
Mill Production Standards

Independence Tube takes great pride in the quality of the structural tubing produced in our Chicago, Marseilles and Decatur facilities. The following are a list of product standards adopted by Independence Tube for manufacturing purposes. *Should you require better than listed below, please contact your Independence Tube Representative.*

All hollow structural steel tubing (HSS) at Independence Tube is produced to **ASTM A500 – 01 Standard Specifications for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes**. For a complete guide to this specification, please visit www.astm.org.

WALL THICKNESS

The minimum wall thickness at any point of measurement on the tubing shall be not more than 10% less than the nominal wall thickness specified. The maximum wall thickness, excluding the weld seam of welded tubing, shall not be more than 10% greater than the nominal wall thickness specified. The wall thickness is to be measured at the center of the flat.

OUTSIDE DIMENSIONS

The specified dimensions, measured across the flats at positions at least 2 inches from either end of the tubing and including an allowance for convexity or concavity, shall not exceed the plus and minus tolerances shown.

Outside Large Flat Dimension, inches	Large Flat Dimension Tolerance¹, plus and minus, inches
2-1/2" or under	0.020
Over 2-1/2" to 3-1/2", incl.	0.025
Over 3-1/2" to 5-1/2", incl.	0.030
Over 5-1/2"	0.01 times large flat dimension

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*Tolerances include allowance for convexity or concavity. For rectangular tubing having a ratio of outside large to small flat dimension less than 1.5, and for square tubing, the tolerance on small flat dimension shall be identical to the large flat dimension tolerance. For rectangular tubing having a ratio of outside large to small flat dimension in the range of 1.5 to 3.0 inclusive, the tolerance on small flat dimension shall be 1.5 times the large flat dimension tolerance. For rectangular tubing having a ratio of outside large to small flat dimension greater than 3.0, the tolerance on small flat dimension shall be 2.0 times the large flat dimension tolerance.

SQUARENESS OF SIDES

For square or rectangular structural tubing, adjacent sides may deviate from 90° by a tolerance of +/-2° maximum.

Straightness

The permissible variation for straightness of structural tubing shall be 1/8-inch times the number of feet of total length divided by 5.

TWIST

The tolerance for twist or variation with respect to axial alignment of the section, for square and rectangular structural tubing:

Specified Dimension of Longest Side, in.	Maximum Twist in the First 3 ft and in each additional 3 ft
Over 1-1/2" to 2-1/2", incl.	0.062
Over 2-1/2" to 4", incl.	0.075
Over 4" to 6", incl.	0.087
Over 6" to 8", incl.	0.100
Over 8"	0.112

Twist is measured by either holding down one end of a square or rectangular tube on a flat surface plate with the bottom side of the tube parallel to the surface plate of the two corners at the opposite end of the bottom side of the tube or by measuring this difference on the heavier sections by a suitable measuring device. The difference in the height of the corners shall not exceed the values in the above table. Twist measurements are not taken within 2 inches of either end of the product.

Weld Seam Location

The weld seam will be within +/- 1/2" of the centerline of the tube flat.

STANDARD MILL LENGTH TOLERANCES

Unless otherwise specified, the standard length tolerance of tubing off the mill will be plus 1 inch, minus 0 inch.

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PHYSICAL REQUIREMENTS

The material shall conform to the requirements as to tensile properties described below:

SHAPED STRUCTURAL TUBING		
	Grade B	Grade C
Tensile strength, min, psi	58,000	62,000
Yield Strength, min, psi	46,000	50,000
Elongation in 2 in., min %	23 ¹	21 ²

¹Applies to specified wall thicknesses 0.180 inches and over. For wall thicknesses under 0.180 inch, the minimum elongation shall be calculated by the formula: percent elongation in 2 inch = 61t + 12.

²Applies to specified wall thicknesses 0.120 inches and over. For lighter wall thicknesses, elongation shall be by agreement with the manufacturer.

The above standards have been adopted by Independence Tube to be in compliance with ASTM A500 – 01. Should you require better or different tolerances than shown above, please contact your Independence Tube Representative.

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