



## A500A vs A513 Specification Comparison (Square & Rectangular Tubing)

	ASTM A500/A500M-07 Grade A	ASTM A513-08a																																																			
Chemical Composition	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Composition, %</th> </tr> <tr> <th>Heat Analysis</th> <th>Product Analysis</th> </tr> </thead> <tbody> <tr> <td>C Max</td> <td>0.26</td> <td>0.30</td> </tr> <tr> <td>Mn Max</td> <td>1.35</td> <td>1.40</td> </tr> <tr> <td>P Max</td> <td>0.035</td> <td>0.045</td> </tr> <tr> <td>S Max</td> <td>0.035</td> <td>0.045</td> </tr> </tbody> </table>		Composition, %		Heat Analysis	Product Analysis	C Max	0.26	0.30	Mn Max	1.35	1.40	P Max	0.035	0.045	S Max	0.035	0.045	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Grade Designation</th> <th colspan="4">Chemical Composition Limits, %</th> </tr> <tr> <th>C</th> <th>Mn</th> <th>P MAX</th> <th>S MAX</th> </tr> </thead> <tbody> <tr> <td>MT 1010</td> <td>0.02-0.15</td> <td>0.30-0.60</td> <td>0.035</td> <td>0.035</td> </tr> <tr> <td>MT 1015</td> <td>0.10-0.20</td> <td>0.30-0.60</td> <td>0.035</td> <td>0.035</td> </tr> <tr> <td>MT X 1015</td> <td>0.10-0.20</td> <td>0.60-0.90</td> <td>0.035</td> <td>0.035</td> </tr> <tr> <td>MT 1020</td> <td>0.15-0.25</td> <td>0.30-0.60</td> <td>0.035</td> <td>0.035</td> </tr> <tr> <td>MT X 1020</td> <td>0.15-0.25</td> <td>0.70-1.00</td> <td>0.035</td> <td>0.035</td> </tr> </tbody> </table> <p style="font-size: small;">* If no grade is specified, Grades MT1010 to MT1020 may be furnished.</p>	Grade Designation	Chemical Composition Limits, %				C	Mn	P MAX	S MAX	MT 1010	0.02-0.15	0.30-0.60	0.035	0.035	MT 1015	0.10-0.20	0.30-0.60	0.035	0.035	MT X 1015	0.10-0.20	0.60-0.90	0.035	0.035	MT 1020	0.15-0.25	0.30-0.60	0.035	0.035	MT X 1020	0.15-0.25	0.70-1.00	0.035	0.035
	Composition, %																																																				
	Heat Analysis	Product Analysis																																																			
C Max	0.26	0.30																																																			
Mn Max	1.35	1.40																																																			
P Max	0.035	0.045																																																			
S Max	0.035	0.045																																																			
Grade Designation	Chemical Composition Limits, %																																																				
	C	Mn	P MAX	S MAX																																																	
MT 1010	0.02-0.15	0.30-0.60	0.035	0.035																																																	
MT 1015	0.10-0.20	0.30-0.60	0.035	0.035																																																	
MT X 1015	0.10-0.20	0.60-0.90	0.035	0.035																																																	
MT 1020	0.15-0.25	0.30-0.60	0.035	0.035																																																	
MT X 1020	0.15-0.25	0.70-1.00	0.035	0.035																																																	
Tensile Requirements	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Shaped structural Tubing</th> <th>Grade A</th> </tr> </thead> <tbody> <tr> <td>YS(Mpa)MIN</td> <td>45000</td> </tr> <tr> <td>YS(Mpa)MIN</td> <td>39000</td> </tr> <tr> <td>EL (%)MIN(*)</td> <td>25</td> </tr> </tbody> </table> <p style="font-size: x-small;">(*) Specified wall thickness(t) is lighter than 0.120 in. Elongation(%) = 56t + 17.5</p>	Shaped structural Tubing	Grade A	YS(Mpa)MIN	45000	YS(Mpa)MIN	39000	EL (%)MIN(*)	25	<p style="font-size: small;">*When Tensile Properties are required, they shall be specified in the purchase order.</p>																																											
Shaped structural Tubing	Grade A																																																				
YS(Mpa)MIN	45000																																																				
YS(Mpa)MIN	39000																																																				
EL (%)MIN(*)	25																																																				
<b>Tolerance</b>																																																					
Outside Dimensions	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Largest Dimension(Inches)*</th> <th>Tolerance(inches)**</th> </tr> </thead> <tbody> <tr> <td>2-1/2 and under</td> <td>±0.020</td> </tr> <tr> <td>Over 2-1/2 to 3-1/2, incl</td> <td>±0.025</td> </tr> <tr> <td>Over 3-1/2 to 5-1/2, incl</td> <td>±0.030</td> </tr> </tbody> </table> <p style="font-size: x-small;">* Measured at least 2" from cut end of tubing</p>	Largest Dimension(Inches)*	Tolerance(inches)**	2-1/2 and 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	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Largest Dimension(Inches)*</th> <th>Tolerance(inches)</th> </tr> </thead> <tbody> <tr> <td>3/16 to 5/8, incl</td> <td>±0.004</td> </tr> <tr> <td>Over 5/8 to 1-1/8, incl</td> <td>±0.005</td> </tr> <tr> <td>Over 1-1/8 to 1-1/2, incl</td> <td>±0.006</td> </tr> <tr> <td>Over 1-1/2 to 2, incl</td> <td>±0.008</td> </tr> <tr> <td>Over 2 to 3, incl</td> <td>±0.010</td> </tr> <tr> <td>Over 3 to 4, incl</td> <td>±0.020</td> </tr> </tbody> </table> <p style="font-size: x-small;">* Measured at least 2" from cut end of tubing</p>	Largest Dimension(Inches)*	Tolerance(inches)	3/16 to 5/8, incl	±0.004	Over 5/8 to 1-1/8, incl	±0.005	Over 1-1/8 to 1-1/2, incl	±0.006	Over 1-1/2 to 2, incl	±0.008	Over 2 to 3, incl	±0.010	Over 3 to 4, incl	±0.020																													
