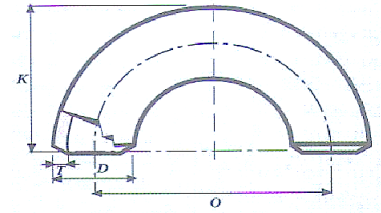


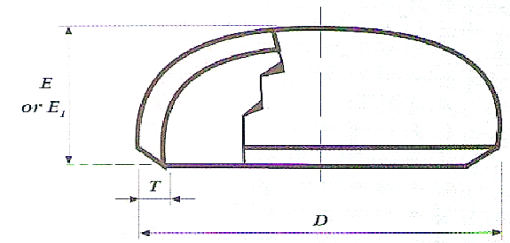
## 90° Elbows Long Radius

DN Inch	O.D. mm	Center to End mm	SCH STD		SCH XS		SCH XXS		SCH 10		SCH 20		SCH 30		SCH 40		SCH 60		SCH 80		SCH 100		SCH 120		SCH 160			
			Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg
	D	A	T		T			T				T				T			T			T			T			
1/2"	21	38	2.77	0.07	3.73	0.09	7.47	0.18							2.77	0.07			3.73	0.09							4.78	0.11
3/4"	27	29	2.87	0.08	3.91	0.1	7.82	0.21							2.87	0.08			3.91	0.10							5.56	0.13
1"	33	38	3.38	0.15	4.55	0.19	9.09	0.30							3.38	0.15			4.55	0.19							6.35	0.24
1 1/4"	42	48	3.56	0.27	4.85	0.36	9.70	0.50							3.56	0.27			4.85	0.36							6.35	0.40
1 1/2"	48	57	3.68	0.4	5.08	0.53	10.16	0.80							3.68	0.40			5.08	0.53							7.14	0.70
2"	60	76	3.91	0.67	5.54	0.9	11.07	1.65							3.91	0.67			5.54	0.90							8.74	1.50
2 1/2"	73	95	5.16	1.3	7.01	1.68	14.02	3.20							5.16	1.30			7.01	1.68							9.53	2.27
3"	89	114	5.49	2.08	7.62	2.65	15.24	5.10							5.49	2.08			7.62	2.65							11.13	4.10
3 1/2"	102	133	5.74	2.92	8.08	3.96									5.74	2.92			8.08	3.96								
4"	114	152	6.02	3.95	8.56	5.4	17.12	10.40							6.02	3.95			8.56	5.40					11.13	7.20	13.49	8.60
5"	141	190	6.55	6.67	9.53	9.34	19.05	17.24							6.55	6.67			9.53	9.34					12.70	12.70	15.88	15.47
6"	168	229	7.11	10.4	10.97	15.5	21.95	31.80							7.11	10.40			10.97	15.50					14.27	21.10	18.26	28.00
8"	219	305	8.18	20.9	12.7	31.3	22.22	55.00				6.35	16.65	7.04	13.50	8.18	20.90	10.31	26.50	12.70	31.30	15.09	38.90	18.26	46.05	23.01	56.72	
10"	273	381	9.27	37	12.7	49.4	25.40	98.65				6.35	26.20	7.80	32.00	9.27	37.00	12.70	49.40	15.09	60.30	18.26	72.70	21.44	84.55	28.58	109.70	
12"	324	457	9.53	54	12.7	71.2	25.40	140.00				6.35	37.50	8.38	49.00	10.31	60.00	14.27	82.20	17.48	99.40	21.44	121.00	25.40	140.00	33.32	182.42	
14"	356	533	9.53	69.3	12.7	91.5			6.35	48.00	7.92	59.60	9.53	69.70	11.13	83.10	15.09	111.50	19.05	138.70	23.83	172.00	27.79	197.60	35.71	246.50		
16"	406	610	9.53	91.2	12.7	120			6.35	62.70	7.92	78.30	9.53	91.30	12.70	120.00	16.66	161.30	21.44	204.00	26.19	246.50	30.96	227.50	40.49	365.90		
18"	457	686	9.53	116	12.7	153			6.35	79.40	7.92	99.20	11.13	138.30	14.27	176.00	19.05	232.60	23.83	287.60	29.39	350.50	34.93	412.00	45.24	519.00		
20"	508	762	9.53	143.3	12.7	190.3			6.35	98.50	9.53	143.60	12.70	190.00	15.09	229.80	20.62	311.00	26.19	391.00	32.54	478.00	38.10	554.60	50.01	716.00		
22"	559	838	9.53	174.5	12.7	230.5			6.35	119.60	9.53	174.30	12.70	230.20			22.22	406.30	28.58	516.40	34.92	623.00	41.28	728.00	53.98	838.00		
24"	610	914	9.53	207	12.7	274.5			6.35	142.00	9.53	207.50	14.27	315.00	17.48	384.00	24.61	535.00	30.96	664.50	38.89	825.00	46.02	964.00	59.54	1250.00		



