



C&N INDUSTRIAL GROUP LIMITED

## ASTM A335 P11 alloy steel pipe

ASTM A335 P11 is the part of ASTM A335, the pipe shall be suitable for bending, flanging, and similar forming operations, and for fusion welding. The steel material shall conform to chemical composition, tensile property, and hardness requirements. Each length of pipe shall be subjected to the hydrostatic test. Also, each pipe shall be examined by a non-destructive examination method in accordance to the required practices.

The different mechanical test requirements for pipes, namely, transverse or longitudinal tension test, flattening test, and hardness or bend test are presented. Both ends of each crate will indicate the order no., heat no., dimensions, weight and bundles or as requested.

- Outer Dimensions: 19.05mm – 114.3mm
- Wall Thickness: 2.0mm – 14 mm
- Length: max 16000mm

Steel grade: ASTM A335 P11

### Packing:

Bare packing/bundle packing/crate packing/wooden protection at the both sides of tubes and suitably protected for sea-worthy delivery or as requested.

### Inspection and Test:

Chemical Composition Inspection, Mechanical Properties Test(Tensile Strength, Yield Strength, Elongation, Flaring, Flattening, Bending, Hardness, Impact Test), Surface and Dimension Test, No-destructive Test, Hydrostatic Test.

### Surface treatment:

Black oil coated  
will indicate the order no., heat no., dimensions, weight and bundles or as requested.

## ASTM A335 P11 Chemical Compositions(%)

Compositions	Data
Carbon	0.05-0.60
Manganese	0.30-0.60
Phosphorus(max.)	0.025
Sulfur(max.)	0.025
Silicon	0.50-1.00
Nickel	...
Chromium	1.00-1.50
Molybdenum	0.44-0.65
Other Elements	...

## Mechanical properties for ASTM A335 P11

Properties	Data
Tensile strength, min, (MPa)	415 Mpa
Yield strength, min, (MPa)	205 Mpa
Elongation, min, (%), L/T	30/20

## Material & Manufacture

Pipe may be either hot finished or cold drawn with the finishing heat treatment noted below.

## Heat Treatment

- A / N+T
- N+T / Q+T
- N+T

## Mechanical Tests Specified

- Transverse or Longitudinal Tension Test and Flattening Test, Hardness Test, or Bend Test
- For material heat treated in a batch-type furnace, tests shall be made on 5% of the pipe from each treated lot. For small lots, at least one pipe shall be tested.
- For material heat treated by the continuous process, tests shall be made on a sufficient number of pipe to constitute 5% of the lot, but in no case less than 2 pipe.

## Notes for Hardness Test:

- P11 shall not have a hardness not exceeding 250 HB/265 HV [25HRC].

## Notes for Bend Test:

- For pipe whose diameter exceeds NPS 25 and whose diameter to wall thickness ratio is 7.0 or less shall be subjected to the bend test instead of the flattening test.
- Other pipe whose diameter equals or exceeds NPS 10 may be given the bend test in place of the flattening test subject to the approval of the purchaser.
- The bend test specimens shall be bent at room temperature through 180 without cracking on the outside of the bent portion.

## DIMENSIONS SHOWN ARE TO ASME B36.10

Nominal Size		Outside Diameter mm (inch)	Wall Thickness mm	Inside Diameter mm	Plain End Mass kg/m	Identification	
☆ NPS	DN					Standard (STD) X-Strong (XS) XX-Strong (XXS)	Schedule Number
1/8	6	10.3 (0.405)	1.73	6.8	0.37	STD	40
			2.41	5.5	0.47	XS	80
1/4	8	13.7 (0.540)	2.24	9.2	0.63	STD	40
			3.02	7.7	0.80	XS	80
3/8	10	17.1 (0.675)	2.31	12.5	0.84	STD	40
			3.20	10.7	1.10	XS	80
1/2	15	21.3 (0.840)	2.77	15.8	1.27	STD	40
			3.73	13.9	1.62	XS	80
			4.78	11.8	1.95	-	160
			7.47	6.4	2.55	XXS	-
3/4	20	26.7 (1.050)	2.87	20.9	1.69	STD	40
			3.91	18.9	2.20	XS	80
			5.56	15.5	2.90	-	160
			7.82	11.0	3.64	XXS	-
1	25	33.4 (1.315)	3.38	26.6	2.50	STD	40
			4.55	24.3	3.24	XS	80
			6.35	20.7	4.24	-	160
			9.09	15.2	5.45	XXS	-
1 1/4	32	42.2 (1.660)	3.56	35.1	3.39	STD	40
			4.85	32.5	4.47	XS	80
			6.35	29.5	5.61	-	160
			9.70	22.8	7.77	XXS	-
1 1/2	40	48.3 (1.900)	3.68	40.9	4.05	STD	40
			5.08	38.1	5.41	XS	80
			7.14	34.0	7.25	-	160
			10.15	27.9	9.55	XXS	-
2	50	60.3 (2.375)	3.91	52.5	5.44	STD	40
			5.54	49.2	7.48	XS	80
			8.74	42.9	11.11	-	160
			11.07	38.2	13.44	XXS	-
2 1/2	65	73.0 (2.875)	5.16	62.7	8.63	STD	40
			7.01	59.0	11.41	XS	80
			9.53	54.0	14.92	-	160
			14.02	45.0	20.39	XXS	-

