 15.2 | 615.5 | 7.78 | 52.7 | 8 | 131 | 31 | |
| | 94 | 139.9 | 178 | 683.8 | 253.7 | 18.9 | 12.5 | 15.2 | 615.6 | 6.70 | 49.4 | 8 | 131 | 34 | |
| | 102 | 151.8 | 194 | 688.1 | 254.4 | 21.1 | 13.1 | 15.2 | 615.5 | 6.03 | 47.1 | 9 | 131 | 36 | |
| | 114 | 169.7 | 216 | 693.2 | 255.8 | 23.6 | 14.5 | 15.2 | 615.6 | 5.41 | 42.5 | 9 | 131 | 39 | |
| W27 27 x 14 (686 x 356) | 146 | 217.3 | 277 | 695.5 | 354.7 | 24.8 | 15.4 | 15.2 | 615.6 | 7.16 | 40.1 | 10 | 180 | 40 | |
| | 161 | 239.6 | 306 | 700.8 | 356.1 | 27.4 | 16.8 | 15.2 | 615.5 | 6.49 | 36.7 | 10 | 180 | 43 | |
| | 178 | 264.9 | 337 | 706.4 | 357.8 | 30.2 | 18.4 | 15.2 | 615.5 | 5.92 | 33.4 | 11 | 180 | 45 | |
| W30 30 x 10 1/2 (762x267) | 99 | 147.3 | 188 | 753.1 | 265.4 | 17.0 | 13.2 | 16.5 | 686.1 | 7.80 | 51.9 | 9 | 136 | 34 | |
| | 108 | 160.7 | 205 | 757.7 | 266.1 | 19.3 | 13.8 | 16.5 | 686.1 | 6.89 | 49.6 | 9 | 136 | 36 | |
| | 116 | 172.6 | 221 | 762.3 | 266.6 | 21.6 | 14.4 | 16.5 | 686.1 | 6.17 | 47.8 | 9 | 136 | 38 | |
| | 124 | 184.5 | 235 | 766.3 | 267.1 | 23.6 | 14.9 | 16.5 | 686.1 | 5.65 | 46.2 | 9 | 136 | 40 | |
| | 132 | 196.4 | 251 | 769.9 | 267.8 | 25.4 | 15.6 | 16.5 | 686.1 | 5.27 | 43.9 | 10 | 136 | 42 | |
| W30 30 x 15 (762 x 381) | 173 | 257.5 | 328 | 773.2 | 380.6 | 27.1 | 16.6 | 16.5 | 686.1 | 7.04 | 41.2 | 10 | 192 | 44 | |
| | 191 | 384.2 | 362 | 779.2 | 382.0 | 30.1 | 18.0 | 16.5 | 686.0 | 6.35 | 38.0 | 11 | 192 | 47 | |
| | 211 | 314.0 | 400 | 785.9 | 383.7 | 33.4 | 19.7 | 16.5 | 686.1 | 5.74 | 34.9 | 12 | 192 | 50 | |
| W33 33 x 11 1/2 (838x292) | 118 | 175.6 | 224 | 834.6 | 291.6 | 18.8 | 14.0 | 17.8 | 761.4 | 7.76 | 54.5 | 9 | 149 | 37 | |
| | 130 | 193.5 | 247 | 840.5 | 292.4 | 21.7 | 14.7 | 17.8 | 761.5 | 6.73 | 51.7 | 9 | 149 | 40 | |
| | 141 | 209.8 | 268 | 845.8 | 293.0 | 24.4 | 15.4 | 17.8 | 761.4 | 6.01 | 49.5 | 10 | 149 | 42 | |
| | 152 | 226.2 | 289 | 850.6 | 293.8 | 26.8 | 16.1 | 17.8 | 761.4 | 5.48 | 47.2 | 10 | 149 | 45 | |

