

# ASTM A333

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## ● Production Standard of ASTM A333

### ● ASTM A333

We offer several grades of ferritic steel in our ASTM A333 pipes, each designed to provide optimal performance in low-temperature service applications. When Grade 6 is ordered, we ensure that no element other than those listed for the ordered grade is added. However, the addition of elements required for the deoxidation of the steel is permitted. This careful selection and control of steel grades ensure that our pipes deliver consistent, reliable performance, meeting your specific application needs.

## ● Dimensions and Sizes of ASTM A333

Nominal Pipe Size		Outside Diameter (mm)	Nominal Wall Thickness Schedule												
NP S	DN		SCH 10	SCH 20	SCH 30	SCH Sth	SCH 40	SCH 60	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS	
		OD							SCH	SCH	SCH	SCH	SCH	SCH	SCH

									S						
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	2.11		2.41	2.77	2.77		3.73	3.73				4.78	7.47
3/1	20	26.7	2.11		2.41	2.87	2.87		3.91	3.91				5.56	7.82
1	25	33.4	2.77		2.9	3.38	3.38		4.55	4.55				6.35	9.09
1 1/4	32	42.2	2.77		2.97	3.56	3.56		4.85	4.85				6.35	9.7
1 1/2	40	48.3	2.77		3.18	3.68	3.68		5.08	5.08				7.14	10.15
2	50	60.3	2.77		3.18	3.91	3.91		5.54	5.54				8.74	11.07
2 1/2	65	73	3.05		4.78	5.16	5.16		7.01	7.01				9.53	14.02
3	80	88.9	3.05		4.78	5.49	5.49		7.62	7.62				11.13	15.24
3 1/2	90	101.6	3.05		4.78	5.74	5.74		8.08	8.08					
4	100	114.3	3.05		4.78	6.02	6.02		8.56	8.56		11.13		13.49	17.12
5	125	141.3	3.4			6.55	6.55		9.53	9.53		12.7		15.88	19.05
6	150	168.3	3.4			7.11	7.11		10.97	10.97		14.27		18.26	21.95
8	200	219.1	3.76	6.35	7.04	8.18	8.18	10.31	12.7	12.7	15.09	18.26	20.62	23.01	22.23
10	250	273	4.19	6.35	7.8	9.27	9.27	12.7	12.7	15.09	18.26	21.44	25.4	28.58	25.4
12	300	323.8	4.57	6.35	8.38	9.53	10.31	14.27	12.7	17.48	21.44	25.4	28.58	33.32	25.4
14	350	355.6	6.35	7.92	9.53	9.53	11.1	15.09	12	19.0	23.8	27.7	31.7	35.7	

							3		.7	5	3	9	5	1	
16	400	406.4	6.35	7.92	9.53	9.53	12.7	16.66	12.7	21.44	26.19	30.96	36.53	40.49	
18	450	457	6.35	7.92	11.13	9.53	14.27	19.05	12.7	23.83	29.36	34.93	39.67	45.24	
20	500	508	6.35	9.53	12.7	9.53	15.09	20.62	12.7	26.19	32.54	38.1	44.45	50.01	
22	550	559	6.35	9.53	12.7	9.53		22.23	12.7	28.58	34.93	41.28	47.63	53.98	
24	600	610	6.35	9.53	14.27	9.53	17.48	24.61	12.7	30.96	38.89	46.02	52.37	59.54	
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	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						

### ●Chemical Composition of ASTM A333

Chemical Requirements									
Element	Composition, %								
	Grade 1A	Grade 3	Grade 4	Grade 6A	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11

Carbon, max	0.3	0.19	0.12	0.3	0.19	0.13	0.2	0.2	0.1
Manganese	0.40–1.06	0.31–0.64	0.50–1.05	0.29–1.06	0.90 max	0.90 max	0.40–1.06	1.15–1.50	0.60 max
Phosphorus, max	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.035	0.025
Sulfur, max	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.015	0.025
Silicon	...	0.18–0.37	0.08–0.37	0.10 min	0.13–0.32	0.13–0.32	...	0.10–0.35	0.35 max
Nickel	...	3.18–3.82	0.47–0.98	...	2.03–2.57	8.40–9.60	1.60–2.24	0.25 max	35.0–37.0
Chromium	...	...	0.44–1.01	...	...	...	...	0.15 max	0.50 max
Copper	...	...	0.40–0.75	...	...	...	0.75–1.25	0.15 max	...
Aluminum	...	...	0.04–0.30	...	...	...	...	0.06 max	...
Vanadium, max	...	...	...	...	...	...	...	0.12	...
Columbium, max	...	...	...	...	...	...	...	0.05	...
Molybdenum, max	...	...	...	...	...	...	...	0.05	0.50 max
Cobalt	...	...	...	...	...	...	...	...	0.50 max

A For each reduction of 0.01 % carbon below 0.30 %, an increase of 0.05 % manganese above 1.06 % would be permitted to a maximum of 1.35 % manganese.