Nominal Size		Outside Diameter mm (inch)	Wall Thickness mm	Inside Diameter mm	Plain End Mass kg/m	Identification	
☆ NPS	DN					Standard (STD) X-Strong (XS) XX-Strong (XXS)	Schedule Number
3	80	88.9 (3.500)	5.49	77.9	11.29	STD	40
			7.62	73.7	15.27	XS	80
			11.13	66.7	21.35	-	160
3 1/2	90	101.6 (4.000)	5.74	90.1	13.57	STD	40
			8.08	85.4	18.64	XS	80
4	100	114.3 (4.500)	6.02	102.3	16.08	STD	40
			8.56	97.2	22.32	XS	80
			11.13	92.1	28.32	-	120
			13.49	87.3	33.54	-	160
5	125	141.3 (5.563)	17.12	80.1	41.03	XXS	-
			6.55	128.2	21.77	STD	40
			9.53	122.3	30.97	XS	80
			12.70	115.9	40.28	-	120
6	150	168.3 (6.625)	15.88	109.6	49.12	-	160
			19.05	103.2	57.43	XXS	-
			7.11	154.1	28.26	STD	40
			10.97	146.3	42.56	XS	80
8	200	219.1 (8.625)	14.27	139.7	54.21	-	120
			18.26	131.8	67.57	-	160
			21.95	124.4	79.22	XXS	-
			6.35	206.4	33.32	-	20
10	250	273.1 (10.75)	7.04	205.0	36.82	-	30
			8.18	202.7	42.55	STD	40
			10.31	198.5	53.09	-	60
			12.70	193.7	64.64	XS	80
			15.09	188.9	75.92	-	100
			18.26	182.6	90.44	-	120
			20.62	177.8	100.93	-	140
			22.23	174.6	107.93	XXS	-
			23.01	173.1	111.27	-	160
			6.35	260.3	41.76	-	20
7.80	257.5	51.01	-	30			
9.27	254.5	60.29	STD	40			
12.70	247.7	81.53	XS	60			
15.09	242.9	95.98	-	80			
18.26	236.5	114.71	-	100			
21.44	230.2	133.01	-	120			
25.40	222.3	155.10	XXS	140			
28.58	215.9	172.27	-	160			

☆ NPS: ASME term.

⌀ DN: SI Metric term.

All dimensions are nominal

NOTE: API and BS 1600 are dimensionally similar to ASME B36.10

## DIMENSIONS SHOWN ARE TO ASME B36.10

Nominal Size		Outside Diameter mm (inch)	Wall Thickness mm	Inside Diameter mm	Plain End Mass kg/m	Identification				
☆ NPS	DN					Standard (STD) X-Strong (XS) XX-Strong (XXS)	Schedule Number			
12	300	323.9 (12.75)	6.35	311.1	49.71	-	20			
			8.38	307.1	65.19	-	30			
			9.53	304.8	73.86	STD	-			
			10.31	303.2	79.71	-	40			
			12.70	298.5	97.44	XS	-			
			14.27	295.3	108.93	-	60			
			17.48	288.9	132.05	-	80			
			21.44	281.0	159.87	-	100			
			25.40	273.1	186.92	XXS	120			
			28.58	266.7	208.08	-	140			
			33.32	257.2	238.69	-	160			
			14	350	355.6 (14.00)	6.35	342.9	54.69	-	10
7.92	339.8	67.91				-	20			
9.53	336.6	81.33				STD	30			
11.13	333.3	94.55				-	40			
11.91	331.8	100.95				-	-			
12.70	330.2	107.40				XS	-			
15.09	325.4	126.72				-	60			
19.05	317.5	158.11				-	80			
23.83	307.9	194.98				-	100			
27.79	300.0	224.66				-	120			
31.75	292.1	253.58				-	140			
35.71	284.2	281.72				-	160			
16	400	406.4 (16.00)	6.35	393.7	62.65	-	10			
			7.92	390.6	77.83	-	20			
			9.53	387.4	93.27	STD	30			
			12.70	381.0	123.31	XS	40			
			16.66	373.1	160.13	-	60			
			21.44	363.5	203.54	-	80			
			26.19	354.0	245.57	-	100			
			30.96	344.5	286.66	-	120			
			36.53	333.3	333.21	-	140			
			40.49	325.4	365.38	-	160			
			18	450	457 (18.00)	6.35	444.5	70.57	-	10
						7.92	441.4	87.71	-	20
9.53	438.2	105.17				STD	-			
11.13	434.9	122.38				-	30			
12.70	431.8	139.16				XS	-			
14.27	428.7	155.81				-	40			
19.05	419.1	205.75				-	60			
23.83	409.5	254.57				-	80			
29.36	398.5	309.64				-	100			
34.93	387.4	363.58				-	120			
39.67	377.9	408.28				-	140			
45.24	366.7	459.39				-	160			

