# AISC Shapes Database v15.0

**Readme File**

November 2017

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### I. Database v15.0

AISC Shapes Database v15.0 is an update to Shapes Database v14.1. This version is consistent with shape properties and dimensions tabulated in the AISC *Steel Construction Manual*, 15th Edition, 1st Printing. The database contains some additional section properties that are not included in the *Manual* .

### A. Table Instructions

Dimensions and properties for each shape are listed sequentially in a single row. The data in each column is as follows:

| Column in Database[a] | Variable | Description[a] |
|---|---|---|
| A | **Type** | Shape type: W, M, S, HP, C, MC, L, WT, MT, ST, 2L, HSS, PIPE |
| B (CG) | **EDI_ STD_ Nomenclature** | The shape designation according to the AISC *Naming Convention for Structural Steel Products for Use in Electronic Data Interchange (EDI)* , June 25, 2001. This information is intended solely for the use of software developers to facilitate the electronic labeling of shape-specific data and electronic transfer of that data. |
| C (CH) | **AISC_ Manual_ Label** | The shape designation as seen in the AISC *Steel Construction Manual* , 15th Edition. The exception to this is the designation for double angles. There is a separate listing (row) for each back-to-back spacing and configuration. Therefore, the shape designation reflects these two variables. The listings for double angles follow the convention specified in the AISC *Naming Convention for Structural Steel Products for Use in Electronic Data Interchange (EDI)* , June 25, 2001. |
| D | **T_F** | Boolean variable. A true, T, value indicates that there is a special note for that shape (see below). A false, F, value indicates that there are no special notes for that shape.<br><br>Special notes:<br>W-shapes: a value of T for: $t_f > 2$ in.<br>M-shapes: a value of T indicates that the shape has sloped flanges.<br>WT-shapes: a value of T for: $t_f > 2$ in<br>MT-shapes: a value of T indicates that the shape has sloped flanges. |
| E (CI) | $W$ | Nominal weight, lb/ft (kg/m) |
| F (CJ) | $A$ | Cross-sectional area, in.$^2$ (mm$^2$) |
| G (CK) | $d$ | Overall depth of member, or width of shorter leg for angles, or width of the outstanding legs of long legs back-to-back double angles, or the width of the back-to-back legs of short legs back-to-back double angles, in. (mm) |
| H (CL) | $d_{det}$ | Detailing value of member depth, in. (mm) |
| I (CM) | $Ht$ | Overall depth of square or rectangular HSS, in. (mm) |
| J (CN) | $h$ | Depth of the flat wall of square or rectangular HSS, in. (mm) |
| K (CO) | $OD$ | Outside diameter of round HSS or pipe, in. (mm) |
| L (CP) | $b_f$ | Flange width, in. (mm) |
| M (CQ) | $b_{fdet}$ | Detailing value of flange width, in. (mm) |
| N (CR) | $B$ | Overall width of square or rectangular HSS, in. (mm) |
| O (CS) | $b$ | Width of the flat wall of square or rectangular HSS, or width of the longer leg for angles, or width of the back-to-back legs of long legs back-to-back double angles, or width of the outstanding legs of short legs back-to-back double angles, in. (mm) |
| P (CT) | $ID$ | Inside diameter of round HSS or pipe, in. (mm) |
| Q (CU) | $t_w$ | Web thickness, in. (mm) |
| R (CV) | $t_{wdet}$ | Detailing value of web thickness, in. (mm) |
| S (CW) | $t_{wdet}/2$ | Detailing value of $t_w/2$, in. (mm) |
| T (CX) | $t_f$ | Flange thickness, in. (mm) |