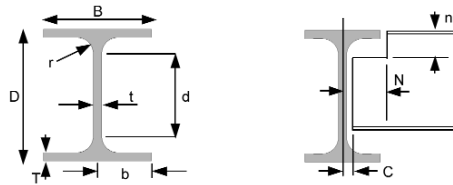
Wide Flange Beams



Imperial Units

| Designation | | Surface Area per Metre | Second Moment of Area | | Radius of Gyration | | Elastic Modulus | | Plastic Modulus | | Buckling Parameter u | Torsional Index x | Warping Constant H | Torsional Constant J | |
|-----------------------------|----------------|------------------------|-----------------------|-----------------|--------------------|----------|-----------------|-----------------|-----------------|-----------------|----------------------|-------------------|--------------------|----------------------|------|
| Size | Mass Per Metre | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | | | | | |
| in (mm) | lb/ft kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ² | cm ² | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ | |
| W21 21 x 8 1/4 (533 x 210) | 73 | 108.6 | 1.88 | 66755 | 2939 | 21.9 | 4.6 | 2475 | 279 | 2825 | 435 | 0.875 | 30.9 | 1.99 | 126 |
| | 82 | 122.0 | 1.89 | 76180 | 3388 | 22.1 | 4.7 | 2798 | 320 | 3203 | 500 | 0.876 | 27.6 | 2.32 | 179 |
| | 83 | 123.5 | 1.89 | 76241 | 3389 | 22.0 | 4.6 | 2801 | 319 | 3212 | 500 | 0.874 | 27.6 | 2.32 | 181 |
| | 93 | 138.4 | 1.90 | 86170 | 3868 | 22.1 | 4.7 | 3139 | 362 | 3617 | 569 | 0.873 | 24.9 | 2.67 | 251 |
| W21 21 x 12 1/4 (533 x 311) | 101 | 150.3 | 2.29 | 100764 | 10316 | 22.9 | 7.3 | 3715 | 661 | 4147 | 1012 | 0.885 | 27.8 | 7.03 | 217 |
| | 111 | 165.2 | 2.30 | 111304 | 11413 | 23.0 | 7.4 | 4074 | 728 | 4565 | 1117 | 0.885 | 25.6 | 7.84 | 284 |
| | 122 | 181.6 | 2.31 | 123257 | 12681 | 23.1 | 7.4 | 4476 | 806 | 5032 | 1238 | 0.885 | 23.4 | 8.78 | 373 |
| | 132 | 196.4 | 2.32 | 134239 | 13847 | 23.2 | 7.4 | 4842 | 876 | 5462 | 1348 | 0.884 | 21.8 | 9.66 | 469 |
| | 147 | 218.8 | 2.33 | 151168 | 15654 | 23.3 | 7.5 | 5396 | 985 | 6116 | 1519 | 0.884 | 19.8 | 11.0 | 643 |
| W24 24 x 7 (610 x 178) | 55 | 81.9 | 1.87 | 56021 | 1210 | 23.2 | 3.4 | 1871 | 136 | 2200 | 219 | 0.843 | 48.3 | 1.04 | 49.2 |
| | 61 | 91.0 | 1.88 | 63879 | 1426 | 23.5 | 3.5 | 2120 | 160 | 2480 | 256 | 0.850 | 43.2 | 1.23 | 68.6 |
| | 62 | 92.3 | 1.88 | 64581 | 1436 | 23.4 | 3.5 | 2142 | 161 | 2512 | 258 | 0.848 | 42.8 | 1.24 | 71.0 |
| W24 24 x 9 (610 x 229) | 68 | 101.2 | 2.07 | 76111 | 2931 | 24.2 | 4.8 | 2526 | 257 | 2893 | 402 | 0.864 | 42.9 | 2.53 | 77.9 |
| | 76 | 113.1 | 2.08 | 87368 | 3433 | 24.6 | 4.9 | 2876 | 301 | 3285 | 469 | 0.869 | 38.0 | 2.99 | 112 |
| | 84 | 125.0 | 2.09 | 98528 | 3930 | 24.9 | 5.0 | 3219 | 343 | 3675 | 535 | 0.873 | 34.1 | 3.45 | 154 |
| | 94 | 139.9 | 2.11 | 112337 | 4536 | 25.1 | 5.0 | 3638 | 394 | 4159 | 615 | 0.875 | 30.4 | 4.02 | 219 |
| W24 24 x 12 (610 x 305) | 100 | 147.0 | 2.38 | 125048 | 9309 | 25.6 | 7.0 | 4103 | 611 | 4586 | 938 | 0.886 | 32.3 | 8.1 | 203 |
| | 120 | 179.0 | 2.40 | 151789 | 11399 | 25.8 | 7.1 | 4916 | 743 | 5526 | 1143 | 0.886 | 27.4 | 10.1 | 343 |
| | 160 | 238.0 | 2.44 | 208047 | 15855 | 26.1 | 7.2 | 6573 | 1018 | 7473 | 1576 | 0.886 | 21.1 | 14.3 | 796 |
| W24 24 x 12 3/4 (610 x 324) | 104 | 154.8 | 2.47 | 129171 | 10790 | 25.6 | 7.4 | 4227 | 666 | 4734 | 1023 | 0.880 | 33.6 | 9.46 | 196 |
| | 117 | 174.1 | 2.48 | 147154 | 12378 | 25.8 | 7.5 | 4776 | 762 | 5360 | 1170 | 0.882 | 30.0 | 10.9 | 280 |
| | 131 | 194.9 | 2.50 | 167347 | 14162 | 25.9 | 7.5 | 5383 | 867 | 6057 | 1335 | 0.883 | 26.8 | 12.6 | 395 |
| | 146 | 217.3 | 2.51 | 190836 | 16264 | 26.2 | 7.7 | 6074 | 993 | 6845 | 1527 | 0.886 | 23.9 | 14.7 | 559 |
| 162 | 241.1 | 2.53 | 215400 | 18440 | 26.4 | 7.7 | 6784 | 1121 | 7670 | 1726 | 0.888 | 21.6 | 16.8 | 770 | |
| W27 27 x 10 (686 x 254) | 84 | 125.0 | 2.32 | 118449 | 4400 | 27.2 | 5.2 | 3492 | 348 | 4005 | 544 | 0.862 | 43.8 | 4.82 | 117 |
| | 94 | 139.9 | 2.33 | 136115 | 5162 | 27.6 | 5.4 | 3981 | 407 | 4554 | 636 | 0.868 | 38.8 | 5.70 | 168 |
| | 102 | 151.8 | 2.34 | 150741 | 5799 | 27.9 | 5.5 | 4381 | 456 | 5005 | 712 | 0.872 | 35.4 | 6.45 | 220 |
| | 114 | 169.7 | 2.35 | 170049 | 6608 | 28.0 | 5.5 | 4906 | 517 | 5619 | 809 | 0.872 | 31.9 | 7.41 | 305 |
| W27 27 x 14 (686 x 356) | 146 | 217.3 | 2.75 | 234198 | 18438 | 29.1 | 8.2 | 6735 | 1040 | 7558 | 1598 | 0.884 | 29.7 | 20.7 | 454 |
| | 161 | 239.6 | 2.77 | 261240 | 20673 | 29.2 | 8.2 | 7455 | 1161 | 8389 | 1787 | 0.885 | 27.0 | 23.4 | 610 |
| | 178 | 264.9 | 2.78 | 290824 | 23116 | 29.4 | 8.3 | 8234 | 1292 | 9298 | 1992 | 0.884 | 24.6 | 26.4 | 814 |
| W30 30 x 10 1/2 (762 x 267) | 99 | 147.3 | 2.51 | 166281 | 5320 | 29.8 | 5.3 | 4416 | 401 | 5116 | 633 | 0.854 | 45.6 | 7.21 | 157 |
| | 108 | 160.7 | 2.52 | 185888 | 6080 | 30.1 | 5.5 | 4907 | 457 | 5665 | 720 | 0.859 | 41.5 | 8.29 | 208 |
| | 116 | 172.6 | 2.53 | 205375 | 6840 | 30.5 | 5.6 | 5388 | 513 | 6202 | 807 | 0.864 | 38.1 | 9.38 | 268 |
| | 124 | 184.5 | 2.54 | 223050 | 7525 | 30.8 | 5.7 | 5821 | 563 | 6689 | 885 | 0.867 | 35.4 | 10.4 | 333 |
| | 132 | 196.4 | 2.55 | 239950 | 8157 | 30.9 | 5.7 | 6233 | 609 | 7167 | 957 | 0.869 | 33.2 | 11.3 | 405 |
| W30 30 x 15 (762 x 381) | 173 | 257.5 | 3.01 | 341237 | 24887 | 32.3 | 8.7 | 8827 | 1308 | 9916 | 2012 | 0.883 | 30.3 | 34.6 | 635 |
| | 191 | 384.2 | 3.02 | 381592 | 28004 | 32.5 | 8.8 | 9794 | 1466 | 11027 | 2258 | 0.885 | 27.5 | 39.3 | 859 |
| | 211 | 314.0 | 3.04 | 427027 | 31497 | 32.7 | 8.9 | 10867 | 1642 | 12271 | 2531 | 0.886 | 25.0 | 44.6 | 1161 |
| W33 33 x 11 1/2 (838 x 292) | 118 | 175.6 | 2.78 | 245628 | 7792 | 33.1 | 5.9 | 5886 | 534 | 6798 | 841 | 0.856 | 46.5 | 13.0 | 221 |
| | 130 | 193.5 | 2.79 | 279326 | 9076 | 33.6 | 6.1 | 6647 | 621 | 7647 | 975 | 0.862 | 41.6 | 15.2 | 307 |
| | 141 | 209.8 | 2.80 | 310151 | 10250 | 34.0 | 6.2 | 7334 | 700 | 8416 | 1097 | 0.867 | 37.9 | 17.3 | 404 |
| | 152 | 226.2 | 2.81 | 339556 | 11361 | 34.3 | 6.3 | 7984 | 773 | 9155 | 1212 | 0.870 | 34.9 | 19.3 | 514 |

