



## A335 P5 SCH80 Carbon Steel Pipe Fittings With ASTM ANSI B16.9

Our Product Introduction

### Basic Information

- Place of Origin: CHINA
- Brand Name: DEYE
- Certification: ISO9001:2015 PED
- Model Number: PF-DE-C04
- Minimum Order Quantity: 10PCS
- Price: USD0.58-USD100 for seamless fittings
- Packaging Details: Ply-wooden cases, pallets, cartons
- Delivery Time: 5-8 days for stock items
- Payment Terms: L/C, T/T, D/P



### Product Specification

- Standard: ASME ANSI DIN GOST
- Material: A335P5, P91, F11, WP22, WPL6, UNS32750, UNS31803,
- Thickness: STD SCH40 SCH80 SCH120 SCH160 XS XXS
- Size: 1/2"-48"
- Connection: Butt Welded BW Butt Welding
- Surface: Black Painting, Vanish Painting, Anti-rust Oil, Sandblastic
- Highlight: **P5 Carbon Steel Pipe Fittings, A335 Carbon Steel Pipe Fittings, SCH80 carbon steel forged fittings**



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## Product Description

### A335 P5 SCH80 Carbon Steel Pipe Fittings With ASTM ANSI B16.9

#### Product Description

ASTM A335 P5/ASME SA335 P5 pipe fittings, Chrome content at 4.00% to 6.00 %, Moly content 0.45% to 0.65%. Also called P5 grade Chrome Moly Alloy Pipe fittings, it is in seamless made used for high-temperature and corrosion environment. Corresponding to welded pipe standard in ASTM A691 5CR, made from ASTM A387 Grade 5 steel plate. ASTM A335 /ASME SA335 named chrome moly pipe fittings because they have a high level of Cr and Mo, these two are key elements for Alloy Pipe fittings. Chromium will increase oxidation resistance and provides high-temperature strength, along with the better tensile & yield strength with proper hardness at room temperature.

#### Product Information/Basis Information/Specification

Product Name	ASTM A335 / ASME SA335 Grade P5
Types	90deg LR Elbows, 90deg SR Elbow, 45deg LR elbow, 22.5deg LR Elbow, 180deg Returns, Bends, Reducing Elbow, straight Tee, Equal Tee, Cross Tee, Con. Reducers, Ecc. reducers, Y tees, caps, Stub Ends, Long and short lap joint stub ends
Size	1/2"-48" DN15-DN1200
Wall Thickness	STD, SCH40, SCH60, XS, SCH80, SCH100, SCH120, SCH140, SCH160, XXS, DIN or customized
Mat. Standard	ASTM A335 / ASME SA335 Grade P9, P5, P1, P11, P22, P91
Material Grade	Carbon Steel : A234 WPB, WP5, WP6, WP9, WP11, WP12, WP22, A420 WPL6, WPL8, WP91 12CrMo, 15Cr5Mo, 1Cr5Mo, 12Cr1MoV, WPHY 42, WPHY 46, WPHY 52, WPH 60, WPHY 65 & WPHY 70 Stainless Steel 304, 304L, 304H, 316, 316L, 316H, 321, 347, 347H, Duplex SS 2507, DSS2205, UNS31803 UNS32750 1.4301, 1.4306, 1.4401, 1.4435, 1.4406, 1.4404, 1.4462, 1.4410, 1.4501
Surface	Polished, Varnished, 3LPE, FBE
Connect Ends	PE (Plain End), BE (Beveled Ends)

#### Features /Characteristics

**Elbows:** Such pipe fittings are used to change the direction of the flow. Elbows They are majorly available in two standard types  
- 90 and 45 degree angles owing to their high demand in plumbing. The 90-degree elbow is primarily used to connect hoses to water pumps, valves, and deck drains, while the 45 degree elbow is mostly used in water supply facilities, electronic and chemical industrial pipeline networks, food, air-conditioning pipelines, garden production, agriculture, and solar-energy facility.

