

Round Bar			
Alloy(s)		Spec. Diameter, in.	Diameter Tol. (over+)/under(-)
1018, 12L14	Cold Drawn/Finish	Up to 1.5, incl.	+/- 0.002"
1018, 12L14	Cold Drawn/Finish	Over 1.5 to 2.5, incl.	+/- 0.003"
1018, 12L14	Cold Drawn/Finish	Over 2.5 to 4, incl.	+/- 0.004"
1045, 1144	Cold Drawn/Finish	Up to 1.5, incl.	+/- 0.003"
1045, 1144	Cold Drawn/Finish	Over 1.5 to 2.5, incl.	+/- 0.004"
1045, 1144	Cold Drawn/Finish	Over 2.5 to 4, incl.	+/- 0.005"
1045 TG&P			
	Diameter	ASTM Tolerances	Typical Precision Tolerances
	1-1/2" and Under	+ 0" / - .0010"	-0.0005" to -.0015"
	Over 1-1/2" to Under 2"	+ 0" / - .0015"	-0.0005" to -.0020"
	2" to Under 2-1/2"	+ 0" / - .0015"	-0.0005" to -.0020"
	2-1/2" to Under and Incl. 3"	+ 0" / - .0020"	-0.0005" to -.0025"
Square Bar			
Alloy(s)		Spec. Square, in.	Square Tol. (over+)/under(-)
1018	Cold Finish	Up to 0.75, incl.	+/- 0.002"
1018	Cold Finish	Over 0.75 to 1.5, incl.	+/- 0.003"
1018	Cold Finish	Over 1.5 to 2.5, incl.	+/- 0.004"
1018	Cold Finish	Over 2.5 to 4, incl.	+/- 0.006"
Hex Bar			
Alloy(s)	Spec. Across Flats, in.	Across Flat Tol. (over+)/under(-)	
1018, 12L14	Up to 0.75	+/- 0.002"	
1018, 12L14	Over 0.75 to 1.5	+/- 0.003"	
1018, 12L14	Over 1.5 to 2.5	+/- 0.004"	
Rectangle Bar			
Alloy(s)		Spec. Width, in.	Width Tol. (over+)/under(-)
1018	Cold Finish	Up to 0.75	+/- 0.003"
1018, 11L17	Cold Finish	Over 0.75 to 1.5, incl.	+/- 0.004"
1018, 11L17	Cold Finish	Over 1.5 to 3, incl.	+/- 0.005"
1018, 11L17	Cold Finish	Over 3 to 4, incl.	+/- 0.006"
1018	Cold Finish	Over 4 to 6, incl.	+/- 0.008"
1018	Cold Finish	Over 6	+/- 0.013"

Round Tube

		Spec. O.D., in.	O.D. Tol. (over(+)/under(-))				
A513-Type 5	DOM	Up to 0.499	+ 0.004", - 0"				
A513-Type 5	DOM	0.500 to 1.699	+ 0.005", - 0"				
A513-Type 5	DOM	1.700 to 2.099	+ 0.006", - 0"				
A513-Type 5	DOM	2.100 to 2.499	+ 0.007", - 0"				
A513-Type 5	DOM	2.500 to 2.899	+ 0.008", - 0"				
A513-Type 5	DOM	2.900 to 3.299	+ 0.009", - 0"				
A513-Type 5	DOM	3.300 to 3.699	+ 0.010", - 0"				
A513-Type 5	DOM	3.700 to 4.099	+ 0.011", - 0"				
A513-Type 5	DOM	4.100 to 4.499	+ 0.012", - 0"				
A513-Type 5	DOM	4.500 to 4.899	+ 0.013", - 0"				
A513-Type 5	DOM	4.900 to 5.299	+ 0.014", - 0"				
A513-Type 5	DOM	5.300 to 5.549	+ 0.015", - 0"				
Spec. Wall Thickness, in.	Wall Thickness Tol. (over(+)/under(-))						
A513-Type 5	DOM	0.035	+/- 0.002"	+/- 0.002"	+/- 0.002"	+/- 0.002"	...
A513-Type 5	DOM	0.049	...	+/- 0.002"	+ 0.002", - 0.003"	+ 0.002", - 0.003"	...
A513-Type 5	DOM	0.065	...	+/- 0.002"	+ 0.002", - 0.003"	+ 0.002", - 0.003"	+/- 0.004"
A513-Type 5	DOM	0.083	...	+/- 0.002"	+ 0.002", - 0.003"	+/- 0.003"	+ 0.004", - 0.005"
A513-Type 5	DOM	0.095	...	+/- 0.002"	+ 0.002", - 0.003"	+/- 0.003"	+/- 0.005"
A513-Type 5	DOM	0.109	...	+ 0.002", - 0.003"	+ 0.002", - 0.004"	+/- 0.003"	+/- 0.005"
A513-Type 5	DOM	0.120	...	+/- 0.003"	+ 0.002", - 0.004"	+/- 0.003"	+/- 0.005"
A513-Type 5	DOM	0.134	...	...	+ 0.002", - 0.004"	+/- 0.003"	+/- 0.005"
A513-Type 5	DOM	0.148	...	...	+ 0.002", - 0.004"	+/- 0.003"	+/- 0.005"
A513-Type 5	DOM	0.165	...	...	+ 0.003", - 0.004"	+ 0.003", - 0.004"	+ 0.005", - 0.006"
A513-Type 5	DOM	0.180	...	...	+/- 0.004"	+ 0.003", - 0.005"	+/- 0.006"
A513-Type 5	DOM	0.203	...	...	+ 0.004", - 0.005"	+ 0.004", - 0.005"	+ 0.006", - 0.007"