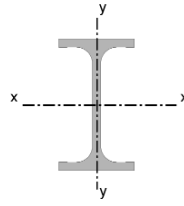
Wide Flange Beams



Imperial Units

| Size | Designation | | Area of Sect. | Depth of Sect. | Width of Sect. | Thickness | | Root Radius | Depth between Fillets | Ratios For Local Buckling | | Dimensions for Detailing | | | | | | |
|-----------------------------|----------------|-------|-----------------|----------------|----------------|-----------|------|-------------|-----------------------|---------------------------|------|--------------------------|-----|------------|---------|-------------|-------|-------|
| | Mass Per Metre | A | | | | D | B | | | T | t | r | d | Flange b/T | Web d/t | Clearance C | Notch | |
| | | | | | | | | | | | | | | | | | End | Notch |
| in (mm) | lb/ft | kg/m | cm ² | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | | | |
| W33 33 x 15 3/4 (838x400) | 201 | 299.1 | 381 | 855.5 | 399.9 | 29.2 | 18.2 | 17.8 | 761.5 | 6.85 | 41.9 | 11 | 201 | 47 | | | | |
| | 221 | 328.9 | 420 | 861.8 | 401.4 | 32.4 | 19.7 | 17.8 | 761.4 | 6.20 | 38.7 | 12 | 201 | 50 | | | | |
| | 241 | 358.6 | 457 | 868.2 | 402.8 | 35.6 | 21.1 | 17.8 | 761.5 | 5.66 | 36.1 | 13 | 201 | 53 | | | | |
| W36 36 x 12 (914 x 305) | 135 | 200.9 | 256 | 903.0 | 303.5 | 20.1 | 15.2 | 19.0 | 824.9 | 7.56 | 54.1 | 10 | 154 | 39 | | | | |
| | 150 | 223.2 | 285 | 910.6 | 304.2 | 23.9 | 15.9 | 19.0 | 824.8 | 6.37 | 51.9 | 10 | 154 | 43 | | | | |
| | 160 | 238.1 | 304 | 914.7 | 304.8 | 25.9 | 16.5 | 19.0 | 824.9 | 5.88 | 50.0 | 10 | 154 | 45 | | | | |
| | 170 | 253.0 | 323 | 918.7 | 305.6 | 27.9 | 17.3 | 19.0 | 824.8 | 5.47 | 47.8 | 11 | 154 | 47 | | | | |
| | 182 | 270.8 | 346 | 922.8 | 306.7 | 30.0 | 18.4 | 19.0 | 824.9 | 5.12 | 44.8 | 11 | 154 | 49 | | | | |
| | 194 | 288.7 | 368 | 926.8 | 307.7 | 32.0 | 19.4 | 19.0 | 824.8 | 4.81 | 42.4 | 12 | 154 | 51 | | | | |
| W36 36 x 16 1/2 (914 x 419) | 230 | 342.3 | 436 | 911.9 | 418.3 | 32.0 | 19.3 | 24.1 | 799.7 | 6.54 | 41.4 | 12 | 210 | 56 | | | | |
| | 245 | 364.6 | 465 | 916.4 | 419.4 | 34.3 | 20.3 | 24.1 | 799.6 | 6.12 | 39.4 | 12 | 210 | 58 | | | | |
| | 260 | 386.9 | 493 | 921.0 | 420.4 | 36.6 | 21.3 | 24.1 | 799.6 | 5.75 | 37.5 | 13 | 210 | 61 | | | | |
| | 280 | 416.7 | 532 | 927.6 | 421.5 | 39.9 | 22.5 | 24.1 | 799.6 | 5.28 | 35.6 | 13 | 210 | 64 | | | | |
| | 300 | 446.4 | 569 | 933.2 | 423.0 | 42.7 | 24.0 | 24.1 | 799.7 | 4.96 | 33.3 | 14 | 210 | 67 | | | | |
| W40 40x12 (1016 x 305) | 149 | 222.0 | 283 | 970.3 | 300 | 21.1 | 16.0 | 30.0 | 868.1 | 7.11 | 54.3 | 10 | 152 | 51 | | | | |
| | 167 | 249.0 | 317 | 980.2 | 300 | 26.0 | 16.5 | 30.0 | 868.2 | 5.77 | 52.6 | 10 | 152 | 56 | | | | |
| | 183 | 272.0 | 347 | 990.1 | 300 | 31.0 | 16.5 | 30.0 | 868.1 | 4.84 | 52.6 | 10 | 152 | 61 | | | | |
| | 211 | 314.0 | 400 | 1000 | 300 | 35.9 | 19.1 | 30.0 | 868.2 | 4.18 | 45.5 | 12 | 150 | 66 | | | | |
| | 235 | 349.0 | 445 | 1008 | 302 | 40.0 | 21.1 | 30.0 | 868.1 | 3.78 | 41.1 | 13 | 150 | 70 | | | | |
| | 264 | 393.0 | 500 | 1016 | 303 | 43.9 | 24.4 | 30.0 | 868.2 | 3.45 | 35.6 | 14 | 149 | 74 | | | | |
| | 278 | 415.0 | 529 | 1020 | 304 | 46.0 | 26.0 | 30.0 | 868.0 | 3.30 | 33.4 | 15 | 149 | 76 | | | | |
| | 294 | 438.0 | 557 | 1026 | 305 | 49.0 | 26.9 | 30.0 | 867.9 | 3.12 | 32.3 | 15 | 149 | 79 | | | | |
| | 327 | 487.0 | 620 | 1036 | 309 | 54.1 | 30.0 | 30.0 | 867.9 | 2.85 | 28.9 | 17 | 149 | 84 | | | | |
| | 331 | 494.0 | 629 | 1036 | 309 | 54.0 | 31.0 | 30.0 | 868.0 | 2.86 | 28.0 | 18 | 149 | 84 | | | | |
| | 359 | 535.0 | 681 | 1046 | 311 | 58.9 | 33.0 | 30.0 | 868.2 | 2.64 | 26.3 | 19 | 149 | 89 | | | | |
| W40 40x16 (1016 x 406) | 199 | 296.0 | 378 | 982 | 400 | 27.1 | 16.5 | 30.0 | 867.8 | 7.38 | 52.6 | 10 | 202 | 57 | | | | |
| | 215 | 321.0 | 409 | 990 | 400 | 31.0 | 16.5 | 30.0 | 868.0 | 6.45 | 52.6 | 10 | 202 | 61 | | | | |
| | 249 | 371.0 | 473 | 1000 | 400 | 36.1 | 19.0 | 30.0 | 867.8 | 5.54 | 45.7 | 12 | 201 | 66 | | | | |
| | 277 | 412.0 | 524 | 1008 | 402 | 40.0 | 21.0 | 30.0 | 868.0 | 5.03 | 41.3 | 13 | 201 | 70 | | | | |
| | 297 | 443.0 | 564 | 1012 | 402 | 41.9 | 23.6 | 30.0 | 868.2 | 4.80 | 36.8 | 14 | 199 | 72 | | | | |
| | 324 | 483.0 | 615 | 1020 | 404 | 46.0 | 25.4 | 30.0 | 868.0 | 4.39 | 34.2 | 15 | 199 | 76 | | | | |
| | 362 | 539.0 | 687 | 1030 | 407 | 51.1 | 28.4 | 30.0 | 867.8 | 3.98 | 30.6 | 16 | 199 | 81 | | | | |
| | 397 | 591.0 | 753 | 1040 | 409 | 55.9 | 31.0 | 30.0 | 868.2 | 3.66 | 28.0 | 18 | 199 | 86 | | | | |
| | 431 | 642.0 | 818 | 1048 | 412 | 60.0 | 34.0 | 30.0 | 868.0 | 3.43 | 25.5 | 19 | 199 | 90 | | | | |
| | 503 | 748.0 | 953 | 1068 | 417 | 70.0 | 39.0 | 30.0 | 868.0 | 2.98 | 22.3 | 22 | 199 | 100 | | | | |
| W44 44x16 (1118 x 406) | 593 | 883.0 | 1125 | 1092 | 424 | 82.0 | 45.5 | 30.0 | 868.0 | 2.59 | 19.1 | 25 | 199 | 112 | | | | |
| | 230 | 343.0 | 436 | 1090 | 400 | 31.0 | 18.0 | 20.0 | 988.0 | 6.45 | 54.9 | 11 | 201 | 51 | | | | |
| | 262 | 390.0 | 497 | 1100 | 400 | 36.0 | 20.0 | 20.0 | 988.0 | 5.56 | 49.4 | 12 | 200 | 56 | | | | |
| | 290 | 433.0 | 551 | 1108 | 402 | 40.0 | 22.0 | 20.0 | 988.0 | 5.03 | 44.9 | 13 | 200 | 60 | | | | |
| | 335 | 499.0 | 635 | 1118 | 405 | 45.0 | 26.0 | 20.0 | 988.0 | 4.50 | 38.0 | 15 | 200 | 65 | | | | |