#### Technology/ Technical Data Sheet

##### Thickness List for pipefittings ANSI B16.9

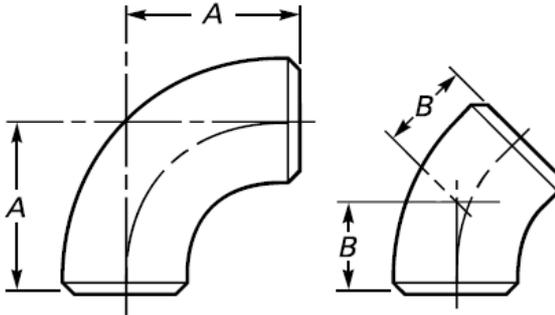
Unit: mm

NPS	Outside Diameter	Different thickness with tolerance of +-12.5%									
		Sch20	Sch30	STD	Sch40	Sch60	XS	Sch80	Schl20	Sch160	XXS
1/8	10.3	—	—	1.73	1.73	—	2.41	2.41	—	—	—
1/4	13.7	—	—	2.24	2.24	—	3.02	3.02	—	—	—
3/8	17.1	—	—	2.31	2.31	—	3.20	3.20	—	—	—
1/2	21.3	—	—	2.77	2.77	—	3.73	3.73	—	4.78	7.47
3/4	26.7	—	—	2.87	2.87	—	3.91	3.91	—	5.56	7.82
1	33.4	—	—	3.38	3.38	—	4.55	4.55	—	6.35	9.09
1 1/4	42.2	—	—	3.56	3.56	—	4.85	4.85	—	6.35	9.70
1 1/2	48.3	—	—	3.68	3.68	—	5.08	5.08	—	7.14	10.15
2	60.3	—	—	3.91	3.91	—	5.54	5.54	—	8.74	11.07
2 1/2	73.0	—	—	5.16	5.16	—	7.01	7.01	—	9.53	14.02
3	88.9	—	—	5.49	5.49	—	7.62	7.62	—	11.13	15.24
3 1/2	101.6	—	—	5.74	5.74	—	8.08	8.08	—	—	—
4	114.3	—	—	6.02	6.02	—	8.56	8.56	11.13	13.49	17.12
5	141.3	—	—	6.55	6.55	—	9.53	9.53	12.70	15.88	19.05
6	168.3	—	—	7.11	7.11	—	10.97	10.97	14.27	18.26	21.95
8	219.1	6.35	7.04	8.18	8.18	10.31	12.70	12.70	18.26	23.01	22.23
10	273.1	6.35	7.80	9.27	9.27	12.70	12.70	15.09	21.44	28.58	25.40
12	323.9	6.35	8.38	9.53	10.31	14.27	12.70	17.48	25.40	33.32	25.40
14	355.6	7.92	9.53	9.53	11.13	15.09	12.70	19.05	27.79	35.71	—
16	406.4	7.92	9.53	9.53	12.70	16.66	12.70	21.44	30.96	40.49	—
18	457.2	7.92	11.13	9.53	14.27	19.05	12.70	23.83	34.96	45.24	—
20	508.0	9.53	12.70	9.53	15.09	20.62	12.70	26.19	38.10	50.01	—

22	558.8	9.53	12.70	9.53	—	22.23	12.70	28.58	41.28	53.98	—
24	609.6	9.53	14.27	9.53	17.48	24.61	12.70	30.96	46.02	59.54	—
26	660.4	12.70	—	9.53	—	—	12.70	—	—	—	—
28	711.2	12.70	15.88	9.53	—	—	12.70	—	—	—	—
30	762.0	12.70	15.88	9.53	—	—	12.70	—	—	—	—
32	812.8	12.70	15.88	9.53	17.48	—	12.70	—	—	—	—
34	863.6	12.70	15.88	9.53	17.48	—	12.70	—	—	—	—
36	914.4	12.70	15.88	9.53	17.48	—	12.70	—	—	—	—
38	965.2	—	—	9.53	—	—	12.70	—	—	—	—
40	1016.0	—	—	9.53	—	—	12.70	—	—	—	—
42	1066.8	—	—	9.53	—	—	12.70	—	—	—	—
44	1117.6	—	—	9.53	—	—	12.70	—	—	—	—
46	1168.4	—	—	9.53	—	—	12.70	—	—	—	—
48	1219.2	—	—	9.53	—	—	12.70	—	—	—	—