Largest Dimension(Inches)*	Tolerance(inches)**																																																				
2-1/2 and 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																																																				
Largest Dimension(Inches)*	Tolerance(inches)																																																				
3/16 to 5/8, incl	±0.004																																																				
Over 5/8 to 1-1/8, incl	±0.005																																																				
Over 1-1/8 to 1-1/2, incl	±0.006																																																				
Over 1-1/2 to 2, incl	±0.008																																																				
Over 2 to 3, incl	±0.010																																																				
Over 3 to 4, incl	±0.020																																																				
Convexity and Concavity	<p style="font-size: small;">** Tolerance include allowance for convexity or concavity</p>	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Largest Dimension(Inches)*</th> <th>Tolerance(inches)</th> </tr> </thead> <tbody> <tr> <td>2-1/2 and under</td> <td>±0.010</td> </tr> <tr> <td>Over 2-1/2 to 4, incl</td> <td>±0.015</td> </tr> </tbody> </table>	Largest Dimension(Inches)*	Tolerance(inches)	2-1/2 and under	±0.010	Over 2-1/2 to 4, incl	±0.015																																													
Largest Dimension(Inches)*	Tolerance(inches)																																																				
2-1/2 and under	±0.010																																																				
Over 2-1/2 to 4, incl	±0.015																																																				
Wall Thickness	±10% of Nominal Wall Thickness	±10% of Nominal Wall Thickness																																																			
Length	-0, +2" (MAC Spec)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Mill Punch Cut Length *</th> <th>Tolerance(Inches)</th> </tr> </thead> <tbody> <tr> <td>1 to 3' incl</td> <td>±1/16</td> </tr> <tr> <td>Over 3 to 12' incl</td> <td>±3/32</td> </tr> <tr> <td>Over 12 to 20' incl</td> <td>±1/8</td> </tr> <tr> <td>Over 20 to 30' incl</td> <td>±3/16</td> </tr> </tbody> </table> <p style="font-size: x-small;">*When specified Length Tolerance is Required</p>	Mill Punch Cut Length *	Tolerance(Inches)	1 to 3' incl	±1/16	Over 3 to 12' incl	±3/32	Over 12 to 20' incl	±1/8	Over 20 to 30' incl	±3/16																																									
Mill Punch Cut Length *	Tolerance(Inches)																																																				
1 to 3' incl	±1/16																																																				
Over 3 to 12' incl	±3/32																																																				
Over 12 to 20' incl	±1/8																																																				
Over 20 to 30' incl	±3/16																																																				
Straightness	Max(Inches) = ( Length(ft) / 5) x 1/8 (Length 20ft ⇒ Max 0.50in)	Max(Inches) = 1/16" per 3ft (Length 20ft ⇒ Max 0.42in)																																																			
Squareness of Sides	±2° Max (2x2x0.120 ⇒ ±0.070in)	±b = Largest Dimension(Inches) x 0.006 in. (b=tolerance for out-of-square) (2x2x0.120 ⇒ ±0.012in)																																																			
Radius of Corners	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Max 3t</th> <th>Wall thickness (Inches)</th> <th>Max Radius (Inches)</th> </tr> </thead> <tbody> <tr> <td></td> <td>0.047</td> <td>0.141</td> </tr> <tr> <td></td> <td>0.060</td> <td>0.180</td> </tr> <tr> <td></td> <td>0.083</td> <td>0.249</td> </tr> <tr> <td></td> <td>0.095</td> <td>0.285</td> </tr> <tr> <td></td> <td>0.120</td> <td>0.360</td> </tr> </tbody> </table>	Max 3t	Wall thickness (Inches)	Max Radius (Inches)		0.047	0.141		0.060	0.180		0.083	0.249		0.095	0.285		0.120	0.360	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Squares and Rectangles Made from Tubes of the following Diameter</th> <th>Wall thickness (Inches)</th> <th>Radius Tolerance (Inches)</th> </tr> </thead> <tbody> <tr> <td>1/2 to 4 Incl</td> <td>0.047</td> <td>3/64 to 5/64</td> </tr> <tr> <td>1/2 to 4-1/8 Incl</td> <td>0.060</td> <td>1/16 to 7/64</td> </tr> <tr> <td>3/4 to 4-1/8 Incl</td> <td>0.083</td> <td>5/64 to 1/8</td> </tr> <tr> <td>1 to 4-1/8 Incl</td> <td>0.095</td> <td>3/32 to 5/32</td> </tr> <tr> <td>1-1/4 to 4 Incl</td> <td>0.120</td> <td>1/8 to 7/32</td> </tr> </tbody> </table>	Squares and Rectangles Made from Tubes of the following Diameter	Wall thickness (Inches)	Radius Tolerance (Inches)	1/2 to 4 Incl	0.047	3/64 to 5/64	1/2 to 4-1/8 Incl	0.060	1/16 to 7/64	3/4 to 4-1/8 Incl	0.083	5/64 to 1/8	1 to 4-1/8 Incl	0.095	3/32 to 5/32	1-1/4 to 4 Incl	0.120	1/8 to 7/32															