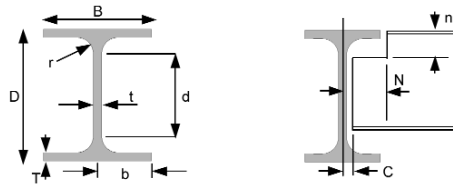
Wide Flange Beams



Imperial Units

| Designation | | Surface Area per Metre | Second Moment of Area | | Radius of Gyration | | Elastic Modulus | | Plastic Modulus | | Buckling Parameter u | Torsional Index x | Warping Constant H | Torsional Constant J | |
|-----------------------------|----------------|------------------------|-----------------------|-----------------|--------------------|----------|-----------------|-----------------|-----------------|-----------------|----------------------|-------------------|--------------------|----------------------|-------|
| Size | Mass Per Metre | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | | | | | |
| in (mm) | lb/ft kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ³ | cm ³ | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ | |
| W33 33 x 15 3/4 (838 x 400) | 201 | 299.1 | 3.24 | 479805 | 31180 | 35.5 | 9.0 | 11217 | 1559 | 12644 | 2405 | 0.881 | 31.2 | 53.2 | 855 |
| | 221 | 328.9 | 3.26 | 534569 | 34960 | 35.7 | 9.1 | 12406 | 1742 | 14013 | 2689 | 0.882 | 28.4 | 60.1 | 1145 |
| | 241 | 358.6 | 3.27 | 590016 | 38802 | 35.9 | 9.2 | 13592 | 1927 | 15382 | 2977 | 0.884 | 26.1 | 67.3 | 1491 |
| W36 36 x 12 (914 x 305) | 135 | 200.9 | 2.96 | 324711 | 9383 | 35.6 | 6.0 | 7192 | 618 | 8347 | 978 | 0.852 | 46.9 | 18.3 | 291 |
| | 150 | 223.2 | 2.97 | 376319 | 11239 | 36.3 | 6.3 | 8265 | 739 | 9529 | 1163 | 0.861 | 41.3 | 22.1 | 421 |
| | 160 | 238.1 | 2.98 | 406063 | 12267 | 36.6 | 6.4 | 8879 | 805 | 10225 | 1266 | 0.864 | 38.6 | 24.2 | 515 |
| | 170 | 253.0 | 2.99 | 436953 | 13334 | 36.8 | 6.4 | 9512 | 873 | 10952 | 1373 | 0.866 | 36.2 | 26.4 | 627 |
| | 182 | 270.8 | 3.00 | 470766 | 14462 | 36.9 | 6.5 | 10203 | 943 | 11768 | 1487 | 0.866 | 33.9 | 28.8 | 768 |
| | 194 | 288.7 | 3.01 | 504005 | 15598 | 37.0 | 6.5 | 10876 | 1014 | 12559 | 1601 | 0.867 | 32.0 | 31.2 | 923 |
| W36 36 x 16 1/2 (914 x 419) | 210 | 312.5 | 3.03 | 548980 | 17126 | 37.1 | 6.6 | 11782 | 1107 | 13645 | 1754 | 0.866 | 29.7 | 34.5 | 1164 |
| | 230 | 342.3 | 3.42 | 625181 | 39102 | 37.9 | 9.5 | 13712 | 1870 | 15456 | 2886 | 0.883 | 30.2 | 75.7 | 1189 |
| | 245 | 364.6 | 3.43 | 671727 | 42235 | 38.0 | 9.5 | 14660 | 2014 | 16546 | 3111 | 0.884 | 28.3 | 82.2 | 1442 |
| | 260 | 386.9 | 3.44 | 718904 | 45384 | 38.2 | 9.6 | 15611 | 2159 | 17644 | 3337 | 0.885 | 26.7 | 88.7 | 1729 |
| | 280 | 416.7 | 3.45 | 785685 | 49871 | 38.4 | 9.7 | 16940 | 2366 | 19171 | 3658 | 0.887 | 24.8 | 98.3 | 2188 |
| W40 40 x 12 (1016 x 305) | 300 | 446.4 | 3.47 | 846884 | 53943 | 38.6 | 9.7 | 18150 | 2550 | 20595 | 3948 | 0.887 | 23.3 | 107 | 2671 |
| | 149 | 222.0 | 3.06 | 407968 | 9553 | 38.0 | 5.8 | 8409 | 637 | 9807 | 1020 | 0.850 | 45.7 | 21.5 | 390 |
| | 167 | 249.0 | 3.08 | 481313 | 11761 | 39.0 | 6.1 | 9821 | 784 | 11350 | 1245 | 0.861 | 39.9 | 26.8 | 582 |
| | 183 | 272.0 | 3.10 | 553981 | 14011 | 40.0 | 6.4 | 11190 | 934 | 12826 | 1470 | 0.873 | 35.0 | 32.2 | 835 |
| | 211 | 314.0 | 3.11 | 644218 | 16239 | 40.1 | 6.4 | 12884 | 1083 | 14851 | 1713 | 0.872 | 30.7 | 37.7 | 1264 |
| | 235 | 349.0 | 3.13 | 723138 | 18467 | 40.3 | 6.4 | 14347 | 1223 | 16592 | 1941 | 0.872 | 27.9 | 43 | 1718 |
| | 264 | 393.0 | 3.14 | 807696 | 20503 | 40.2 | 6.4 | 15900 | 1353 | 18539 | 2168 | 0.868 | 25.5 | 48.4 | 2330 |
| | 278 | 415.0 | 3.15 | 853128 | 21714 | 40.2 | 6.4 | 16728 | 1429 | 19571 | 2298 | 0.866 | 24.4 | 51.5 | 2704 |
| | 294 | 438.0 | 3.17 | 909913 | 23454 | 40.4 | 6.5 | 17739 | 1536 | 20762 | 2469 | 0.868 | 23.1 | 56.0 | 3185 |
| | 327 | 487.0 | 3.19 | 1021427 | 26728 | 40.6 | 6.6 | 19717 | 1733 | 23200 | 2800 | 0.867 | 21.1 | 64.4 | 4299 |
| | 331 | 494.0 | 3.19 | 1027966 | 26831 | 40.4 | 6.5 | 19845 | 1737 | 23413 | 2818 | 0.865 | 21.0 | 65 | 4396 |
| W40 40 x 16 (1016 x 406) | 359 | 535.0 | 3.22 | 1130714 | 29972 | 40.8 | 6.6 | 21620 | 1925 | 25566 | 3126 | 0.866 | 19.5 | 73.0 | 5576 |
| | 392 | 584.0 | 3.24 | 1246078 | 33440 | 40.9 | 6.7 | 23600 | 2130 | 28039 | 3475 | 0.866 | 18.1 | 82.3 | 7154 |
| | 199 | 296.0 | 3.48 | 620321 | 28968 | 40.5 | 8.8 | 12634 | 1448 | 14255 | 2243 | 0.879 | 38.0 | 66.0 | 764 |
| | 215 | 321.0 | 3.50 | 696453 | 33128 | 41.3 | 9.0 | 14070 | 1656 | 15797 | 2555 | 0.887 | 34.1 | 76.2 | 1033 |
| | 249 | 371.0 | 3.51 | 813739 | 38589 | 41.5 | 9.0 | 16275 | 1929 | 18361 | 2984 | 0.887 | 29.8 | 89.6 | 1588 |
| | 277 | 412.0 | 3.53 | 909818 | 43414 | 41.7 | 9.1 | 18052 | 2160 | 20440 | 3348 | 0.887 | 27.1 | 101.7 | 2140 |
| | 297 | 443.0 | 3.53 | 966519 | 45505 | 41.4 | 9.0 | 19101 | 2264 | 21777 | 3529 | 0.882 | 25.8 | 107 | 2543 |
| | 324 | 483.0 | 3.55 | 1067490 | 50719 | 41.7 | 9.1 | 20931 | 2511 | 23923 | 3919 | 0.883 | 23.8 | 120.3 | 3307 |
| | 362 | 539.0 | 3.58 | 1202545 | 57639 | 41.8 | 9.2 | 23350 | 2832 | 26824 | 4436 | 0.882 | 21.6 | 138.1 | 4530 |
| | 397 | 591.0 | 3.60 | 1331043 | 64021 | 42.1 | 9.2 | 25597 | 3131 | 29530 | 4916 | 0.882 | 19.9 | 155.0 | 5896 |
| W44 44 x 16 (1118 x 406) | 431 | 642.0 | 3.62 | 1450597 | 70291 | 42.1 | 9.3 | 27683 | 3412 | 32097 | 5379 | 0.880 | 18.6 | 171.5 | 7382 |
| | 503 | 748.0 | 3.67 | 1731950 | 85118 | 42.6 | 9.4 | 32434 | 4082 | 37881 | 6459 | 0.881 | 16.2 | 212 | 11555 |
| | 593 | 883.0 | 3.74 | 2096426 | 104979 | 43.2 | 9.7 | 38396 | 4952 | 45265 | 7874 | 0.881 | 14.1 | 267.7 | 18518 |
| | 230 | 343.0 | 3.71 | 867389 | 33125 | 44.6 | 8.7 | 15915 | 1656 | 18062 | 2568 | 0.875 | 38.9 | 92.9 | 1034 |
| | 262 | 390.0 | 3.73 | 1005399 | 38478 | 45.0 | 8.8 | 18280 | 1924 | 20780 | 2988 | 0.878 | 34.0 | 108.9 | 1559 |
| | 290 | 433.0 | 3.75 | 1125575 | 43411 | 45.2 | 8.9 | 20317 | 2160 | 23161 | 3362 | 0.878 | 30.8 | 123.8 | 2121 |
| 335 | 499.0 | 3.77 | 1294061 | 49985 | 45.1 | 8.9 | 23150 | 2468 | 26599 | 3870 | 0.875 | 27.4 | 143.9 | 3112 | |