**Dimension List**

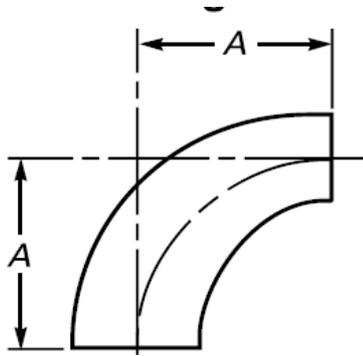
**Table 1 Dimensions of Long Radius Elbows**



**GENERAL NOTE: All dimensions are in millimeters.**

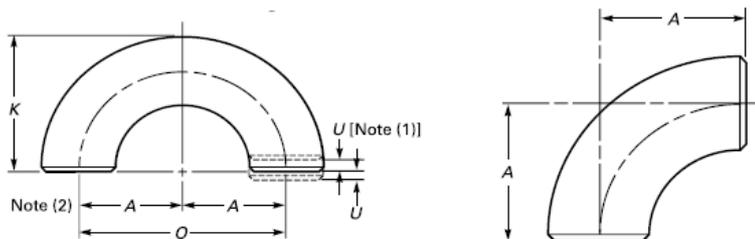
Normal Pipe Size (NPS)	Outside Diameter at Bevel	90-deg Elbows, A	45-deg Elbows, B
1/2	21.3	38	16
3/4	26.7	38	19
1	33.4	38	22
1 1/4	42.2	48	25
1 1/2	48.3	57	29
2	60.3	76	35
2 1/2	73.0	95	44
3	88.9	114	51
3 1/2	101.6	133	57
4	114.3	152	64
5	141.3	190	79
6	168.3	229	95
8	219.1	305	127
10	273.0	381	159
12	323.8	457	190
14	355.6	533	222
16	406.4	610	254
18	457.0	686	286
20	508.0	762	318
22	559.0	838	343
24	610.0	914	381
26	660.0	991	406
28	711.0	1 067	438
30	762.0	1 143	470
32	813.0	1 219	502
34	864.0	1 295	533
36	914.0	1 372	565
38	965.0	1 448	600
40	1 016.0	1 524	632
42	1 067.0	1 600	660
44	1 118.0	1 676	695
46	1 168.0	1 753	727
48	1 219.0	1 829	759