| | | |
|---|---|---|
| U (CY) | $t_{fdet}$ | Detailing value of flange thickness, in. (mm) |
| V (CZ) | $t$ | Thickness of angle leg, in. (mm) |
| W (DA) | $t_{nom}$ | HSS and pipe nominal wall thickness, in. (mm) |
| X (DB) | $t_{des}$ | HSS and pipe design wall thickness, in. (mm) |
| Y (DC) | $k_{des}$ | Design distance from outer face of flange to web toe of fillet, in. (mm) |
| Z (DD) | $k_{det}$ | Detailing distance from outer face of flange to web toe of fillet, in. (mm) |
| AA (DE) | $k_1$ | Detailing distance from center of web to flange toe of fillet, in. (mm) |
| AB (DF) | $x$ | Horizontal distance from designated member edge, as defined in the AISC *Steel Construction Manual* , to member centroidal axis, in. (mm) |
| AC (DG) | $y$ | Vertical distance from designated member edge, as defined in the AISC *Steel Construction Manual* , to member centroidal axis, in. (mm) |
| AD (DH) | $e_o$ | Horizontal distance from designated member edge, as defined in the AISC *Steel Construction Manual* , to member shear center, in. (mm) |
| AE (DI) | $x_p$ | Horizontal distance from designated member edge, as defined in the AISC *Steel Construction Manual* , to member plastic neutral axis, in. (mm) |
| AF (DJ) | $y_p$ | Vertical distance from designated member edge, as defined in the AISC *Steel Construction Manual* , to member plastic neutral axis, in. (mm) |
| AG (DK) | $b_f/2t_f$ | Slenderness ratio |
| AH (DL) | $b/t$ | Slenderness ratio for angles |
| AI (DM) | $b/t_{des}$ | Slenderness ratio for square or rectangular HSS |
| AJ (DN) | $h/t_w$ | Slenderness ratio |
| AK (DO) | $h/t_{des}$ | Slenderness ratio for square or rectangular HSS |
| AL (DP) | $D/t$ | Slenderness ratio for round HSS and pipe, or tee shapes |
| AM (DQ) | $I_x$ | Moment of inertia about the *x* -axis, in.$^4$ (mm$^4$ /10$^6$) |
| AN (DR) | $Z_x$ | Plastic section modulus about the *x* -axis, in.$^3$ (mm$^3$ /10$^3$) |
| AO (DS) | $S_x$ | Elastic section modulus about the *x* -axis, in.$^3$ (mm$^3$ /10$^3$) |
| AP (DT) | $r_x$ | Radius of gyration about the *x* -axis, in. (mm) |
| AQ (DU) | $I_y$ | Moment of inertia about the *y* -axis, in.$^4$ (mm$^4$ /10$^6$) |
| AR (DV) | $Z_y$ | Plastic section modulus about the *y* -axis, in.$^3$ (mm$^3$ /10$^3$) |
| AS (DW) | $S_y$ | Elastic section modulus about the *y* -axis, in.$^3$ (mm$^3$ /10$^3$) |
| AT (DX) | $r_y$ | Radius of gyration about the *y* -axis (with no separation for double angles back-to-back), in. (mm) |
| AU (DY) | $I_z$ | Moment of inertia about the *z* -axis, in.$^4$ (mm$^4$ /10$^6$) |
| AV (DZ) | $r_z$ | Radius of gyration about the *z* -axis, in. (mm) |
| AW (EA) | $S_z$ | Elastic section modulus about the *z* -axis, in.$^3$ (mm$^3$ /10$^3$) |
| AX (EB) | $J$ | Torsional moment of inertia, in.$^4$ (mm$^4$ /10$^3$) |
| AY (EC) | $C_w$ | Warping constant, in.$^6$ (mm$^6$ /10$^9$) |
| AZ (ED) | $C$ | HSS torsional constant, in.$^3$ (mm$^3$ /10$^3$) |
| BA (EE) | $W_{no}$ | Normalized warping function, as used in Design Guide 9, in.$^2$ (mm$^2$) |
| BB (EF) | $S_{w1}$ | Warping statical moment at point 1 on cross section, as used in AISC Design Guide 9 and shown in Figures 1 and 2, in.$^4$ (mm$^4$ /10$^6$) |
| BC (EG) | $S_{w2}$ | Warping statical moment at point 2 on cross section, as used in AISC Design Guide 9 and shown in Figure 2, in.$^4$ (mm$^4$ /10$^6$) |
| BD (EH) | $S_{w3}$ | Warping statical moment at point 3 on cross section, as used in AISC Design Guide 9 and shown in Figure 2, in.$^4$ (mm$^4$ /10$^6$) |
| BE (EI) | $Q_f$ | Statical moment for a point in the flange directly above the vertical edge of the web, as used in AISC Design Guide 9, in.$^3$ (mm$^3$ /10$^3$) |
| BF (EJ) | $Q_w$ | Statical moment for a point at mid-depth of the cross section, as used in AISC Design Guide 9, in.$^3$ (mm$^3$ /10$^3$) |
| BG (EK) | $r_o$ | Polar radius of gyration about the shear center, in. (mm) |
| BH (EL) | $H$ | Flexural constant |
| BI (EM) | $\tan(\alpha)$ | Tangent of the angle between the *y-y* and *z-z* axes for single angles, where $\alpha$ is shown in Figure 3 |
| BJ (EN) | $I_w$ | Moment of inertia about the *w* -axis for single angles, in.$^4$ (mm$^4$ /10$^6$) |
| BK (EO) | $z_A$ | Distance from point A to center of gravity along *z* -axis, as shown in Figure 3, in. (mm) |
| BL (EP) | $z_B$ | Distance from point B to center of gravity along *z* -axis, as shown in Figure 3, in. (mm) |
| BM (EQ) | $z_C$ | Distance from point C to center of gravity along *z* -axis, as shown in Figure 3, in. (mm) |
| BN (ER) | $w_A$ | Distance from point A to center of gravity along *w* -axis, as shown in Figure 3, in. (mm) |
| BO (ES) | $w_B$ | Distance from point B to center of gravity along *w* -axis, as shown in Figure 3, in. (mm) |
| BP (ET) | $w_C$ | Distance from point C to center of gravity along *w* -axis, as shown in Figure 3, in. (mm) |
| BQ (EU) | $S_{wA}$ | Elastic section modulus about the *w* -axis at point A on cross section, as shown in Figure 3, in.$^3$ (mm$^3$ /10$^3$) |
| BR (EV) | $S_{wB}$ | Elastic section modulus about the *w* -axis at point B on cross section, as shown in Figure 3, in.$^3$ (mm$^3$ /10$^3$) |
| BS (EW) | $S_{wC}$ | Elastic section modulus about the *w* -axis at point C on cross section, as shown in Figure 3, in.$^3$ (mm$^3$ /10$^3$) |
| BT (EX) | $S_{zA}$ | Elastic section modulus about the *z* -axis at point A on cross section, as shown in Figure 3, in.$^3$ (mm$^3$ /10$^3$) |