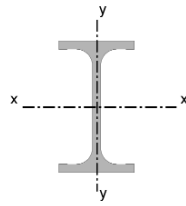
Wide Flange Beams



Metric Units

| Designation | | Area of Sect. A | Depth of Sect. D | Width of Sect. B | Thickness | | Root Radius r | Depth between Fillets d | Ratios For Local Buckling | | Dimensions for Detailing | | |
|-------------|----------------|--------------------|---------------------|---------------------|-------------|----------|------------------|----------------------------|---------------------------|------------|--------------------------|-------|----|
| Size | Mass Per Metre | | | | Flange T | Web t | | | Flange b/T | Web d/t | End Clearance C | Notch | |
| | | | | | | | | | | | | N | n |
| mm | kg/m | cm ² | mm | mm | mm | mm | mm | mm | | | mm | mm | mm |
| 100 x 50 | 9.3 | 11.8 | 100 | 50 | 7 | 5 | 8 | 70 | 3.57 | 14.0 | 5 | 33 | 15 |
| 100 x 100 | 17.2 | 21.9 | 100 | 100 | 8 | 6 | 10 | 64 | 6.25 | 10.7 | 5 | 57 | 18 |
| 125 x 60 | 13.2 | 16.8 | 125 | 60 | 8 | 6 | 9 | 91 | 3.75 | 15.2 | 5 | 37 | 17 |
| 125 x 125 | 23.8 | 30.3 | 125 | 125 | 9 | 6.5 | 10 | 87 | 6.94 | 13.4 | 5 | 69 | 19 |
| 150 x 75 | 14 | 17.8 | 150 | 75 | 7 | 5 | 8 | 120 | 5.36 | 24.0 | 5 | 45 | 15 |
| 150 x 100 | 21.1 | 26.8 | 148 | 100 | 9 | 6 | 11 | 108 | 5.56 | 18.0 | 5 | 57 | 20 |
| 150 x 150 | 31.5 | 40.1 | 150 | 150 | 10 | 7 | 11 | 108 | 7.50 | 15.4 | 6 | 82 | 21 |
| 175 x 90 | 18.1 | 23.0 | 175 | 90 | 8 | 5 | 9 | 141 | 5.63 | 28.2 | 5 | 53 | 17 |
| 175 x 175 | 40.2 | 51.2 | 175 | 175 | 11 | 7.5 | 12 | 129 | 7.95 | 17.2 | 6 | 94 | 23 |
| 200 x 100 | 18.2 | 23.2 | 198 | 99 | 7 | 4.5 | 11 | 162 | 7.07 | 36.0 | 4 | 57 | 18 |
| | 21.3 | 27.2 | 200 | 100 | 8 | 5.5 | 11 | 162 | 6.25 | 29.5 | 5 | 57 | 19 |
| 200 x 150 | 30.6 | 39.0 | 194 | 150 | 9 | 6 | 13 | 150 | 8.33 | 25.0 | 5 | 82 | 22 |
| 200 x 200 | 49.9 | 63.5 | 200 | 200 | 12 | 8 | 13 | 150 | 8.33 | 18.8 | 6 | 106 | 25 |
| | 56.2 | 71.5 | 200 | 204 | 12 | 12 | 13 | 150 | 8.50 | 12.5 | 8 | 106 | 25 |
| | 65.7 | 83.7 | 208 | 202 | 16 | 10 | 13 | 150 | 6.31 | 15.0 | 7 | 106 | 29 |
| 250 x 125 | 25.7 | 32.7 | 248 | 124 | 8 | 5 | 12 | 208 | 7.75 | 41.6 | 5 | 70 | 20 |
| | 29.6 | 37.7 | 250 | 125 | 9 | 6 | 12 | 208 | 6.94 | 34.7 | 5 | 70 | 21 |
| 250 x 175 | 44.1 | 56.2 | 244 | 175 | 11 | 7 | 16 | 190 | 7.95 | 27.1 | 6 | 94 | 27 |
| 250 x 250 | 64.4 | 82.1 | 244 | 252 | 11 | 11 | 16 | 190 | 11.45 | 17.3 | 8 | 131 | 27 |
| | 66.5 | 84.7 | 248 | 249 | 13 | 8 | 16 | 190 | 9.58 | 23.8 | 6 | 131 | 29 |
| | 72.4 | 92.2 | 250 | 250 | 14 | 9 | 16 | 190 | 8.93 | 21.1 | 7 | 131 | 30 |
| | 82.2 | 105 | 250 | 255 | 14 | 14 | 16 | 190 | 9.11 | 13.6 | 9 | 131 | 30 |
| 300 x 150 | 32.0 | 40.8 | 298 | 149 | 8 | 5.5 | 13 | 256 | 9.31 | 46.5 | 5 | 82 | 21 |
| | 36.7 | 46.8 | 300 | 150 | 9 | 6.5 | 13 | 256 | 8.33 | 39.4 | 5 | 82 | 22 |
| 300 x 200 | 56.8 | 72.4 | 294 | 200 | 12 | 8 | 18 | 234 | 8.33 | 29.3 | 6 | 106 | 30 |
| | 65.4 | 83.4 | 298 | 201 | 14 | 9 | 18 | 234 | 7.18 | 26.0 | 7 | 106 | 32 |
| 300 x 300 | 84.5 | 108 | 294 | 302 | 12 | 12 | 18 | 234 | 12.58 | 19.5 | 8 | 155 | 30 |
| | 87.0 | 111 | 298 | 299 | 14 | 9 | 18 | 234 | 10.68 | 26.0 | 7 | 155 | 32 |
| | 94.0 | 120 | 300 | 300 | 15 | 10 | 18 | 234 | 10.00 | 23.4 | 7 | 155 | 33 |
| | 106 | 135 | 300 | 305 | 15 | 15 | 18 | 234 | 10.17 | 15.6 | 10 | 155 | 33 |
| | 106 | 135 | 304 | 301 | 17 | 11 | 18 | 234 | 8.85 | 21.3 | 8 | 155 | 35 |
| 350 x 175 | 41.4 | 52.7 | 346 | 174 | 9 | 6 | 14 | 300 | 9.67 | 50.0 | 5 | 94 | 23 |
| | 49.6 | 63.1 | 350 | 175 | 11 | 7 | 14 | 300 | 7.95 | 42.9 | 6 | 94 | 25 |
| 350 x 250 | 69.2 | 88.2 | 336 | 249 | 12 | 8 | 20 | 272 | 10.38 | 34.0 | 6 | 131 | 32 |
| | 79.7 | 102 | 340 | 250 | 14 | 9 | 20 | 272 | 8.93 | 30.2 | 7 | 131 | 34 |
| 350 x 350 | 106 | 135 | 338 | 351 | 13 | 13 | 20 | 272 | 13.50 | 20.9 | 9 | 179 | 33 |
| | 115 | 146 | 344 | 348 | 16 | 10 | 20 | 272 | 10.88 | 27.2 | 7 | 179 | 36 |
| | 131 | 167 | 344 | 354 | 16 | 16 | 20 | 272 | 11.06 | 17.0 | 10 | 179 | 36 |
| | 137 | 174 | 350 | 350 | 19 | 12 | 20 | 272 | 9.21 | 22.7 | 8 | 179 | 39 |
| | 156 | 198 | 350 | 357 | 19 | 19 | 20 | 272 | 9.39 | 14.3 | 12 | 179 | 39 |
| | 159 | 202 | 356 | 352 | 22 | 14 | 20 | 272 | 8.00 | 19.4 | 9 | 179 | 42 |