Max 3t	Wall thickness (Inches)	Max Radius (Inches)																																																			
	0.047	0.141																																																			
	0.060	0.180																																																			
	0.083	0.249																																																			
	0.095	0.285																																																			
	0.120	0.360																																																			
Squares and Rectangles Made from Tubes of the following Diameter	Wall thickness (Inches)	Radius Tolerance (Inches)																																																			
1/2 to 4 Incl	0.047	3/64 to 5/64																																																			
1/2 to 4-1/8 Incl	0.060	1/16 to 7/64																																																			
3/4 to 4-1/8 Incl	0.083	5/64 to 1/8																																																			
1 to 4-1/8 Incl	0.095	3/32 to 5/32																																																			
1-1/4 to 4 Incl	0.120	1/8 to 7/32																																																			
Twist	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Largest Dimension(Inches)</th> <th>Max in 3ft(Inches)</th> </tr> </thead> <tbody> <tr> <td>1-1/2 and under</td> <td>0.050</td> </tr> <tr> <td>Over 1-1/2 to 2-1/2, incl</td> <td>0.062</td> </tr> <tr> <td>Over 2-1/2 to 4, incl</td> <td>0.075</td> </tr> </tbody> </table>	Largest Dimension(Inches)	Max in 3ft(Inches)	1-1/2 and under	0.050	Over 1-1/2 to 2-1/2, incl	0.062	Over 2-1/2 to 4, incl	0.075	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Largest Dimension(Inches)</th> <th>Max in 3ft(Inches)</th> </tr> </thead> <tbody> <tr> <td>1/2 and under</td> <td>0.032</td> </tr> <tr> <td>Over 1/2 to 1-1/2, incl</td> <td>0.050</td> </tr> <tr> <td>Over 1-1/2 to 2-1/2, incl</td> <td>0.062</td> </tr> <tr> <td>Over 2-1/2 to 4, incl</td> <td>0.075</td> </tr> </tbody> </table>	Largest Dimension(Inches)	Max in 3ft(Inches)	1/2 and under	0.032	Over 1/2 to 1-1/2, incl	0.050	Over 1-1/2 to 2-1/2, incl	0.062	Over 2-1/2 to 4, incl	0.075																																	
Largest Dimension(Inches)	Max in 3ft(Inches)																																																				
1-1/2 and under	0.050																																																				
Over 1-1/2 to 2-1/2, incl	0.062																																																				
Over 2-1/2 to 4, incl	0.075																																																				
Largest Dimension(Inches)	Max in 3ft(Inches)																																																				
1/2 and under	0.032																																																				
Over 1/2 to 1-1/2, incl	0.050																																																				
Over 1-1/2 to 2-1/2, incl	0.062																																																				
Over 2-1/2 to 4, incl	0.075																																																				

# A513 Specification (Round Tubing)



ASTM A513-08a																																																																																																																																				
<b>Chemical Composition</b>	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: left;">Grade Designation</th> <th colspan="4" style="text-align: center;">Chemical Composition Limits, %</th> </tr> <tr> <th style="text-align: center;">C</th> <th style="text-align: center;">Mn</th> <th style="text-align: center;">P MAX</th> <th style="text-align: center;">S MAX</th> </tr> </thead> <tbody> <tr> <td>MT 1010</td> <td style="text-align: center;">0.02-0.15</td> <td style="text-align: center;">0.30-0.60</td> <td style="text-align: center;">0.035</td> <td style="text-align: center;">0.035</td> </tr> <tr> <td>MT 1015</td> <td style="text-align: center;">0.10-0.20</td> <td style="text-align: center;">0.30-0.60</td> <td style="text-align: center;">0.035</td> <td style="text-align: center;">0.035</td> </tr> <tr> <td>MT X 1015</td> <td style="text-align: center;">0.10-0.20</td> <td style="text-align: center;">0.60-0.90</td> <td style="text-align: center;">0.035</td> <td style="text-align: center;">0.035</td> </tr> <tr> <td>MT 1020</td> <td style="text-align: center;">0.15-0.25</td> <td style="text-align: center;">0.30-0.60</td> <td style="text-align: center;">0.035</td> <td style="text-align: center;">0.035</td> </tr> <tr> <td>MT X 1020</td> <td style="text-align: center;">0.15-0.25</td> <td style="text-align: center;">0.70-1.00</td> <td style="text-align: center;">0.035</td> <td style="text-align: center;">0.035</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">* If no grade is specified, Grades MT1010 may be furnished.</p>	Grade Designation	Chemical Composition Limits, %				C	Mn	P MAX	S MAX	MT 1010	0.02-0.15	0.30-0.60	0.035	0.035	MT 1015	0.10-0.20	0.30-0.60	0.035	0.035	MT X 1015	0.10-0.20	0.60-0.90	0.035	0.035	MT 1020	0.15-0.25	0.30-0.60	0.035	0.035	MT X 1020	0.15-0.25	0.70-1.00	0.035	0.035																																																																																																	