**Table 2 Dimensions of Long Radius Reducing Elbow**



Nominal Pipe Size (NPS)	Outside Diameter at Bevel		Center-to-End, A	Nominal Pipe Size (NPS)	Outside Diameter at Bevel		Center-to-End, A
	Large End	Small End			Large End	Small End	
2 x 1-1/2"	60.3	48.3	76	10 x 8	273.0	219.1	381
2 x 1-1/4"	60.3	42.2	76	10 x 6	273.0	168.3	381
2 x 1"	60.3	33.4	76	10 x 5	273.0	141.3	381
2-1/2 x 2"	73.0	60.3	95	12 x 10	323.8	273.0	457
2-1/2 X 1-1/2"	73.0	48.3	95	12 x 8	323.8	219.1	457
2-1/2 x 1-1/4"	73.0	42.2	95	12 x 6	323.8	168.3	457
3 x 2-1/2"	88.9	73.0	114	14 x 12	355.6	323.8	533
3x2"	88.9	60.3	114	14 X 10	355.6	273.0	533
3 x 1-1/2"	88.9	48.3	114	14 X 8	355.6	219.1	533
3-1/2x 3"	101.6	88.9	133	16 x 14	406.4	355.6	610
3-1/2 x 2-1/2"	101.6	73.0	133	16 x 12	406.4	323.8	610
3-1/2 x 2"	101.6	60.3	133	16 x 10	406.4	273.0	610
4 x 3-1/2"	114.3	101.6	152	18 x 16	457.0	406.4	686
4x3"	114.3	88.9	152	18 x 14	457.0	355.6	686
4 x 2-1/2"	114.3	73.0	152	18 x 12	457.0	323.8	686
4X2"	114.3	60.3	152	18 x 10	457.0	273.0	686
5x4"	141.3	114.3	190	20 x 18	508.0	457.0	762
5 x 3-1/2"	141.3	101.6	190	20 x 16	508.0	406.4	762
5X3"	141.3	88.9	190	20 x 14	508.0	355.6	762
5 x 2-1/2"	141.3	73.0	190	20 x 12	508.0	323.8	762
				20 x 10	508.0	273.0	762
6x5"	168.3	141.3	229				
6X4"	168.3	114.3	229	24 x 22	610.0	559.0	914
6 x 3-1/2"	168.3	101.6	229	24 x 20	610.0	508.0	914
6x3"	168.3	88.9	229	24 x 18	610.0	457.0	914
				24 x 16	610.0	406.4	914
8X6"	219.1	168.3	305	24 X 14	610.0	355.6	914
8X5"	219.1	141.3	305	24 X 12	610.0	323.8	914
8X4"	219.1	114.3	305	•••	•••	•••	•••

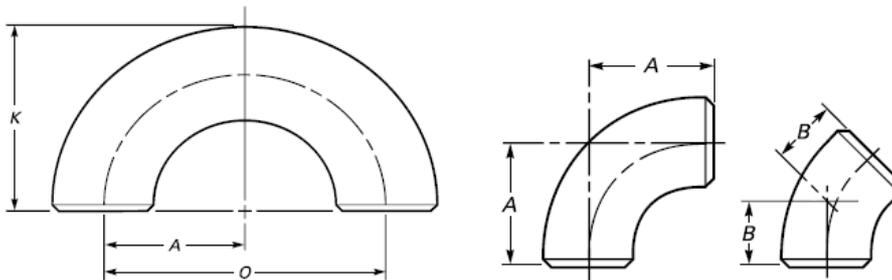
**Table 3 Dimensions of Long Radius Returns Table 4 Dimensions of Short Radius Elbows**



Nominal Pipe Size NPS	Outside Diameter at Bevel	Center-to-Center	Back-to-Face	Nominal Pipe Size (NPS)	Outside Diameter at Bevel	Center-to-End, A
			K			
1/2	21.3	76	48			
3/4	26.7	76	51			
1	33.4	76	56	1	33.4	25

1 1/4	42.2	95	70	1 1/4	42.2	32
1 1/2	48.3	114	83	1 1/2	48.3	38
2	60.3	152	106	2	60.3	51
2 1/2	73.0	190	132	2 1/2	73.0	64
3	88.9	229	159	3	88.9	76
3 1/2	101.6	267	184	3 1/2	101.6	89
4	114.3	305	210	4	114.3	102
5	141.3	381	262	5	141.3	127
6	168.3	457	313	6	168.3	152
8	219.1	610	414	8	219.1	203
10	273.0	762	518	10	273.0	254
12	323.8	914	619	12	323.8	305
14	355.6	1 067	711	14	355.6	356
16	406.4	1 219	813	16	406.4	406
18	457.0	1 372	914	18	457.0	457
20	508.0	1 524	1 016	20	508.0	508
22	559.0	1 676	1 118	22	559.0	559
24	610.0	1 829	1 219	24	610.0	610