| | | |
|---|---|---|
| BU (EY) | $S_{zB}$ | Elastic section modulus about the *z*-axis at point B on cross section, as shown in Figure 3, in.$^3$ (mm$^3$ /10$^3$) |
| BV (EZ) | $S_{zC}$ | Elastic section modulus about the *z*-axis at point C on cross section, as shown in Figure 3, in.$^3$ (mm$^3$ /10$^3$) |
| BW (FA) | $r_{ts}$ | Effective radius of gyration, in. (mm) |
| BX (FB) | $h_o$ | Distance between the flange centroids, in. (mm) |
| BY (FC) | $P_A$ | Shape perimeter minus one flange surface (or short leg surface for a single angle), as used in Design Guide 19, in. (mm) |
| BZ (FD) | $P_{A2}$ | Single angle shape perimeter minus long leg surface, as used in AISC Design Guide 19, in. (mm) |
| CA (FE) | $P_B$ | Shape perimeter, as used in AISC Design Guide 19, in. (mm) |
| CB (FF) | $P_C$ | Box perimeter minus one flange surface, as used in Design Guide 19, in. (mm) |
| CC (FG) | $P_D$ | Box perimeter, as used in AISC Design Guide 19, in. (mm) |
| CD (FH) | $T$ | Distance between web toes of fillets at top and bottom of web, in. (mm) |
| CE (FI) | $WG_i$ | The workable gage for the inner fastener holes in the flange that provides for entering and tightening clearances and edge distance and spacing requirements. The actual size, combination, and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility. See AISC *Manual* Part 1 for additional information, in. (mm) |
| CF(FJ) | $WG_o$ | The bolt spacing between inner and outer fastener holes when the workable gage is compatible with four holes across the flange. See AISC *Manual* Part 1 for additional information, in. (mm) |
| [a] Values in parentheses "()" is for metric data. | | |

