STEEL GRADE COMPARISON & FACT SHEET

STEEL STANDARDS

	ASTM A500-01A	CSA G40.21-98
DESCRIPTION	Standard Specification for cold-formed welded and seamless carbon steel structural tubing in rounds and shapes.	General requirements for rolled or welded structural quality steel/structural quality steel.
INTENDED USE	Welded, riveted, or bolted construction of bridges and buildings, and for general structural purposes.	General specifications for plates, shapes, hollow sections, sheet, sheet piling cold-formed channels and bars used in construction.

TECHNICAL INFORMATION

SPECIFICATIONS	ROUND STRUCTURAL TUBING	
STRENGTH LEVELS	**Grade C**	**50W**
Yield Strength	46,000 psi min.	50,000 psi min.
Tensile Strength	62,000 psi min.	65,000–90,000 psi
Elongation % in 2"	21 min.*	22 min.*
TOLERANCES	**Grade C**	**50W**
O.D. Size		
> 1.9–2.5 incl.	+/- .75%	+/- .020"
> 2.5–3.5 incl.	+/- .75%	+/- .030"
> 3.5–5.5 incl.	+/- .75%	+/- .040"
> 5.5 incl.	+/- .75%	+/- 1%

SPECIFICATIONS	SHAPED STRUCTURAL TUBING	
STRENGTH LEVELS	**Grade C**	**50W**
Yield Strength	50,000 psi min.	50,000 psi min.
Tensile Strength	62,000 psi min.	65,000–90,000 psi
Elongation % in 2"	21 min.*	22 min.*
TOLERANCES	**Grade C**	**50W**
O.D. Size		
≤ 2.5 incl.	+/- .020"	+/- .020"
> 2.5–3.5 incl.	+/- .025"	+/- .030"
> 3.5–5.5 incl.	+/- .030"	+/- .040"
> 5.5 incl.	+/- 1%	+/- 1%

NOTE: Tolerance includes allowance for convexity and concavity. For rectangular sections, the tolerance calculated for the larger flat dimension shall also apply to the smaller flat dimension. This tolerance shall be increased by 50% when applied to the smaller dimension for rectangular sections whose ratio of cross-sectional dimensions is between 1.5 and 3, and by 100% when this ratio exceeds 3.

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SPECIFICATIONS	SHAPED STRUCTURAL TUBING		
TOLERANCES	**Grade C**	**50W**	
Wall Thickness (deviation from nominal)	+/- 10%	+10%/-5%	
Mass	N/A	+10%/-3.5%	
Straightness (maximum)	⅛" x length (in feet) divided by 5	⅛" x length (in feet) divided by 5	
Squareness	+/- 2°	+/- 2°	
Twist			
≤ 1.5 incl.	.050"	.050"	
> 1.5–2.5 incl.	.062"	.062"	
> 2.5–4.0 incl.	.075"	.075"	
> 4.0–6.0 incl.	.087"	.087"	
> 6.0–8.0 incl.	.100"	.100"	
> 8.0 incl (max 3').	.112"	.112"	
Corner Radii		**Perimeter ≤ 24" incl.**	**Perimeter > 24" incl.**
≤ .109 incl.	3t	.218"	—
> .109–.134 incl.	3t	.268"	—
> .134–.156 incl.	3t	.312"	—
> .156–.188 incl.	3t	.470"	—
> .188–.250 incl.	3t	.625"	.750"
> .250–.313 incl.	3t	.785"	.940"
> .313–.375 incl.	3t	.938"	1.125"
> .375–.500 incl.	3t	1.250"	1.500"
> .500 incl.	3t	—	3t

CHEMISTRY LEVELS	Grade C	50W
Carbon	.23 max.	.23 max.
Manganese	1.35 max.	.50–1.50
Phosphorus	.035 max.	.040 max.
Sulfur	.035 max.	.050 max.
Silicon	N/A	.400 max.*
Grain Refining Elements	N/A	.100 max.*

NOTE:

1) The above is provided for information purposes only as a general comparison of the specifications listed and in no way should be considered as a complete version of each specification. For more detailed information, the actual specification should be consulted.

2) *Other restrictions may apply. Please refer to complete specification for details.

3) Consult the Steel Tube Inisitute of North America publication "Recommended Methods to Check Dimensional Tolerances On HSS" for the industry recognized measurement methods.

4) The above comparison also applies to the metric version of the CSA Specification G40.21 350W.

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