## 180° Returns Long Radius

DN Inch	O.D. mm	Center to Center mm	Back to Face mm	SCH STD		SCH XS		SCH XXS		SCH 10		SCH 20		SCH 30		SCH 40		SCH 60		SCH 80		SCH 100		SCH 120		SCH 160			
				Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg
	D	O	K	T		T		T		T		T		T		T		T		T		T		T		T		T	
1/2"	21	76	48	2.77	0.15	3.73	0.18	7.47	0.37							2.77	0.15			3.73	0.18							4.78	0.22
3/4"	27	57	43	2.87	0.16	3.91	0.20	7.82	0.43							2.87	0.16			3.91	0.20							5.56	0.27
1"	33	76	56	3.38	0.31	4.55	0.38	9.09	0.62							3.38	0.31			4.55	0.38							6.35	0.49
1 1/4"	42	95	70	3.56	0.55	4.85	0.73	9.70	1.00							3.56	0.55			4.85	0.73							6.35	0.81
1 1/2"	48	114	83	3.68	0.81	5.08	1.07	10.16	1.61							3.68	0.81			5.08	1.07							7.14	1.41
2"	60	152	106	3.91	1.35	5.54	1.81	11.07	3.32							3.91	1.35			5.54	1.81							8.74	3.10
2 1/2"	73	191	132	5.16	2.62	7.01	3.38	14.02	6.43							5.16	2.62			7.01	3.38							9.53	4.60
3"	89	229	159	5.49	4.18	7.62	5.33	15.24	10.25							5.49	4.18			7.62	5.33							11.13	8.30
3 1/2"	102	267	184	5.74	5.87	8.08	7.96									5.74	5.87			8.08	7.96								
4"	114	305	210	6.02	7.94	8.56	10.85	17.12	20.90							6.02	7.94			8.56	10.85					11.13	14.50	13.49	17.30
5"	141	381	262	6.55	13.40	9.53	18.76	19.05	34.64							6.55	13.40			9.53	18.76					12.70	25.50	15.88	31.10
6"	168	457	313	7.11	20.90	10.97	31.14	21.95	63.90							7.11	20.90			10.97	31.14					14.27	42.40	18.26	56.30
8"	219	610	414	8.18	42.00	12.70	62.88	22.22	110.50			6.35	33.45	7.04	27.20	8.18	42.00	10.31	53.30	12.70	62.88	15.09	78.20	18.26	92.60	23.01	114.00		
10"	273	762	518	9.27	74.40	12.70	99.25	25.40	198.20			6.35	52.70	7.80	64.30	9.27	74.40	12.70	99.30	15.09	121.20	18.26	146.10	21.44	169.90	28.58	220.40		
12"	324	914	619	9.53	108.50	12.70	143.05	25.40	281.30			6.35	75.40	8.38	98.40	10.31	120.60	14.27	165.20	17.48	199.70	21.44	243.10	25.40	281.30	33.32	366.50		
14"	356	1067	711	9.53	139.30	12.70	183.84			6.35	96.44	7.92	119.80	9.53	140.10	11.13	167.00	15.09	224.00	19.05	278.70	23.83	345.60	27.79	397.00	35.71	495.30		
16"	406	1219	813	9.53	183.20	12.70	241.10			6.35	125.98	7.92	157.30	9.53	183.40	12.70	241.10	16.66	324.10	21.44	409.90	26.19	495.30	30.96	457.10	40.49	735.20		
18"	457	1372	914	9.53	233.10	12.70	307.40			6.35	159.53	7.92	199.30	11.13	277.90	14.27	353.60	19.05	467.40	23.83	577.80	29.39	704.20	34.93	827.80	45.24	1042.80		
20"	508	1524	1016	9.53	287.90	12.70	382.34			6.35	197.90	9.53	288.50	12.70	381.80	15.09	461.70	20.62	624.90	26.19	785.60	32.54	960.40	38.10	1114.30	50.01	1438.60		
22"	559	1676	1118	9.53	350.60	12.70	463.10			6.35	240.30	9.53	350.20	12.70	462.50			22.22	816.40	28.58	1037.60	34.92	1251.70	41.28	1462.70	53.98	1683.70		
24"	610	1829	1219	9.53	415.90	12.70	551.50			6.35	285.30	9.53	416.90	14.27	632.90	17.48	771.50	24.61	1075.00	30.96	1335.00	38.89	1657.60	46.02	1937.00	59.54	2511.00		