**Table 5 Dimensions of Short Radius 180-deg Returns Table 6 Dimensions of 3D Elbow**



Nominal Pipe Size	Outside Diameter	Center-to-Center	Back-to-Face	Pipe Size	Outside Diameter	90-deg Elbows	45-deg Elbows
(NPS)	r	0	K	(NPS)	at Bevel	A	B
1	33.4	51	41	3/4	26.7	57	24
1-1/4"	42.2	64	52	1	33.4	76	31
1-1/2"	48.3	76	62	1 1/4	42.2	95	39
2	60.3	102	81	1 1/2	48.3	114	47
2-1/2"	73.0	127	100	2	60.3	152	63
3	88.9	152	121	2 1/2	73.0	190	79
3-1/2"	101.6	178	140	3	88.9	229	95
4	114.3	203	159	3 1/2	101.6	267	111
5	141.3	254	197	4	114.3	305	127
6	168.3	305	237	5	141.3	381	157
8	219.1	406	313	6	168.3	457	189
10	273.0	508	391	8	219.1	610	252
12	323.8	610	467	10	273.0	762	316
14	355.6	711	533	12	323.8	914	378
16	406.4	813	610	14	355.6	1 067	441
18	457.0	914	686	16	406.4	1 219	505
20	508.0	1 016	762	18	457.0	1 372	568
22	559.0	1 118	838	20	508.0	1 524	632
24	610.0	1 219	914	22	559.0	1 676	694
				24	610.0	1 829	757
				26	660.0	1 981	821
				28	710.0	2 134	883
				30	762.0	2 286	964
				32	813.0	2 438	1 010
				34	864.0	2 591	1 073
				36	914.0	2 743	1 135
				38	965.0	2 896	1 200
				40	1 016.0	3 048	1 264
				42	1 067.0	3 200	1 326
				44	1 118.0	3 353	1 389
				46	1 168.0	3 505	1 453
				48	1 219.0	3 658	1 516

GENERAL NOTES: All dimensions are in millimeters.

Application/Usage

Low and middle pressure fluid pipeline, boiler, petroleum and natural gas industry, drilling, chemical industry, electric industry, shipbuilding, fertilizer equipment and pipeline, structure, petrochemical, pharmaceutical industries, etc.

### Material Specification

Designation: A 234/A 234M – 05 Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

This specification covers wrought carbon steel and alloy steel fittings of seamless and welded construction covered by the latest revision of ASME B16.9, B16.11, MSS SP-79, and MSS SP-95. These fittings are for use in pressure piping and in pressure vessel fabrication for service at moderate and elevated temperatures. Fittings differing from these ASME and MSS standards shall be furnished in accordance with Supplementary Requirement S58 of Specification A 960.

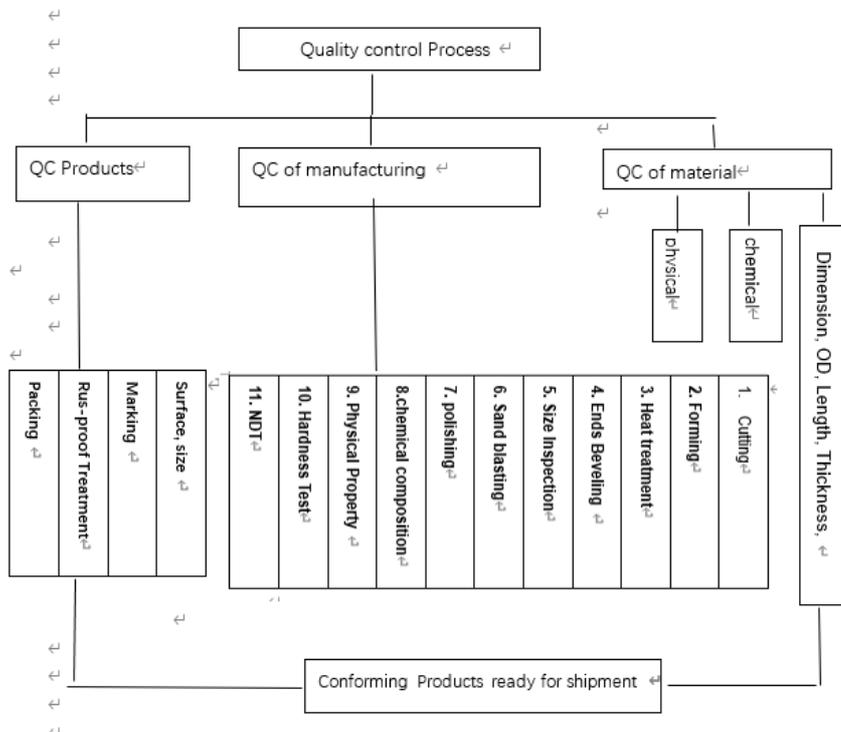
### Chemical Requirements (Composition, %)