Grade Designation	Chemical Composition Limits, %																																																																																																																																			
	C	Mn	P MAX	S MAX																																																																																																																																
MT 1010	0.02-0.15	0.30-0.60	0.035	0.035																																																																																																																																
MT 1015	0.10-0.20	0.30-0.60	0.035	0.035																																																																																																																																
MT X 1015	0.10-0.20	0.60-0.90	0.035	0.035																																																																																																																																
MT 1020	0.15-0.25	0.30-0.60	0.035	0.035																																																																																																																																
MT X 1020	0.15-0.25	0.70-1.00	0.035	0.035																																																																																																																																
<b>Tensile Requirements</b>	<p>*When Tensile Properties are required, they shall be specified in the purchase order.</p>																																																																																																																																			
Tolerance																																																																																																																																				
<b>Outside Diameter</b>	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Outside Diameter (in)*</th> <th style="text-align: center;">Wall Thickness (in)</th> <th style="text-align: center;">Flash-In-Tubing Tolerance (in)</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;"><b>Cold Rolled</b></td> </tr> <tr> <td>5/8, incl</td> <td style="text-align: center;">0.047 to 0.060</td> <td style="text-align: center;">±0.003</td> </tr> <tr> <td>Over 5/8 to 1-1/8, incl</td> <td style="text-align: center;">0.047 to 0.120</td> <td style="text-align: center;">±0.0035</td> </tr> <tr> <td>Over 1-1/8 to 2, incl</td> <td style="text-align: center;">0.047 to 0.120</td> <td style="text-align: center;">±0.005</td> </tr> <tr> <td>Over 2 to 2-1/2, incl</td> <td style="text-align: center;">0.047 to 0.120</td> <td style="text-align: center;">±0.006</td> </tr> <tr> <td>Over 2-1/2 to 3, incl</td> <td style="text-align: center;">0.047 to 0.120</td> <td style="text-align: center;">±0.008</td> </tr> <tr> <td colspan="3" style="text-align: center;"><b>Hot Rolled (and P0)</b></td> </tr> <tr> <td>3/4 to 1-1/8, incl</td> <td style="text-align: center;">0.060 to 0.120</td> <td style="text-align: center;">±0.0035</td> </tr> <tr> <td>Over 1-1/8 to 2, incl</td> <td style="text-align: center;">0.060 to 0.120</td> <td style="text-align: center;">±0.005</td> </tr> <tr> <td>Over 2 to 2-1/2, incl</td> <td style="text-align: center;">0.060 to 0.120</td> <td style="text-align: center;">±0.006</td> </tr> <tr> <td>Over 2-1/2 to 3, incl</td> <td style="text-align: center;">0.060 to 0.120</td> <td style="text-align: center;">±0.008</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">* Measured at least 2" from cut end of tubing</p>	Outside Diameter (in)*	Wall Thickness (in)	Flash-In-Tubing Tolerance (in)	<b>Cold Rolled</b>			5/8, incl	0.047 to 0.060	±0.003	Over 5/8 to 1-1/8, incl	0.047 to 0.120	±0.0035	Over 1-1/8 to 2, incl	0.047 to 0.120	±0.005	Over 2 to 2-1/2, incl	0.047 to 0.120	±0.006	Over 2-1/2 to 3, incl	0.047 to 0.120	±0.008	<b>Hot Rolled (and P0)</b>			3/4 to 1-1/8, incl	0.060 to 0.120	±0.0035	Over 1-1/8 to 2, incl	0.060 to 0.120	±0.005	Over 2 to 2-1/2, incl	0.060 to 0.120	±0.006	Over 2-1/2 to 3, incl	0.060 to 0.120	±0.008																																																																																															
Outside Diameter (in)*	Wall Thickness (in)	Flash-In-Tubing Tolerance (in)																																																																																																																																		