A513-Type 5	DOM	0.220	...	...	+ 0.004", - 0.006"	+ 0.004", - 0.006"	+/- 0.007"
A513-Type 5	DOM	0.238	...	...	+ 0.005", - 0.006"	+ 0.005", - 0.006"	+/- 0.007"
A513-Type 5	DOM	0.259	...	...	+ 0.005", - 0.006"	+ 0.005", - 0.006"	+/- 0.007"
A513-Type 5	DOM	0.284	...	...	+ 0.005", - 0.006"	+ 0.005", - 0.006"	+/- 0.007"
A513-Type 5	DOM	0.300	...	...	+/- 0.006"	+/- 0.006"	+/- 0.008"
A513-Type 5	DOM	0.320	...	...	+/- 0.007"	+/- 0.007"	+/- 0.008"
A513-Type 5	DOM	0.344	...	...	+/- 0.008"	+/- 0.008"	+/- 0.009"
A513-Type 5	DOM	0.375	...	...	...	+/- 0.009"	+/- 0.009"
A513-Type 5	DOM	0.400	...	...	...	+/- 0.010"	+/- 0.010"
A513-Type 5	DOM	0.438	...	...	...	+/- 0.011"	+/- 0.011"
A513-Type 5	DOM	0.460	...	...	...	+/- 0.012"	+/- 0.012"
A513-Type 5	DOM	0.480	...	...	...	+/- 0.012"	+/- 0.012"
A513-Type 5	DOM	0.531	...	...	...	+/- 0.013"	+/- 0.013"
A513-Type 5	DOM	0.563	...	...	...	+/- 0.013"	+/- 0.013"

**SQUARE & RECTANGULAR TUBING
AND WALL THICKNESS TOLERANCES FOR A500**

OD

Largest Outside Dimension Across Flats (Inch)	Tolerance for Outside Dimensions Including Convexity or Concavity	Wall Thickness Tolerance
1 to 2-1/2 incl.	Plus or minus 0.020"	Plus or minus 10% (exclusive of weld area)
Over 2-1/2 to 3-1/2 incl.	Plus or minus 0.025"	Plus or minus 10% (exclusive of weld area)
Over 3-1/2 to 5-1/2 incl	Plus or minus 0.030"	Plus or minus 10% (exclusive of weld area)
Over 5-1/2	Plus or minus 1%	Plus or minus 10% (exclusive of weld area)

A500 Pipe - Outside Diameter Tolerances

1.900" and smaller OD:

±0.50%

2.000 and larger OD:

±0.75%

A53 - Pipe Permissible Variations in Outside Diameter

Outside Diameter at any point shall not vary from standard specified more than:

For NPS 1 1/2 and Smaller
Sizes

For NPS 2 and Larger Sizes

+/- 1/64"

+/- 1%

Outside Diameter and Inside Diameter Tolerances (ASTM A513-T5 DOM)