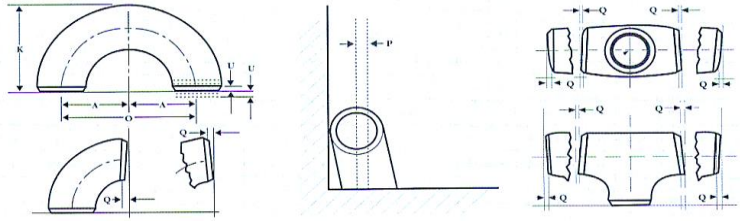


## Caps

DN Inch	O.D. mm	Length mm	Length mm	SCH STD		SCH XS		SCH XXS		SCH 10		SCH 20		SCH 30		SCH 40		SCH 60		SCH 80		SCH 100		SCH 120		SCH 160			
				Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg	Thickness mm	Weight kg
	D	E <sup>(a)</sup>	E1 <sup>(b)</sup>	T		T		T		T		T		T		T		T		T		T		T		T		T	
1/2"	21	25	25	2.77	0.03	3.73	0.04	7.47	0.06							2.77	0.03			3.73	0.04							4.78	0.05
3/4"	27	25	25	2.87	0.05	3.91	0.06	7.82	0.10							2.87	0.05			3.91	0.06							5.56	0.08
1"	33	38	38	3.38	0.10	4.55	0.13	9.09	0.20							3.38	0.10			4.55	0.13							6.35	0.15
1 1/4"	42	38	38	3.56	0.18	4.85	0.24	9.70	0.37							3.56	0.18			4.85	0.24							6.35	0.28
1 1/2"	48	38	38	3.68	0.22	5.08	0.30	10.16	0.45							3.68	0.22			5.08	0.30							7.14	0.34
2"	60	38	44	3.91	0.26	5.54	0.33	11.07	0.65							3.91	0.26			5.54	0.33							8.78	0.50
2 1/2"	73	38	51	5.16	0.38	7.01	0.53	14.02	1.35							5.16	0.38			7.01	0.53							9.53	0.97
3"	89	51	64	5.49	0.61	7.62	0.86	15.24	1.83							5.49	0.61			7.62	0.86							11.13	1.52
3 1/2"	102	64	76	5.74	1.19	8.08	1.58									5.74	1.19			8.08	1.58								
4"	114	64	76	6.02	1.33	8.56	1.76	17.12	3.50							6.02	1.33			8.56	1.76				11.13	2.50	13.49	3.00	
5"	141	76	89	6.55	1.99	9.52	2.64	19.05	5.02							6.55	1.99			9.53	2.64				12.70	3.65	15.88	4.10	
6"	168	89	102	7.11	3.00	10.97	4.40	21.95	8.53							7.11	3.00			10.97	4.40				14.27	6.14	18.26	7.50	
8"	219	102	127	8.18	5.43	12.70	7.46	22.22	13.50			6.35	5.43	7.04	5.43	8.18	5.43	10.31	6.70	12.70	7.46	15.09	9.72	18.26	11.90	23.01	13.50		
10"	273	127	152	9.27	8.63	12.70	11.85	25.40	23.56			6.35	8.63	7.80	8.63	9.27	8.63	12.70	11.85	15.09	13.85	18.26	20.47	21.44	19.64	28.58	23.56		
12"	324	152	178	9.53	12.13	12.70	16.65	25.40	30.96			6.35	12.13	8.38	12.13	10.31	13.25	14.27	19.45	17.48	23.40	21.44	25.80	25.40	30.96	33.32	36.12		