<b>Cold Rolled</b>																																																																																																																																				
5/8, incl	0.047 to 0.060	±0.003																																																																																																																																		
Over 5/8 to 1-1/8, incl	0.047 to 0.120	±0.0035																																																																																																																																		
Over 1-1/8 to 2, incl	0.047 to 0.120	±0.005																																																																																																																																		
Over 2 to 2-1/2, incl	0.047 to 0.120	±0.006																																																																																																																																		
Over 2-1/2 to 3, incl	0.047 to 0.120	±0.008																																																																																																																																		
<b>Hot Rolled (and P0)</b>																																																																																																																																				
3/4 to 1-1/8, incl	0.060 to 0.120	±0.0035																																																																																																																																		
Over 1-1/8 to 2, incl	0.060 to 0.120	±0.005																																																																																																																																		
Over 2 to 2-1/2, incl	0.060 to 0.120	±0.006																																																																																																																																		
Over 2-1/2 to 3, incl	0.060 to 0.120	±0.008																																																																																																																																		
<b>Wall Thickness</b>	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="7" style="text-align: center;">Cold Rolled</th> </tr> <tr> <th rowspan="2" style="text-align: left;">Wall Thickness</th> <th colspan="6" style="text-align: center;">Outside Diameter (in)</th> </tr> <tr> <th colspan="2" style="text-align: center;">5/8 to 7/8 Incl.</th> <th colspan="2" style="text-align: center;">Over 7/8 to 1-1/8 Incl.</th> <th colspan="2" style="text-align: center;">Over 1-1/8 to 3 Incl.</th> </tr> <tr> <th style="text-align: center;">in</th> <th style="text-align: center;">+</th> <th style="text-align: center;">-</th> <th style="text-align: center;">+</th> <th style="text-align: center;">-</th> <th style="text-align: center;">+</th> <th style="text-align: center;">-</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.047</td> <td style="text-align: center;">0.003</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.002</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.002</td> <td style="text-align: center;">0.006</td> </tr> <tr> <td style="text-align: center;">0.060</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.007</td> </tr> <tr> <td style="text-align: center;">0.072</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.007</td> </tr> <tr> <td style="text-align: center;">0.083</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.007</td> </tr> <tr> <td style="text-align: center;">0.095</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.007</td> </tr> <tr> <td style="text-align: center;">0.120</td> <td style="text-align: center;">...</td> <td style="text-align: center;">...</td> <td style="text-align: center;">0.007</td> <td style="text-align: center;">0.008</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.008</td> </tr> <tr> <th colspan="7" style="text-align: center;">Hot Rolled (and P0)</th> </tr> <tr> <th rowspan="2" style="text-align: left;">Wall Thickness</th> <th colspan="6" style="text-align: center;">Outside Diameter (in)</th> </tr> <tr> <th colspan="2" style="text-align: center;">3/4 to 1 Incl.</th> <th colspan="2" style="text-align: center;">Over 1 to 1-15/16 Incl.</th> <th colspan="2" style="text-align: center;">Over 1-15/16 to 3 Incl.