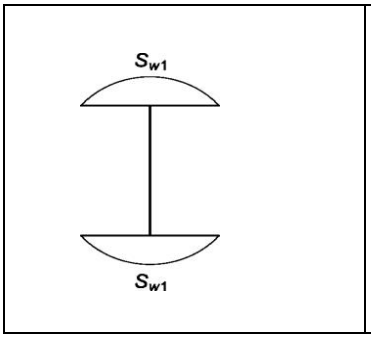


*Fig. 1. Location of warping statical moment for W-, M-, S- and HP-shapes.*

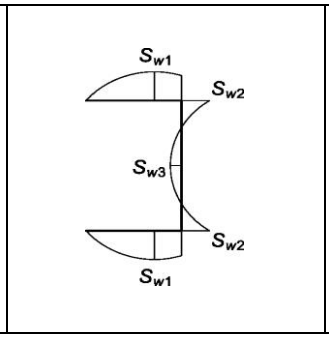


*Fig. 2. Location of warping statical moment for C- and MC-shapes.*

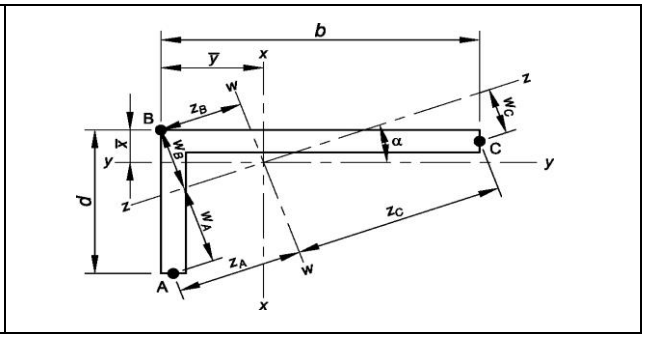


*Fig. 3. Location of Point A, B and C for single angles.*

**B. New Shapes in v15.0**

| Shape Type | Section Size |
|---|---|
| W | W40X655, W36X925, W36X853, W36X802,W36X723, W21X275, W21X248, W21X223, W14X873, W14X808 |
| HP | HP12X89 |
| L | L12X12X1-3/8, L12X12X1-1/4, L12X12X1-1/8, L12X12X1, L10X10X1-3/8, L10X10X1-1/4, L10X10X1-1/8, L10X10X1, L10X10X7/8, L10X10X3/4 |
| WT | WT20X327.5, WT18X462.5, WT18X426.5, WT18X401, WT18X361.5, WT10.5X137.5, WT10.5X124, WT10.5X111.5, WT7X436.5, WT7X404 |
| 2L | 2L12X12X1-3/8, 2L12X12X1-3/8X3/4, 2L12X12X1-3/8X1-1/2, 2L12X12X1-1/4, 2L12X12X1-1/4X3/4, 2L12X12X1-1/4X1-1/2, 2L12X12X1-1/8, 2L12X12X1-1/8X3/4, 2L12X12X1-1/8X1-1/2, 2L12X12X1, 2L12X12X1X3/4, 2L12X12X1X1-1/2, 2L10X10X1-3/8, 2L10X10X1-3/8X3/4, 2L10X10X1-3/8X1-1/2, 2L10X10X1-1/4, 2L10X10X1-1/4X3/4, 2L10X10X1-1/4X1-1/2, 2L10X10X1-1/8, 2L10X10X1-1/8X3/4, 2L10X10X1-1/8X1-1/2, 2L10X10X1, 2L10X10X1X3/4, 2L10X10X1X1-1/2, 2L10X10X7/8, 2L10X10X7/8X3/4, 2L10X10X7/8X1-1/2, 2L10X10X3/4, 2L10X10X3/4X3/4, 2L10X10X3/4X1-1/2 |
| HSS | HSS24X12X3/4, HSS24X12X5/8, HSS24X12X1/2, HSS22X22X7/8, HSS22X22X3/4, HSS20X20X7/8, HSS20X20X3/4, HSS20X20X5/8, HSS20X20X1/2, HSS20X12X3/4, HSS18X18X7/8, HSS18X18X3/4, HSS18X18X5/8, HSS18X18X1/2, HSS16X16X7/8, HSS16X16X3/4, HSS16X12X3/4, HSS14X14X7/8, HSS14X14X3/4, HSS12X12X3/4, HSS10X10X3/4 |
| Pipe | Pipe26STD, Pipe24STD, Pipe20STD, Pipe18STD, Pipe16STD, Pipe14STD, Pipe26XS, Pipe24XS, Pipe20XS, Pipe18XS, Pipe16XS, Pipe14XS, Pips12XXS, Pipe10XXS |

**C. New Variables in v15.0**

- $P_{A2}$
- $P_c$
- $P_d$
- $T$
- $W_{gi}$
- $W_{go}$

**D. Variables Removed in v15.0**

- $Q_s$