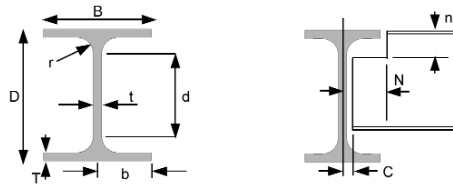
Wide Flange Beams



Metric Units

| Designation | | Surface | Second | | Radius | | Elastic | | Plastic | | Buckling | Torsional | Warping | Torsional |
|-------------|----------------|----------------|-----------------|-----------------|-------------|----------|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------------|-----------------|
| Size | Mass Per Metre | Area per Metre | Moment of Area | | of Gyration | | Modulus | | Modulus | | Parameter | Index | Constant | Constant |
| | | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | u | x | H | J |
| mm | kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ³ | cm ³ | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ |
| 100 x 50 | 9.3 | 0.38 | 188 | 15 | 3.98 | 1.12 | 37.5 | 5.93 | 44.1 | 9.52 | 0.876 | 12.7 | 0.000320 | 2.03 |
| 100 x 100 | 17.2 | 0.57 | 383 | 134 | 4.18 | 2.47 | 76.5 | 26.8 | 87.6 | 41.2 | 0.837 | 10.7 | 0.00283 | 5.17 |
| 125 x 60 | 13.2 | 0.46 | 413 | 29 | 4.95 | 1.32 | 66.1 | 9.75 | 77.6 | 15.7 | 0.872 | 14.0 | 0.00100 | 3.75 |
| 125 x 125 | 23.8 | 0.72 | 847 | 294 | 5.29 | 3.11 | 136 | 47.0 | 154 | 71.9 | 0.840 | 12.5 | 0.00988 | 8.43 |
| 150 x 75 | 14 | 0.58 | 666 | 50 | 6.11 | 1.67 | 88.8 | 13.2 | 102 | 20.8 | 0.876 | 20.4 | 0.00253 | 2.81 |
| 150 x 100 | 21.1 | 0.67 | 1021 | 151 | 6.17 | 2.37 | 138 | 30.1 | 157 | 46.7 | 0.881 | 15.0 | 0.00728 | 7.37 |
| 150 x 150 | 31.5 | 0.87 | 1641 | 563 | 6.39 | 3.75 | 219 | 75.1 | 246 | 115 | 0.842 | 13.7 | 0.0276 | 13.5 |
| 175 x 90 | 18.1 | 0.68 | 1214 | 98 | 7.26 | 2.06 | 139 | 21.7 | 157 | 33.7 | 0.885 | 21.4 | 0.00680 | 4.50 |
| 175 x 175 | 40.2 | 1.01 | 2884 | 984 | 7.50 | 4.38 | 330 | 112 | 369 | 171 | 0.844 | 14.7 | 0.0662 | 20.4 |
| 200 x 100 | 18.2 | 0.76 | 1582 | 114 | 8.26 | 2.22 | 160 | 23.0 | 180 | 35.7 | 0.884 | 26.5 | 0.0104 | 3.86 |
| | 21.3 | 0.77 | 1844 | 134 | 8.24 | 2.22 | 184 | 26.8 | 209 | 41.9 | 0.880 | 23.6 | 0.0124 | 5.77 |
| 200 x 150 | 30.6 | 0.95 | 2690 | 507 | 8.30 | 3.61 | 277 | 68 | 309 | 104 | 0.878 | 19.8 | 0.0434 | 10.9 |
| 200 x 200 | 49.9 | 1.16 | 4716 | 1602 | 8.62 | 5.02 | 472 | 160 | 525 | 244 | 0.846 | 15.5 | 0.142 | 29.8 |
| | 56.2 | 1.17 | 4983 | 1702 | 8.35 | 4.88 | 498 | 167 | 565 | 257 | 0.826 | 14.3 | 0.150 | 39.6 |
| | 65.7 | 1.18 | 6531 | 2201 | 8.83 | 5.13 | 628 | 218 | 710 | 332 | 0.848 | 12.2 | 0.203 | 66.7 |
| 250 x 125 | 25.7 | 0.96 | 3537 | 255 | 10.4 | 2.79 | 285 | 41.1 | 319 | 63.6 | 0.886 | 29.9 | 0.0367 | 6.74 |
| | 29.6 | 0.97 | 4052 | 294 | 10.4 | 2.79 | 324 | 47.0 | 366 | 73.1 | 0.881 | 26.9 | 0.0427 | 9.68 |
| 250 x 175 | 44.1 | 1.15 | 6122 | 985 | 10.4 | 4.19 | 502 | 113 | 558 | 173 | 0.884 | 20.5 | 0.134 | 23.2 |
| 250 x 250 | 64.4 | 1.45 | 8787 | 2939 | 10.3 | 5.98 | 720 | 233 | 805 | 358 | 0.829 | 19.0 | 0.399 | 39.5 |
| | 66.5 | 1.45 | 9931 | 3348 | 10.8 | 6.29 | 801 | 269 | 883 | 408 | 0.850 | 17.9 | 0.462 | 46.7 |
| | 72.4 | 1.45 | 10833 | 3649 | 10.8 | 6.29 | 867 | 292 | 960 | 444 | 0.848 | 16.7 | 0.508 | 58.7 |
| | 82.2 | 1.46 | 11484 | 3877 | 10.5 | 6.09 | 919 | 304 | 1039 | 468 | 0.827 | 15.4 | 0.540 | 79.0 |
| 300 x 150 | 32 | 1.16 | 6318 | 442 | 12.4 | 3.29 | 424 | 59.4 | 475 | 91.8 | 0.880 | 35.6 | 0.0930 | 8.65 |
| | 36.7 | 1.16 | 7210 | 508 | 12.4 | 3.29 | 481 | 67.7 | 542 | 105 | 0.876 | 32.0 | 0.107 | 12.4 |
| 300 x 200 | 56.8 | 1.34 | 11339 | 1604 | 12.5 | 4.71 | 771 | 160 | 859 | 247 | 0.883 | 22.7 | 0.319 | 35.8 |
| | 65.4 | 1.35 | 13312 | 1900 | 12.6 | 4.77 | 893 | 189 | 1000 | 291 | 0.884 | 20.1 | 0.383 | 53.4 |
| 300 x 300 | 84.5 | 1.74 | 16865 | 5517 | 12.5 | 7.16 | 1147 | 365 | 1277 | 560 | 0.831 | 21.1 | 1.10 | 61.4 |
| | 87 | 1.74 | 18850 | 6242 | 13.0 | 7.51 | 1265 | 418 | 1389 | 634 | 0.850 | 20.0 | 1.26 | 71.3 |
| | 94 | 1.75 | 20411 | 6756 | 13.1 | 7.51 | 1361 | 450 | 1501 | 684 | 0.848 | 18.8 | 1.37 | 88.1 |
| | 106 | 1.76 | 21536 | 7106 | 12.6 | 7.26 | 1436 | 466 | 1614 | 716 | 0.829 | 17.4 | 1.44 | 116 |
| | 106 | 1.76 | 23381 | 7733 | 13.2 | 7.57 | 1538 | 514 | 1705 | 781 | 0.849 | 16.9 | 1.59 | 125 |
| 350 x 175 | 41.4 | 1.35 | 11095 | 792 | 14.5 | 3.88 | 641 | 91.0 | 716 | 140 | 0.882 | 37.5 | 0.225 | 13.6 |
| | 49.6 | 1.36 | 13559 | 985 | 14.7 | 3.95 | 775 | 113 | 868 | 174 | 0.884 | 31.8 | 0.283 | 23.0 |
| 350 x 250 | 69.2 | 1.62 | 18506 | 3093 | 14.5 | 5.92 | 1102 | 248 | 1215 | 380 | 0.881 | 25.8 | 0.812 | 44.6 |
| | 79.7 | 1.63 | 21678 | 3652 | 14.6 | 6.00 | 1275 | 292 | 1412 | 447 | 0.882 | 22.8 | 0.970 | 66.3 |
| 350 x 350 | 106 | 2.02 | 28192 | 9381 | 14.4 | 8.33 | 1668 | 535 | 1851 | 818 | 0.829 | 22.5 | 2.48 | 90.3 |
| | 115 | 2.03 | 33296 | 11246 | 15.1 | 8.78 | 1936 | 646 | 2122 | 980 | 0.849 | 20.4 | 3.02 | 121 |
| | 131 | 2.04 | 35332 | 11848 | 14.6 | 8.43 | 2054 | 669 | 2299 | 1027 | 0.828 | 18.7 | 3.19 | 164 |
| | 137 | 2.04 | 40296 | 13587 | 15.2 | 8.84 | 2303 | 776 | 2545 | 1179 | 0.849 | 17.5 | 3.72 | 199 |
| | 156 | 2.06 | 42798 | 14434 | 14.7 | 8.53 | 2446 | 809 | 2760 | 1244 | 0.827 | 16.1 | 3.95 | 270 |
| | 159 | 2.06 | 47591 | 16005 | 15.3 | 8.90 | 2674 | 909 | 2979 | 1382 | 0.848 | 15.4 | 4.46 | 305 |