</th> </tr> <tr> <th style="text-align: center;">in</th> <th style="text-align: center;">+</th> <th style="text-align: center;">-</th> <th style="text-align: center;">+</th> <th style="text-align: center;">-</th> <th style="text-align: center;">+</th> <th style="text-align: center;">-</th> </tr> <tr> <td style="text-align: center;">0.060</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.009</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.003</td> <td style="text-align: center;">0.011</td> </tr> <tr> <td style="text-align: center;">0.072</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.009</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.003</td> <td style="text-align: center;">0.011</td> </tr> <tr> <td style="text-align: center;">0.083</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.011</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.012</td> </tr> <tr> <td style="text-align: center;">0.095</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.011</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.012</td> </tr> <tr> <td style="text-align: center;">0.120</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.005</td> <td style="text-align: center;">0.011</td> <td style="text-align: center;">0.004</td> <td style="text-align: center;">0.012</td> </tr> </tbody> </table>	Cold Rolled							Wall Thickness	Outside Diameter (in)						5/8 to 7/8 Incl.		Over 7/8 to 1-1/8 Incl.		Over 1-1/8 to 3 Incl.		in	+	-	+	-	+	-	0.047	0.003	0.006	0.002	0.006	0.002	0.006	0.060	0.005	0.007	0.004	0.007	0.004	0.007	0.072	0.005	0.007	0.004	0.007	0.004	0.007	0.083	0.006	0.007	0.005	0.007	0.004	0.007	0.095	0.006	0.007	0.005	0.007	0.004	0.007	0.120	...	...	0.007	0.008	0.006	0.008	Hot Rolled (and P0)							Wall Thickness	Outside Diameter (in)						3/4 to 1 Incl.		Over 1 to 1-15/16 Incl.		Over 1-15/16 to 3 Incl.		in	+	-	+	-	+	-	0.060	0.005	0.009	0.004	0.010	0.003	0.011	0.072	0.005	0.009	0.004	0.010	0.003	0.011	0.083	0.006	0.010	0.005	0.011	0.004	0.012	0.095	0.006	0.010	0.005	0.011	0.004	0.012	0.120	0.006	0.010	0.005	0.011	0.004	0.012
Cold Rolled																																																																																																																																				
Wall Thickness	Outside Diameter (in)																																																																																																																																			
	5/8 to 7/8 Incl.		Over 7/8 to 1-1/8 Incl.		Over 1-1/8 to 3 Incl.																																																																																																																															
in	+	-	+	-	+	-																																																																																																																														
0.047	0.003	0.006	0.002	0.006	0.002	0.006																																																																																																																														
0.060	0.005	0.007	0.004	0.007	0.004	0.007																																																																																																																														
0.072	0.005	0.007	0.004	0.007	0.004	0.007																																																																																																																														
0.083	0.006	0.007	0.005	0.007	0.004	0.007																																																																																																																														
0.095	0.006	0.007	0.005	0.007	0.004	0.007																																																																																																																														
0.120	...	...	0.007	0.008	0.006	0.008																																																																																																																														
Hot Rolled (and P0)																																																																																																																																				
Wall Thickness	Outside Diameter (in)																																																																																																																																			
	3/4 to 1 Incl.		Over 1 to 1-15/16 Incl.		Over 1-15/16 to 3 Incl.																																																																																																																															
in	+	-	+	-	+	-																																																																																																																														
0.060	0.005	0.009	0.004	0.010	0.003	0.011																																																																																																																														
0.072	0.005	0.009	0.004	0.010	0.003	0.011																																																																																																																														
0.083	0.006	0.010	0.005	0.011	0.004	0.012																																																																																																																														
0.095	0.006	0.010	0.005	0.011	0.004	0.012																																																																																																																														
0.120	0.006	0.010	0.005	0.011	0.004	0.012																																																																																																																														
