

# ASTM A500 Grade D

- Production Standard of ASTM A500 Grade D
- Dimensions and Sizes of ASTM A500 Grade D
- Chemical Composition of ASTM A500 Grade D
- Mechanical Properties Tensile Strength Grade D and Yield Strength of ASTM A500 Grade D



## ● Production Standard of ASTM A500 Grade D

### ● ASTM A500 Grade D

ASTM A500 Grade D refers to a steel grade. The ASTM A500 standard defines steel grade D as structural steel with a minimum yield strength of 36,000 psi and a minimum ultimate tensile strength of 58,000 psi. This steel grade is generally used in structural applications. The steel grade contains a higher carbon content. It also generally requires a heat treatment for shape (round, square, or rectangular) and greater dimensional accuracy.

## ● Dimensions and Sizes of ASTM A500 Grade D

Nominal Pipe Size		Outside Diameter (mm)	Nominal Wall Thickness Schedule												
NP S	DN		OD	SC H 5	SCH 10	SCH 20	SCH 30	SCH Sth	SCH 40	SCH 60	SCH XS	SCH 80	SCH 100	SCH 120	SCH 140
1/8	6	10.3		1.24		1.45	1.73	1.73		2.41	2.41				
1/4	8	13.7		1.65		1.85	2.24	2.24		3.02	3.02				
3/8	10	17.1		1.65		1.85	2.31	2.31		3.2	3.2				
1/2	15	21.3	1.6	2.11		2.41	2.77	2.77		3.73	3.73				

			5											
3/4	20	26.7	1.6 5	2.11		2.41	2.87	2.87		3.91	3.91			
1	25	33.4	1.6 5	2.77		2.9	3.38	3.38		4.55	4.55			
1 1/4	32	42.2	1.6 5	2.77		2.97	3.56	3.56		4.85	4.85			
1 1/2	40	48.3	1.6 5	2.77		3.18	3.68	3.68		5.08	5.08			
2	50	60.3	1.6 5	2.77		3.18	3.91	3.91		5.54	5.54			
2 1/2	65	73	2.1 1	3.05		4.78	5.16	5.16		7.01	7.01			
3	80	88.9	2.1 1	3.05		4.78	5.49	5.49		7.62	7.62			
3 1/2	90	101.6	2.1 1	3.05		4.78	5.74	5.74		8.08	8.08			
4	10 0	114.3	2.1 1	3.05		4.78	6.02	6.02		8.56	8.56		11.13	
5	12 5	141.3	2.7 7	3.4			6.55	6.55		9.53	9.53		12.7	
6	15 0	168.3	2.7 7	3.4			7.11	7.11		10.9 7	10.9 7		14.27	
8	20 0	219.1	2.7 7	3.76	6.35	7.04	8.18	8.18	10.3 1	12.7	12.7	15.0 9	18.26	20.62
10	25 0	273	3.4	4.19	6.35	7.8	9.27	9.27	12.7	12.7	15.0 9	18.2 6	21.44	25.4
12	30 0	323.8	3.9 6	4.57	6.35	8.38	9.53	10.3 1	14.2 7	12.7	17.4 8	21.4 4	25.4	
14	35 0	355.6	3.9 6	6.35	7.92	9.53	9.53	11.1 3	15.0 9	12.7	19.0 5	23.8 3		
16	40 0	406.4	4.1 9	6.35	7.92	9.53	9.53	12.7	16.6 6	12.7	21.4 4			
18	45 0	457	4.1 9	6.35	7.92	11.1 3	9.53	14.2 7	19.0 5	12.7	23.8 3			
20	50 0	508	4.7 8	6.35	9.53	12.7	9.53	15.0 9	20.6 2	12.7				
22	55 0	559	4.7 8	6.35	9.53	12.7	9.53		22.2 3	12.7				
24	60	610	5.5	6.35	9.53	14.2	9.53	17.4	24.6	12.7				