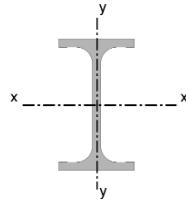
Wide Flange Beams



Metric Units

| Designation | | Area of Sect. A | Depth of Sect. D | Width of Sect. B | Thickness | | Root Radius r | Depth between Fillets d | Ratios For Local Buckling | | Dimensions for Detailing | | |
|-------------|----------------|--------------------|---------------------|---------------------|-------------|----------|------------------|----------------------------|---------------------------|------------|--------------------------|-------|----|
| Size | Mass Per Metre | | | | Flange T | Web t | | | Flange b/T | Web d/t | End Clearance C | Notch | |
| | | | | | | | | | | | | N | n |
| mm | kg/m | cm ² | mm | mm | mm | mm | mm | mm | | | mm | mm | mm |
| 400 x 200 | 56.6 | 72.2 | 396 | 199 | 11 | 7 | 16 | 342 | 9.05 | 48.9 | 6 | 106 | 27 |
| | 66.0 | 84.1 | 400 | 200 | 13 | 8 | 16 | 342 | 7.69 | 42.8 | 6 | 106 | 29 |
| 400 x 300 | 94.3 | 120 | 386 | 299 | 14 | 9 | 22 | 314 | 10.68 | 34.9 | 7 | 155 | 36 |
| | 107 | 136 | 390 | 300 | 16 | 10 | 22 | 314 | 9.38 | 31.4 | 7 | 155 | 38 |
| 400 x 400 | 140 | 178 | 388 | 402 | 15 | 15 | 22 | 314 | 13.40 | 20.9 | 10 | 204 | 37 |
| | 147 | 187 | 394 | 398 | 18 | 11 | 22 | 314 | 11.06 | 28.5 | 8 | 204 | 40 |
| | 168 | 214 | 394 | 405 | 18 | 18 | 22 | 314 | 11.25 | 17.4 | 11 | 204 | 40 |
| | 172 | 219 | 400 | 400 | 21 | 13 | 22 | 314 | 9.52 | 24.2 | 9 | 204 | 43 |
| | 197 | 251 | 400 | 408 | 21 | 21 | 22 | 314 | 9.71 | 15.0 | 13 | 204 | 43 |
| | 200 | 255 | 406 | 403 | 24 | 16 | 22 | 314 | 8.40 | 19.6 | 10 | 204 | 46 |
| | 232 | 295 | 414 | 405 | 28 | 18 | 22 | 314 | 7.23 | 17.4 | 11 | 204 | 50 |
| | 283 | 361 | 428 | 407 | 35 | 20 | 22 | 314 | 5.81 | 15.7 | 12 | 204 | 57 |
| | 415 | 529 | 458 | 417 | 50 | 30 | 22 | 314 | 4.17 | 10.5 | 17 | 204 | 72 |
| | 605 | 770 | 498 | 432 | 70 | 45 | 22 | 314 | 3.09 | 7.0 | 25 | 204 | 92 |
| 450 x 200 | 66.2 | 84 | 446 | 199 | 12 | 8 | 18 | 386 | 8.29 | 48.3 | 6 | 106 | 30 |
| | 76.0 | 96.8 | 450 | 200 | 14 | 9 | 18 | 386 | 7.14 | 42.9 | 7 | 106 | 32 |
| 450 x 300 | 106 | 135 | 434 | 299 | 15 | 10 | 24 | 356 | 9.97 | 35.6 | 7 | 155 | 39 |
| | 124 | 157 | 440 | 300 | 18 | 11 | 24 | 356 | 8.33 | 32.4 | 8 | 155 | 42 |
| 500 x 200 | 79.5 | 101 | 496 | 199 | 14 | 9 | 20 | 428 | 7.11 | 47.6 | 7 | 105 | 34 |
| | 89.6 | 114 | 500 | 200 | 16 | 10 | 20 | 428 | 6.25 | 42.8 | 7 | 105 | 36 |
| | 103 | 131 | 506 | 201 | 19 | 11 | 20 | 428 | 5.29 | 38.9 | 8 | 105 | 39 |
| 500 x 300 | 114 | 146 | 482 | 300 | 15 | 11 | 26 | 400 | 10.00 | 36.4 | 8 | 155 | 41 |
| | 128 | 164 | 488 | 300 | 18 | 11 | 26 | 400 | 8.33 | 36.4 | 8 | 155 | 44 |
| 600 x 200 | 94.6 | 120 | 596 | 199 | 15 | 10 | 22 | 522 | 6.63 | 52.2 | 7 | 105 | 37 |
| | 106 | 134 | 600 | 200 | 17 | 11 | 22 | 522 | 5.88 | 47.5 | 8 | 105 | 39 |
| | 120 | 152 | 606 | 201 | 20 | 12 | 22 | 522 | 5.03 | 43.5 | 8 | 105 | 42 |
| | 134 | 171 | 612 | 202 | 23 | 13 | 22 | 522 | 4.39 | 40.2 | 9 | 105 | 45 |
| 600 x 300 | 137 | 174 | 582 | 300 | 17 | 12 | 28 | 492 | 8.82 | 41.0 | 8 | 154 | 45 |
| | 151 | 192 | 588 | 300 | 20 | 12 | 28 | 492 | 7.50 | 41.0 | 8 | 154 | 48 |
| | 175 | 222 | 594 | 302 | 23 | 14 | 28 | 492 | 6.57 | 35.1 | 9 | 154 | 51 |
| 700 x 300 | 166 | 211 | 692 | 300 | 20 | 13 | 28 | 596 | 7.50 | 45.8 | 9 | 154 | 48 |
| | 185 | 235 | 700 | 300 | 24 | 13 | 28 | 596 | 6.25 | 45.8 | 9 | 154 | 52 |
| | 215 | 274 | 708 | 302 | 28 | 15 | 28 | 596 | 5.39 | 39.7 | 10 | 154 | 56 |
| 800 x 300 | 191 | 243 | 792 | 300 | 22 | 14 | 28 | 692 | 6.82 | 49.4 | 9 | 153 | 50 |
| | 210 | 267 | 800 | 300 | 26 | 14 | 28 | 692 | 5.77 | 49.4 | 9 | 153 | 54 |
| | 241 | 308 | 808 | 302 | 30 | 16 | 28 | 692 | 5.03 | 43.3 | 10 | 153 | 58 |
| 900 x 300 | 213 | 271 | 890 | 299 | 23 | 15 | 28 | 788 | 6.50 | 52.5 | 10 | 152 | 51 |
| | 243 | 310 | 900 | 300 | 28 | 16 | 28 | 788 | 5.36 | 49.3 | 10 | 152 | 56 |
| | 286 | 364 | 912 | 302 | 34 | 18 | 28 | 788 | 4.44 | 43.8 | 11 | 152 | 62 |