14"	356	165	191	9.53	14.42	12.70	19.80			6.35	14.42	7.92	14.42	9.53	14.42	11.13	17.07	15.09	25.14	19.05	32.80	23.83	36.36	27.79	41.99	35.71	52.48		
16"	406	178	203	9.53	18.86	12.70	25.89			6.35	18.86	7.92	18.86	9.53	18.86	12.70	22.30	16.66	30.87	21.44	42.88	26.19	51.45	30.96	60.03	40.49	77.20		
18"	457	203	229	9.53	27.65	12.70	36.52			6.35	27.65	7.92	27.65	11.13	36.52	14.27	38.75	19.05	46.14	23.83	58.72	29.39	73.40	34.93	83.88	45.24	104.85		
20"	508	229	254	9.53	35.60	12.70	46.98			6.35	35.00	9.53	35.60	12.70	46.98	15.09	56.55	20.62	80.45	26.19	94.22	32.54	120.50	38.10	120.70	50.01	169.00		
22"	559	254	254	9.53	39.00	12.70	56.60			6.35	39.00	9.53	39.00	12.70	56.60			22.22	86.30	28.58	126.00	34.92	153.00	41.28	155.00	53.98	242.00		
24"	610	267	305	9.53	46.00	12.70	64.60			6.35	46.00	9.53	46.00	14.27	78.70	17.48	96.50	24.61	118.10	30.96	150.00	38.89	184.70	46.02	184.80	59.54	286.00		







# Tolerance of Fittings

According to ANSI B16.9

All Fittings				90° & 45° Elbows and Tees	Reducers	Caps	180° Returns			Nominal Pipe Size	Angularity Tolerance	
Nominal Pipe Size (NPS)	Outside(1) Diameter at Bevel	Inside (2) Diameter at End	Wall(2) Thickness	Center to End Dimension	Overall Length	Overall Length	Center to Center Dimension	Back to Face Dimension	Alignment Of Ends		Off Angel	Off Plane
	D		T	A.B.C.M.	H	E	O	K	U		Q	P
1/2" to 2½"	±1	±0.8		±2	±2	±4	±7	±7	±1	1/2 to 4"	±1	±2
3" to 3½"	±1	±1.6		±2	±2	±4	±7	±7	±1	5" to 8"	±2	±4
4"	±2-1	±1.6	Not	±2	±2	±4	±7	±7	±1	10" to 12"	±3	±5
5" to 6"	±3-1	±1.6	Less Than	±2	±2	±7	±7	±7	±1	14" to 16"	±3	±7
8"	±2	±1.6	87.50%	±2	±2	±7	±7	±7	±1	18" to 24"	±4	±10
10"	+4-3	±3.2	of Nominal	±2	±2	±7	±10	±7	±2	26" to 30"	±5	±10
12" to 18"	+4-3	±3.2	Thickness	±3	±3	±7	±10	±7	±2	32" to 42"	±5	±13
20" to 24"	+6-5	±4.8		±3	±3	±7	±10	±7	±2	44" to 48"	±5	±20
26" to 30"	+7-5	±4.8		±3	±3	±10	---	---	---	---	---	---
32" to 48"	+7-5	±4.8		±5	±5	±10	---	---	---	---	---	---