	0		4			7		8	1								
26	650	660		7.92	12.7		9.53			12.7							
28	700	711		7.92	12.7	15.88	9.53			12.7							
30	750	762	6.35	7.92	12.7	15.88	9.53			12.7							
32	800	813		7.92	12.7	15.88	9.53	17.48		12.7							
34	850	864		7.92	12.7	15.88	9.53	17.48		12.7							
36	900	914		7.92	12.7	15.88	9.53	19.05		12.7							
38	950	965					9.53			12.7							
40	1000	1016					9.53			12.7							
42	1050	1067					9.53			12.7							
44	1100	1118					9.53			12.7							
46	1150	1168					9.53			12.7							
48	1200	1219					9.53			12.7							
52	1300	1321	9.53	10.31	11.13	11.91	12.7	14.27	15.88	17.48	19.05	20.62	22.23	23.83	25.4		
56	1400	1422	9.53	10.31	11.13	11.91	12.7	14.27	15.88	17.48	19.05	20.62	22.23	23.83	25.4		
60	1500	1524	9.53	10.31	11.13	11.91	12.7	14.27	15.88	17.48	19.05	20.62	22.23	23.83	25.4		
64	1600	1626	9.53	10.31	11.13	11.91	12.7	14.27	15.88	17.48	19.05	20.62	22.23	23.83	25.4		
68	1700	1727	9.53	10.31	11.13	11.91	12.7	14.27	15.88	17.48	19.05	20.62	22.23	23.83	25.4		

72	18 00	1829					12.7	14.2 7	15.8 8	17.4 8	19.0 5	20.6 2	22.23	23 .8 3	25. 4
76	19 00	1930					12.7	14.2 7	15.8 8	17.4 8	19.0 5	20.6 2	22.23	23 .8 3	25. 4
80	20 00	2032						14.2 7	15.8 8	17.4 8	19.0 5	20.6 2	22.23	23 .8 3	25. 4
84		2134													
88		2235													

## ●Chemical Composition of ASTM A500 Grade D

Typical Chemical Properties		
Chemistry (%)	ASTM A500	
	Gr. D	
	Heat Analysis	Product Analysis
Carbon*	0.26 Max	0.30 Max
Manganese*	1.35 Max	1.40 Max
Phosphorus	0.035 Max	.045 Max
Sulphur	0.035 Max	.045 Max
Copper**	0.20 Min	0.18 Min
*For each reduction of 0.01 percentage point below the specified maximum for carbon, an increase of 0.06 percentage point above the specified maximum for manganese is permitted, up to a maximum of 1.50% by heat analysis and 1.60% by product analysis		
**If copper containing steel is specified in the purchase order		

## ●Mechanical Properties Tensile Strength and Yield Strength of ASTM A500

### Grade D

Round Structural Tubing	
Grade	Gr. D
Tensile strength, mn, ps (MPa)	58 000
	-400
Yield strength, mn, psi (MPa)	36 000
	-250
Elongation in 2 in. (50.8 mm), min, %A	23C

Shaped Structural Tubing	
Steel Grade	Gr. D
Tensile strength, mn, ps (MPa)	58 000
	-400
Yield strength, mn, psi (MPa)	36 000
	-250
Elongation in 2 in. (50.8 mm), min, %A	23C

\*Applies to specified wall thicknesses (t) equal to or greater than 0.120". For lighter specified wall thicknesses, the minimum elongation values shall be calculated by the formula: % elongation in 2" = 56t+17.5, rounded to the nearest percent.

\*\* Applies to specified wall thicknesses (t) equal to or greater than 0.180". For lighter specified wall thicknesses, the minimum elongation values shall be calculated by the formula: % elongation in 2" = 61t+12, rounded to the nearest percent.

\*\*\* Applies to specified wall thicknesses (t) equal to or greater than 0.120". For lighter specified wall thicknesses, the minimum elongation values shall be by agreement with the manufacturer.