Wide Flange Beams



Metric Units

| Designation | | Surface | Second | | Radius | | Elastic | | Plastic | | Buckling | Torsional | Warping | Torsional |
|-------------|----------------|----------------|-----------------|-----------------|-------------|----------|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------------|-----------------|
| Size | Mass Per Metre | Area per Metre | Moment of Area | | of Gyration | | Modulus | | Modulus | | Parameter | Index | Constant | Constant |
| | | | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | Axis x-x | Axis y-y | u | x | H | J |
| mm | kg/m | m ² | cm ⁴ | cm ⁴ | cm | cm | cm ³ | cm ³ | cm ³ | cm ³ | | | dm ⁶ | cm ⁴ |
| 400 x 200 | 56.6 | 1.55 | 20019 | 1448 | 16.7 | 4.48 | 1011 | 145 | 1128 | 224 | 0.884 | 35.6 | 0.536 | 27.1 |
| | 66 | 1.56 | 23705 | 1737 | 16.8 | 4.54 | 1185 | 174 | 1326 | 268 | 0.886 | 30.9 | 0.650 | 42.2 |
| 400 x 300 | 94.3 | 1.91 | 33680 | 6246 | 16.7 | 7.21 | 1745 | 418 | 1918 | 637 | 0.880 | 25.8 | 2.16 | 79.9 |
| | 107 | 1.92 | 38676 | 7210 | 16.9 | 7.28 | 1983 | 481 | 2188 | 733 | 0.881 | 23.2 | 2.52 | 114 |
| 400 x 400 | 140 | 2.32 | 48967 | 16260 | 16.6 | 9.55 | 2524 | 809 | 2802 | 1237 | 0.830 | 22.5 | 5.66 | 156 |
| | 147 | 2.32 | 56147 | 18925 | 17.3 | 10.1 | 2850 | 951 | 3118 | 1441 | 0.850 | 20.9 | 6.69 | 194 |
| | 168 | 2.33 | 59715 | 19957 | 16.7 | 9.65 | 3031 | 986 | 3390 | 1511 | 0.828 | 19.2 | 7.05 | 264 |
| | 172 | 2.34 | 66623 | 22415 | 17.5 | 10.1 | 3331 | 1121 | 3672 | 1700 | 0.850 | 18.2 | 8.05 | 303 |
| | 197 | 2.35 | 70890 | 23811 | 16.8 | 9.75 | 3545 | 1167 | 3992 | 1794 | 0.828 | 16.7 | 8.55 | 415 |
| | 200 | 2.35 | 78041 | 26202 | 17.5 | 10.1 | 3844 | 1300 | 4280 | 1977 | 0.846 | 16.1 | 9.56 | 462 |
| | 232 | 2.37 | 92773 | 31029 | 17.7 | 10.2 | 4482 | 1532 | 5026 | 2331 | 0.848 | 14.1 | 11.6 | 714 |
| | 283 | 2.41 | 119206 | 39364 | 18.2 | 10.4 | 5570 | 1934 | 6311 | 2941 | 0.854 | 11.6 | 15.2 | 1317 |
| | 415 | 2.49 | 187140 | 60526 | 18.8 | 10.7 | 8172 | 2903 | 9540 | 4436 | 0.853 | 8.5 | 25.2 | 3885 |
| | 605 | 2.60 | 297912 | 94364 | 19.7 | 11.1 | 11964 | 4369 | 14457 | 6724 | 0.852 | 6.4 | 43.2 | 11063 |
| 450 x 200 | 66.2 | 1.64 | 28698 | 1581 | 18.5 | 4.33 | 1287 | 159 | 1450 | 247 | 0.878 | 36.5 | 0.74 | 38 |
| | 76 | 1.65 | 33452 | 1872 | 18.6 | 4.40 | 1487 | 187 | 1679 | 291 | 0.879 | 32.2 | 0.890 | 56.9 |
| 450 x 300 | 106 | 2.00 | 46797 | 6695 | 18.6 | 7.04 | 2157 | 448 | 2384 | 686 | 0.883 | 27.0 | 2.94 | 104.1 |
| | 124 | 2.02 | 56072 | 8114 | 18.9 | 7.18 | 2549 | 541 | 2825 | 828 | 0.887 | 23.4 | 3.61 | 163.4 |
| 500 x 200 | 79.5 | 1.74 | 41870 | 1846 | 20.3 | 4.27 | 1688 | 186 | 1914 | 290 | 0.876 | 35.2 | 1.07 | 60.8 |
| | 89.6 | 1.75 | 47847 | 2142 | 20.5 | 4.33 | 1914 | 214 | 2175 | 335 | 0.877 | 31.6 | 1.25 | 85.9 |
| | 103 | 1.76 | 56517 | 2582 | 20.7 | 4.43 | 2234 | 257 | 2541 | 401 | 0.881 | 27.5 | 1.53 | 132 |
| 500 x 300 | 114 | 2.10 | 60371 | 6768 | 20.4 | 6.82 | 2505 | 451 | 2791 | 695 | 0.880 | 29.4 | 3.69 | 118 |
| | 128 | 2.11 | 70956 | 8118 | 20.8 | 7.05 | 2908 | 541 | 3228 | 830 | 0.889 | 25.9 | 4.48 | 172 |
| 600 x 200 | 94.6 | 1.93 | 68718 | 1982 | 23.9 | 4.06 | 2306 | 199 | 2651 | 315 | 0.864 | 39.7 | 1.67 | 82.4 |
| | 106 | 1.94 | 77634 | 2280 | 24.0 | 4.12 | 2588 | 228 | 2979 | 361 | 0.865 | 36.0 | 1.94 | 113 |
| | 120 | 1.95 | 90397 | 2723 | 24.3 | 4.23 | 2983 | 271 | 3432 | 429 | 0.870 | 31.7 | 2.34 | 167 |
| | 134 | 1.97 | 103489 | 3178 | 24.6 | 4.32 | 3382 | 315 | 3893 | 498 | 0.873 | 28.3 | 2.76 | 237 |
| 600 x 300 | 137 | 2.29 | 102715 | 7675 | 24.3 | 6.63 | 3530 | 512 | 3963 | 793 | 0.879 | 32.1 | 6.13 | 173 |
| | 151 | 2.30 | 118116 | 9025 | 24.8 | 6.85 | 4018 | 602 | 4489 | 928 | 0.888 | 28.8 | 7.28 | 241 |
| | 175 | 2.32 | 137326 | 10590 | 24.9 | 6.90 | 4624 | 701 | 5197 | 1085 | 0.887 | 25.5 | 8.63 | 356 |
| 700 x 300 | 166 | 2.51 | 172429 | 9030 | 28.6 | 6.53 | 4984 | 602 | 5629 | 936 | 0.878 | 34.3 | 10.2 | 260 |
| | 185 | 2.53 | 201495 | 10830 | 29.3 | 6.78 | 5757 | 722 | 6464 | 1116 | 0.889 | 30.0 | 12.4 | 383 |
| | 215 | 2.55 | 237147 | 12892 | 29.4 | 6.86 | 6699 | 854 | 7559 | 1323 | 0.889 | 26.3 | 14.9 | 588 |
| 800 x 300 | 191 | 2.71 | 253645 | 9936 | 32.3 | 6.39 | 6405 | 662 | 7288 | 1036 | 0.873 | 36.8 | 14.7 | 341 |
| | 210 | 2.72 | 291662 | 11736 | 33.0 | 6.62 | 7292 | 782 | 8243 | 1216 | 0.883 | 32.5 | 17.6 | 486 |
| | 241 | 2.74 | 339239 | 13818 | 33.2 | 6.70 | 8397 | 915 | 9534 | 1426 | 0.883 | 28.7 | 20.9 | 726 |
| 900 x 300 | 213 | 2.90 | 345320 | 10290 | 35.7 | 6.16 | 7760 | 688 | 8913 | 1085 | 0.865 | 40.2 | 19.3 | 403 |
| | 243 | 2.92 | 411272 | 12650 | 36.4 | 6.39 | 9139 | 843 | 10454 | 1324 | 0.873 | 34.5 | 24.0 | 633 |
| | 286 | 2.95 | 497791 | 15672 | 37.0 | 6.56 | 10916 | 1038 | 12501 | 1629 | 0.877 | 29.3 | 30.2 | 1050 |