Nominal Size		Outside Diameter mm (inch)	Wall Thickness mm	Inside Diameter mm	Plain End Mass kg/m	Identification				
☆ NPS	DN					Standard (STD) X-Strong (XS) XX-Strong (XXS)	Schedule Number			
20	500	508 (20.00)	6.35	495.3	78.56	-	10			
			9.53	489.0	117.15	STD	20			
			12.70	482.6	155.13	XS	30			
			15.09	477.8	183.43	-	40			
			20.62	466.8	247.84	-	60			
			26.19	455.6	311.19	-	80			
			32.54	442.9	381.55	-	100			
			38.10	431.8	441.52	-	120			
			44.45	419.1	508.15	-	140			
			50.01	408.0	564.85	-	160			
			22	550	559 (22.00)	6.35	546.1	86.55	-	10
						9.53	539.8	129.14	STD	20
12.70	533.4	171.10				XS	30			
22.23	514.4	294.27				-	60			
28.58	501.7	373.85				-	80			
34.93	489.0	451.45				-	100			
41.28	476.2	527.05				-	120			
47.63	463.5	600.67				-	140			
53.98	450.8	672.30				-	160			
24	600	610 (24.00)				6.35	596.9	94.53	-	10
						9.53	590.6	141.12	STD	20
						12.70	584.2	187.07	XS	-
			14.27	581.1	209.65	-	30			
			17.48	574.6	255.43	-	40			
			24.61	560.4	355.28	-	60			
			30.96	547.7	442.11	-	80			
			38.89	531.8	547.74	-	100			
			46.02	517.6	640.07	-	120			
			52.37	504.9	720.19	-	140			
			59.54	490.5	808.27	-	160			
			26	650	660 (26.00)	7.92	644.6	127.36	-	10
9.53	641.4	152.88				STD	-			
28	700	711 (28.00)	12.70	635.0	202.74	XS	20			
			7.92	695.4	137.32	-	10			
30	750	762 (30.00)	9.53	692.2	164.86	STD	-			
			12.70	685.8	218.71	XS	20			
36	900	914 (36.00)	15.88	679.5	271.23	-	30			
			7.92	746.2	147.29	-	10			
42	1050	1067 (42.00)	9.53	743.0	176.85	STD	-			
			12.70	736.6	234.68	XS	20			
48	1200	1219 (48.00)	15.88	730.2	292.20	-	30			
			7.92	898.6	176.97	-	10			
54	1350	1368 (54.00)	9.53	895.4	212.57	STD	-			
			12.70	889.0	282.29	XS	20			
60	1500	1524 (60.00)	15.88	882.6	351.73	-	30			
			19.05	876.3	420.45	-	40			
72	1800	1827 (72.00)	9.53	1047.8	248.53	STD	-			
			12.70	1041.4	330.21	XS	-			

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↕ DN: SI Metric term.

All dimensions are nominal

NOTE: API and BS 1600 are dimensionally similar to ASME B36.10

FORMULA TO ATTAIN APPROXIMATE MASS IN KILOGRAMS PER METRE (kg/m) FOR STEEL ROUND PIPE AND TUBING M

$$= (D - T) T \times 0.02466$$

Where: **m** = mass to the nearest 0.01 kg/m.

**D** = Outside Diameter in millimetres (mm).

(To nearest 0.1mm for O.D. up to 406.4mm)

(To nearest 1.0mm for O.D. 457mm and above)

**t** = Wall Thickness to nearest 0.01mm

### EXAMPLE

**NOMINAL SIZE: NPS-12. DN-300**

**O.D. = 323.9mm W.T. = 9.53mm**

**Step 1.** 323.9 - 9.53 = 314.37

**Step 2.** 314.37 x 9.53 = 2995.9461

**Step 3.** 2995.9461 x 0.02466 = **73.88 kg/m**