## ●Mechanical Properties Tensile Strength and Yield Strength of ASTM A333

Tensile Requirements										
	Grade 1		Grade 3		Grade 4		Grade 6		Grade 7	
	psi	MPa	psi	MPa	psi	MPa	psi	MPa	psi	MPa
Tensile Strength, min	55000	380	65000	450	60000	415	60000	415	65000	450
Yield Strength, min	30000	205	35000	240	35000	240	35000	240	35000	240
	Grade 8		Grade 9		Grade 10		Grade 11			
	psi	MPa	psi	MPa	psi	MPa	psi	MPa		
Tensile Strength, min	100000	690	63000	435	80000	550	65000	450		
Yield Strength, min	75000	515	46000	315	65000	450	35000	240		

## ●ASTM A333 Specification

<b>Standard</b>	ASTM A333
<b>Manufacturing</b>	Standard Specification for
<b>Processed</b>	Seamless and Welded Steel Pipe for Low-Temperature Service <sup>1</sup>
<b>Steel Grade</b>	Grade 1,3,4,6,7,8,9,10,11
<b>Our Diameter</b>	21.3mm-914.4mm

<b>Length</b>	Single Random Length, Double Random Length, 20 ft, 40 ft					
<b>Corrosion prevention</b>	3PE/3LPE, FBE, Galvanized, Varnished					
<b>WT Schedules</b>	SCH 10, SCH 20, SCH 40, SCH STD, SCH 80, SCH XS to SCH 160, SCH XXS					
<b>ENDS</b>	Plain End, Beveled End, Thread					
<b>Chemical composition</b>	Grade	C	Si	Mn	P	S
	Grade 1	≤0.30		0.40~1.06	≤0.025	≤0.025
	Grade 3	≤0.19	0.18~0.37	0.31~0.64	≤0.025	≤0.025
	Grade 4	≤0.12	0.18~0.37	0.50~1.05	≤0.025	≤0.025
	Grade 6	≤0.30	≥0.10	0.29~1.06	≤0.025	≤0.025
	Grade 7	≤0.19	0.13~0.32	≤0.90	≤0.025	≤0.025
	Grade 8	≤0.13	0.13~0.32	≤0.90	≤0.025	≤0.025
	Grade 9	≤0.20		0.40~1.06	≤0.025	≤0.025
	Grade 10	≤0.20	0.10~0.35	1.15~1.50	≤0.03	≤0.015
	Grade 11	≤0.10	≤0.35	≤0.6	≤0.025	≤0.025
<b>Mechanical Property</b>	Grade	Tensile Strength (MPa)	Yield Point (MPa)	Elongation (%)		
				Y	X	
	Grade 1	≥380	≥205	≥35	≥25	
	Grade 3	≥450	≥240	≥30	≥20	
	Grade 4	≥415	≥240	≥30	≥16.5	

	Grade 6	≥415	≥240	≥30	≥16.5	
	Grade 7	≥450	≥240	≥30	≥22	
	Grade 8	≥690	≥515	≥22		
	Grade 9	≥435	≥315	≥28		
	Grade 10	≥550	≥450	≥22		
	Grade 11	≥450	≥240	≥18		
<b>Strike temperature</b>	The lowest temperature for strike test					
<b>condition</b>	Grade	°F	°C	Grade	°F	°C
	ASTM A333 Grade 1	-50	-45	ASTM A333 Grade 7	-100	-75
	ASTM A333 Grade 3	-150	-100	ASTM A333 Grade 8	-320	-195
	ASTM A333 Grade 4	-150	-100	ASTM A333 Grade 9	-100	-75
	ASTM A333 Grade 6	-50	-45	ASTM A333 Grade 10	-75	-60