<b>Length</b>	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Mill Punch Cut Length *</th> <th style="text-align: center;">Tolerance (in)</th> </tr> </thead> <tbody> <tr> <td>6in. to 12in. incl</td> <td style="text-align: center;">±1/16</td> </tr> <tr> <td>Over 12in. to 48in. incl</td> <td style="text-align: center;">±1/16</td> </tr> <tr> <td>Over 48in. to 10ft incl</td> <td style="text-align: center;">±1/8</td> </tr> <tr> <td>Over 10ft to 24ft incl</td> <td style="text-align: center;">±1/4</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">*Definite cut lengths are furnished when specified by the purchaser.</p>	Mill Punch Cut Length *	Tolerance (in)	6in. to 12in. incl	±1/16	Over 12in. to 48in. incl	±1/16	Over 48in. to 10ft incl	±1/8	Over 10ft to 24ft incl	±1/4																																																																																																																									
Mill Punch Cut Length *	Tolerance (in)																																																																																																																																			
6in. to 12in. incl	±1/16																																																																																																																																			
Over 12in. to 48in. incl	±1/16																																																																																																																																			
Over 48in. to 10ft incl	±1/8																																																																																																																																			
Over 10ft to 24ft incl	±1/4																																																																																																																																			
<b>Straightness</b>	<p>Max(Inches) = 0.030"/ 3ft</p>																																																																																																																																			
<b>Ovality</b>	<p>The ovality may be 50% greater than the outside tolerance. (except when the wall thickness is less than 3% of the outside diameter.)</p>																																																																																																																																			
<b>Squareness of Cut (Either End)</b>	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: left;">Length of Tube, ft</th> <th colspan="3" style="text-align: center;">Tolerance (in)</th> </tr> <tr> <th colspan="3" style="text-align: center;">Outside Diameter, in</th> </tr> <tr> <th></th> <th style="text-align: center;">Under 1</th> <th style="text-align: center;">1 to 2, incl</th> <th style="text-align: center;">Over 2 to 3, incl</th> </tr> </thead> <tbody> <tr> <td>Under 1</td> <td style="text-align: center;">0.006</td> <td style="text-align: center;">0.008</td> <td style="text-align: center;">0.010</td> </tr> <tr> <td>1 to 3, Incl</td> <td style="text-align: center;">0.008</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.015</td> </tr> <tr> <td>Over 3 to 6, Incl</td> <td style="text-align: center;">0.010</td> <td style="text-align: center;">0.015</td> <td style="text-align: center;">0.020</td> </tr> <tr> <td>Over 6 to 9, Incl</td> <td style="text-align: center;">0.015</td> <td style="text-align: center;">0.020</td> <td style="text-align: center;">0.025</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">*when Specified for Round Tubing</p>	Length of Tube, ft	Tolerance (in)			Outside Diameter, in				Under 1	1 to 2, incl	Over 2 to 3, incl	Under 1	0.006	0.008	0.010	1 to 3, Incl	0.008	0.010	0.015	Over 3 to 6, Incl	0.010	0.015	0.020	Over 6 to 9, Incl	0.015	0.020	0.025																																																																																																								
Length of Tube, ft	Tolerance (in)																																																																																																																																			
	Outside Diameter, in																																																																																																																																			
	Under 1	1 to 2, incl	Over 2 to 3, incl																																																																																																																																	
Under 1	0.006	0.008	0.010																																																																																																																																	
1 to 3, Incl	0.008	0.010	0.015																																																																																																																																	
Over 3 to 6, Incl	0.010	0.015	0.020																																																																																																																																	
Over 6 to 9, Incl	0.015	0.020	0.025																																																																																																																																	