Grade and Material	C	Mn	P	S	Silicon	Chromium	Molybdenum	Nickel	Copper
WPB <sup>B,C,D,E,F</sup>	0.30 max	0.29–1.06	0.05	0.058	0.10 min	0.40 max	0.15 max	0.40 max	0.40 max
WPC <sup>C,D,E,F</sup>	0.35 max	0.29–1.06	0.05	0.058	0.10 min	0.40 max	0.15 max	0.40 max	0.40 max
WP1	0.28 max	0.30–0.90	0.045	0.045	0.10–0.50	...	0.44–0.65	.....	
WP12 CL1	0.05–0.20	0.30–0.80	0.045	0.045	0.60 max	0.80–1.25	0.44–0.65	.....	
WP12 CL2									
WP11 CL1	0.05–0.15	0.30–0.60	0.03	0.03	0.50–1.00	1.00–1.50	0.44–0.65	.....	
WP11 CL2,	0.05–0.20	0.30–0.80	0.04	0.04	0.50–1.00	1.00–1.50	0.44–0.65	.....	
WP11 CL3									
WP22 CL1	0.05–0.15	0.30–0.60	0.04	0.04	0.50 max	1.90–2.60	0.87–1.13	.....	
WP22 CL3									
WP5 CL1	0.15 max	0.30–0.60	0.04	0.03	0.50 max	4.0–6.0	0.44–0.65	.....	
WP5 CL3									
WP9 CL1	0.15 max	0.30–0.60	0.03	0.03	1.00 max	8.0–10.0	0.90–1.10	.....	
WP9 CL3 WPR	0.20 max	0.40–1.06	0.045	0.05	...	...	...	1.60–2.24	0.75–1.25
WP91	0.08–0.12	0.30–0.60	0.02	0.01	0.20–0.50	8.0–9.5	0.85–1.05	0.40 max	...
WP911	0.09–0.13	0.30–0.60	0.02	0.01	0.10–0.50	8.5–9.5	0.90–1.10	0.40 max	..

### Mechanical Performance Requirements

Grade and Marking Symbol	WPC,		WP11 CL1,		WP11 CL3,				
	WPB	WP11 CL2, WP12 CL2	WP1	WP22 CL1, WP5 CL1	WPR	WP22 CL3 WP5 CL3	WP91	WP911	WP12 CL1
Tensile strength, range ksi [MPa]	60–85	70–95	55–80	60–85	63–88	75–100	85–110	90–120	60–85
	[415–585]	[485–655]	[380–550]	[415–585]	[435–605]	[520–690]	[585–760]	[620–840]	[415–585]
Yield strength, min, ksi [MPa]	35 [240]	40 [275]	30 [205]	30 [205]	46 [315]	45 [310]	60 [415]	64 [440]	32 [220]
(0.2 % offset or 0.5 % extension-under-load)									

### Production Process



## Reference Standards

### ASME B16.9 Specification for Butt Welded Fittings

ASME B16.9 specification is designed for butt welded fittings applied in industrial construction pipelines. Including elbow, tee, cross, cap, reducer, and etc.

### Standard Scope

The standard includes specifications of NPS 1/2 to NPS 48 (DN15-DN1200) factory-made wrought butt-welded pipe fittings overall dimensions, tolerances ratings, test methods and markings.