OD Inches Size Range	Wall: Percent of OD	OD Inches		ID Inches	
		Plus	Minus	Plus	Minus
Up to 0.499	All	0.004	0		
0.500-1.699	All	0.005	0	0	0.005
1.700-2.099	All	0.006	0	0	0.006
2.100-2.499	All	0.007	0	0	0.007
2.500-2.899	All	0.008	0	0	0.008
2.900-3.299	All	0.009	0	0	0.009
3.300-3.699	All	0.01	0	0	0.01
3.700-4.099	All	0.011	0	0	0.011
4.100-4.499	All	0.012	0	0	0.012
4.500-4.899	All	0.013	0	0	0.013
4.900-5.299	All	0.014	0	0	0.014
5.300-5.549	All	0.015	0	0	0.015
5.550-5.999	Under 6	0.01	0.01	0.01	0.01
	6 and Over	0.009	0.009	0.009	0.009
6.000-6.499	Under 6	0.013	0.013	0.013	0.013
	6 and Over	0.01	0.01	0.01	0.01
6.500-6.999	Under 6	0.015	0.015	0.015	0.015
	6 and Over	0.012	0.012	0.012	0.012
7.000-7.499	Under 6	0.018	0.018	0.018	0.018
	6 and Over	0.013	0.013	0.013	0.013
7.500-7.999	Under 6	0.02	0.02	0.02	0.02
	6 and Over	0.015	0.015	0.015	0.015
8.000-8.499	Under 6	0.023	0.023	0.023	0.023
	6 and Over	0.016	0.016	0.016	0.016
8.500-8.999	Under 6	0.025	0.025	0.025	0.025
	6 and Over	0.017	0.017	0.017	0.017
9.000-9.499	Under 6	0.028	0.028	0.028	0.028
	6 and Over	0.019	0.019	0.019	0.019
9.500-9.999	Under 6	0.03	0.03	0.03	0.03
	6 and Over	0.02	0.02	0.02	0.02
10.000-10.999	All	0.034	0.034	0.034	0.034
11.000-11.999	All	0.035	0.035	0.035	0.035

12.000-12.999	All	0.036	0.036	0.036	0.036
13.000-13.999	All	0.037	0.037	0.037	0.037
14.000-15.000	All	0.038	0.038	0.038	0.038

Wall Tolerances (ASTM A513 Type 5)

Wall Thickness (Inches)	Including .375" to .875" OD		Over .875" to 1.875" OD		Over 1.875" to 3.750" OD		Over 3.750 "to 15.000" OD	
	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus
0.035	0.002	0.002	0.002	0.002	0.002	0.002		
0.049	0.002	0.002	0.002	0.003	0.002	0.003		
0.065	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004
0.083	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.005
0.095	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.005
0.109	0.002	0.003	0.002	0.004	0.003	0.003	0.005	0.005
0.12	0.003	0.003	0.002	0.004	0.003	0.003	0.005	0.005
0.134			0.002	0.004	0.003	0.003	0.005	0.005
0.148			0.002	0.004	0.003	0.003	0.005	0.005
0.165			0.003	0.004	0.003	0.004	0.005	0.006
0.18			0.004	0.004	0.003	0.005	0.006	0.006
0.203			0.004	0.005	0.004	0.005	0.006	0.007
0.22			0.004	0.006	0.004	0.006	0.007	0.007
0.238			0.005	0.006	0.005	0.006	0.007	0.007
0.259			0.005	0.006	0.005	0.006	0.007	0.007
0.284			0.005	0.006	0.005	0.006	0.007	0.007
0.3			0.006	0.006	0.006	0.006	0.008	0.008
0.32			0.007	0.007	0.007	0.007	0.008	0.008
0.344			0.008	0.008	0.008	0.008	0.009	0.009
0.375					0.009	0.009	0.009	0.009
0.4					0.01	0.01	0.01	0.01
0.438					0.011	0.011	0.011	0.011
0.46					0.012	0.012	0.012	0.012
0.48					0.012	0.012	0.012	0.012
0.531					0.013	0.013	0.013	0.013
0.563					0.013	0.013	0.013	0.013
0.58					0.014	0.014	0.014	0.014
0.6					0.015	0.015	0.015	0.015
0.625					0.016	0.016	0.016	0.016
0.65					0.017	0.017	0.017	0.017

Hydraulic Tube Welded J525

When tubing is specified by outside diameter and inside diameter, the tolerances shown in the table shall apply.

Nominal Outside Diameter (Inch)	OD (Inch)	ID (Inch)
Up to 0.375	±0.002	±0.005
Over 3/8 to & incl. 5/8	±0.0025	±0.0025
Over 5/8 to & incl. 2	±0.003	±0.003
Over 2 to & incl. 2-1/2	±0.004	±0.004

Hydraulic Tube Seamless J524

When tubing is specified by outside diameter and wall, the tolerances shown in the table shall apply.

	Nominal Outside Diameter (Inch)	Wall (%)
Up to 3/8	±0.003	±15%
Over 3/8 to & incl. 1/2	±0.003	±10%
Over 1/2 to & incl. 1-1/2	±0.005	±10%
Over 1-1/2 to & incl. 2-1/2	±0.010	±10%