

TOLERANCES

STRUCTURALS

Permissible Variations in Cross Section for W, HP, S, M, C and MC Shapes

Shape	Section Nominal Sizes in.	Depth, in.		Flange Width, in.		Flanges Out-of- Square, max. in. ^{††}
		Over	Under	Over	Under	
		Theo- retical	Theo- retical	Theo- retical	Theo- retical	
W and HP	Up to 12 incl	1/8	1/8	1/4	3/16	1/4
	over 12	1/8	1/8	1/4	3/16	5/16
S and M	3 to 7, incl	3/32	1/16	1/8	1/8	1/32
	Over 7 to 14, incl	1/8	3/32	5/32	5/32	1/32
	Over 14 to 24, incl	3/16	1/8	3/16	3/16	1/32
C and MC	1 1/2 and under	1/32	1/32	1/32	1/32	1/32
	Over 1 1/2 to 3, excl	1/16	1/16	1/16	1/16	1/32
	3 to 7, incl	3/32	1/16	1/8	1/8	1/32
	Over 7 to 14, incl	1/8	3/32	1/8	5/32	1/32
	Over 14	3/16	1/8	1/8	3/16	1/32

* Applies when flanges of channels are toed in or out. For channels 5/8 in. and under in depth, the permissible out-of-square is 3/64 in./in. of depth.

† Tolerance is per inch of flange width for S, M, C, and MC shapes.

Permissible Variations in Cross Section for Angles (L Shapes) and Zees

Section	Nominal Size, in.	Depth, in.		Flange Width or Length of Leg, in.		Out of Square per Inch, in.	Variations from Thickness for Thick- ness Given, Over and Under, in.		
		Over	Under	Over	Under		3/16 and under	Over 3/16 to 3/8 incl	Over 3/8
		Theo- retical	Theo- retical	Theo- retical	Theo- retical				
Angles* (L Shapes)	1 and under	—	—	1/32	1/32	3/128 [†]	0.008	0.010	—
	Over 1 to 2, incl	—	—	3/64	3/64	3/128 [†]	0.010	0.010	0.012
	Over 2 to 3, excl	—	—	1/16	1/16	3/128 [†]	0.012	0.015	0.015
	3 to 4, incl	—	—	1/8	3/32	3/128 [†]	—	—	—
	Over 4 to 6, incl	—	—	1/8	1/8	3/128 [†]	—	—	—
Zees	Over 6	—	—	3/16	1/8	3/128 [†]	—	—	—
	3 to 4, incl	1/8	1/16	1/8	3/32	3/128 [†]	—	—	—
	Over 4 to 6, incl	1/8	1/16	1/8	1/8	3/128 [†]	—	—	—

* For unequal leg angles, longer leg determines classification.

† 3/128 in./in. = 1 1/2 deg.

Permissible Variations in Sectional Dimensions for Rolled Tees

Nominal Size*, in	Depth [†] , in.		Width [†] , in.		Thickness of Flange, in.		Thickness of Stem, in.	
	Over	Under	Over	Under	Over	Under	Over	Under
1 1/4 and under	3/64	3/64	3/64	3/64	0.010	0.010	0.005	0.020
Over 1 1/4 to 2, incl	1/16	1/16	1/16	1/16	0.012	0.012	0.010	0.020
Over 2 to 3, excl	3/32	3/32	3/32	3/32	0.015	0.015	0.015	0.020

* The longer member of an unequal tee determines the size for permissible variations.

† Measurements for both depth and width are overall.

Permissible Variations in Straightness for S, M, C, MC, L, T, Z, Shapes

Variable	Nominal Size, in.	Permissible Variation, in.
Camber	Under 3	1/4 in. in any 5 ft, or 1/4 × (number of feet of total length/5)
	3 and over	1/8 × (number of feet of total length/5)
Sweep	all	Due to the extreme variations in flexibility of these shapes, straightness tolerances for sweep are subject to negotiations between the manufacturer and the purchaser for the individual sections involved.

Permissible Variations in Straightness for W Shapes

Permissible Variation