### Special Fittings

Special fittings here refer to special sizes, forms and tolerances that agreed between buyer and manufacturer.

### Fabricated Fittings

Fabricated laterals and other fittings by circumferential or intersection welds are considered pipe fabrication could not apply this standard.

Units under ASME B16.9 shall be stated in both SI (Metric) and U.S. Customary units. Designation for size is NPS.

### Reference Standards

It is not considered practical to identify the specific edition of each standard and specification in the individual references. A product made comply with a prior edition of referenced standards and in all other respects conforming to this standard will be considered complied.

ASME B16.5: Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard

ASME B16.25: For Buttwelding Ends

ASME B31: Code for Pressure Piping

ASME B31.3: Process Piping

ASME B36.10M, Welded and Seamless Wrought Steel Pipe

ASME B36.19M, Stainless Steel Pipe

ASME Boiler and Pressure Vessel Code

ASTM A234/A234M-17, Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

ASTM A403/A403M-16, Specification for Wrought Austenitic Stainless Steel Piping Fittings

ASTM A420/A420M-16, Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low Temperature Service

ASTM A815/A815M-14e1, Specification for Wrought Ferritic, Ferritic/Austenitic and Martensitic Stainless Steel Piping Fittings

ASTM A960/A960M-16a, Specification for Common Requirements for Wrought Steel Piping Fittings

ASTM E29-13, Practice for Using Significant Digits in Test Data to Determine Conformance With Specifications

ASTM B361-16, ASTM B363-14, ASTM B366/B366M-17: For other material metals. (Aluminum, Titanium, Nickel, and alloy).

## FAQ/ Customer Question and Answers

### Q: Customer asked for butt weld fittings in A105:

A: Most common carbon steel buttweld fitting material is A234WPB. It is equivalent to A105 flanges, however there is no such thing as an A105 or A106 butt weld fitting A106 Gr.B is for pipe grade. The A234WPB fittings are made from A106GR.B pipes. A105 is a material from Bar forged to be High pressure Fittings or Flange

### Q: Customer requests "Normalized" butt weld fittings:

A: This is also a misconception since flanges are available in A105 and A105 N, where N stands for normalized.

However, there is no such thing as A234WPBN. Manufactures normalize their butt weld fittings was considered that normalized heat treating process was done, Especially for the elbows and Tees Customer needing "normalized" butt weld fittings should request WPL6 fittings which are high yield and are normalized as a standard procedure.

**Q: Customer forgets to mention pipe schedule:**

A: Butt weld fittings are sold as per pipe size but pipe schedule must be specified to match the ID of the fitting to the ID of the pipe. If no schedule is mentioned, we will assume a standard wall is requested.

**Q: Customer forgets to mention welded or seamless butt weld fitting:**

A: Butt weld fittings are available in both welded and seamless configuration. A seamless butt weld carbon steel or stainless-steel fitting is made of seamless pipe and is generally more expensive. Seamless pipe fittings are NOT common in sizes bigger than 12". Welded pipe fittings are made of ERW welded carbon steel or stainless-steel pipe. They are available in sizes ½" to 72" and are more affordable than seamless fittings.

**Q: What does Short Radius (SR) or Long Radius (LR) means?**

A: You will often hear SR45 elbow or LR45 elbow. The 45 or 90 refers to the angle of the bend for butt weld fitting to change the direction of flow. A long radius elbow (LR 90 Elbow or LR 45 elbow) will have a pipe bend that will be 1.5 times the size of the pipe. So, a 6 inch LR 90 has bending radius that is 1.5 x nominal pipe size. A short radius elbow (SR45 or SR90) has a pipe bend that is equal to the size of the fitting, so a 6" SR 45 has a bending radius that is 6" nominal pipe size.

**Q: What is a 3R or 3D elbow pipe fitting?**

A: First, the terms 3R or 3D are used synonymously. A 3R butt weld elbow has a bending radius that is 3 times the nominal pipe size. A 3R elbow is equal to 3D Elbows

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