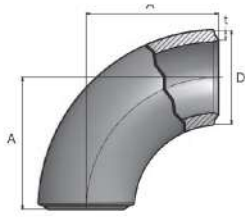


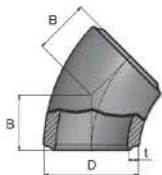
DIMENSIONS & GRADES



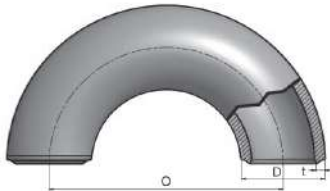
PRODUCTION SIZE RANGE ACCORDING TO ANSI B16.9



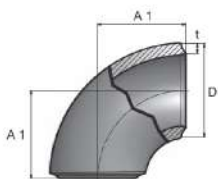
90° LR ELBOWS



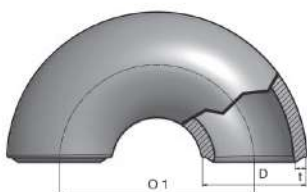
45° LR ELBOWS



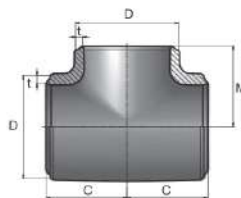
180° LR ELBOWS



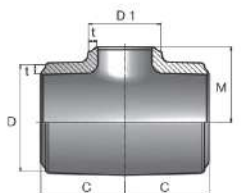
90° SR ELBOWS



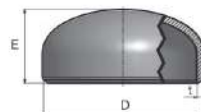
180° SR ELBOWS



EQUAL TEES



REDUCING TEES



CAPS

ELBOWS and CAPS								
NOMINAL PIPE SIZE	OUTSIDE DIAMETER D	CENTER to FACE A	CENTER to FACE A1	CENTER to CENTER O	CENTER to CENTER O1	CENTER to FACE B	LENGTH E	
							≤XS	<XS
1/2"	21	38	19	76	38	16	25	25
3/4"	27	38	18	76	36	11	25	25
1"	33	38	25	76	51	22	38	38
1 1/4"	42	48	32	95	64	25	38	38
1 1/2"	48	57	38	114	76	29	38	38
2"	60	76	51	152	102	35	38	44
2 1/2"	73	95	64	191	127	44	38	51
3"	89	114	76	229	152	51	51	64
3 1/2"	102	133	89	267	178	57	64	76
4"	114	152	102	305	203	64	64	76
5"	141	190	127	381	254	79	76	89
6"	168	229	152	457	305	95	89	102
8"	219	305	203	610	406	127	102	127
10"	273	381	254	762	508	159	127	152
12"	324	457	305	914	610	190	152	178
14"	356	533	356	1067	711	222	165	191
16"	406	610	406	1219	813	254	178	203
18"	457	686	457	1372	914	286	203	229
20"	508	762	508	1524	1016	318	229	254
22"	559	838	559	1676	1118	343	254	254
24"	610	914	610	1829	1219	381	267	305
26"	660	991	660			406	267	267
28"	711	1067	711			438	267	267
30"	762	1143	762			470	267	267
32"	813	1219	813			502	267	267
34"	864	1295	864			533	267	267
36"	914	1372	914			565	267	267
38"	965	1448	965			600	305	305
40"	1016	1524	1016			632	305	305
42"	1067	1600	1067			660	305	305
44"	1118	1676	1118			695	343	343
46"	1168	1753	1168			727	343	343
48"	1219	1829	1219			759	343	343
50"	1270	1905	1270			789	367	367
52"	1321	1982	1321			821	381	381
54"	1372	2058	1372			852	393	393
56"	1422	2133	1422			883	406	406

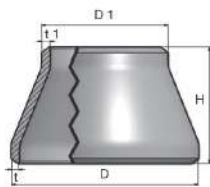
TEES and REDUCERS					
NOMINAL PIPE SIZE	OUTSIDE DIAMETER D	OUTSIDE DIAMETER D1	CENTER to END C	CENTER to END M	LENGTH H
1/2" x 3/4"	27	21	29	29	38
1/2" x 1"	27	17	29	29	38
1" x 1"	33	33	38	38	51
1" x 1 1/2"	33	27	38	38	51
1" x 2"	33	21	38	38	51
1 1/4" x 1 1/4"	42	42	48	48	51
1 1/4" x 1"	42	33	48	48	51
1 1/4" x 1 1/2"	42	27	48	48	51
1 1/4" x 2"	42	21	48	48	51
1 1/2" x 1 1/2"	48	48	57	57	63
1 1/2" x 1"	48	42	57	57	63
1 1/2" x 1 1/4"	48	33	57	57	63
1 1/2" x 3/4"	48	27	57	57	63
1 1/2" x 1 1/2"	48	21	57	57	63
2" x 2"	60	60	64	64	76
2" x 1 1/2"	60	48	64	60	76
2" x 1"	60	42	64	57	76
2" x 1 1/4"	60	33	64	51	76
2" x 3/4"	60	27	64	44	76
2 1/2" x 2 1/2"	73	73	76	76	89
2 1/2" x 2"	73	60	76	70	89
2 1/2" x 1 1/2"	73	48	76	67	89
2 1/2" x 1"	73	42	76	64	89
2 1/2" x 3/4"	73	33	76	57	89
3" x 3"	89	89	86	86	89
3" x 2 1/2"	89	73	86	83	89
3" x 2"	89	60	86	76	89
3" x 1 1/2"	89	48	86	73	89
3" x 1"	89	42	86	70	89
3 1/2" x 3 1/2"	102	102	95	95	102
3 1/2" x 3"	102	89	95	92	102
3 1/2" x 2 1/2"	102	73	95	89	102
3 1/2" x 2"	102	60	95	83	102
3 1/2" x 1 1/2"	102	48	95	79	102
4" x 4"	114	114	105	105	102
4" x 3 1/2"	114	102	105	102	102
4" x 3"	114	89	105	98	102
4" x 2 1/2"	114	73	105	95	102
4" x 2"	114	60	105	89	102
4" x 1 1/2"	114	48	105	86	102
5" x 5"	141	141	124	124	127
5" x 4"	141	114	124	117	127
5" x 3 1/2"	141	102	124	114	127
5" x 3"	141	89	124	111	127
5" x 2 1/2"	141	73	124	108	127
5" x 2"	141	60	124	105	127
6" x 6"	168	168	143	143	140
6" x 5"	168	141	143	137	140
6" x 4"	168	114	143	130	140
6" x 3 1/2"	168	102	143	127	140
6" x 3"	168	89	143	124	140
6" x 2 1/2"	168	73	143	121	140
8" x 8"	219	219	178	178	152
8" x 6"	219	168	178	168	152
8" x 5"	219	141	178	162	152
8" x 4"	219	114	178	156	152
8" x 3 1/2"	219	102	178	152	152

PRODUCTION SIZE RANGE ACCORDING TO ANSI B16.9

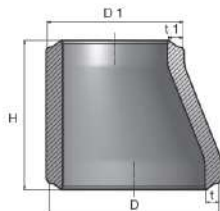
TEES and REDUCERS					
NOMINAL PIPE SIZE	OUTSIDE DIAMETER	OUTSIDE DIAMETER	CENTER to END	CENTER to END	LENGTH
	D	D1	C	M	H
10"x 10"	273	273	216	216	178
10"x 8"	273	219	216	203	178
10"x 6"	273	168	216	194	178
10"x 5"	273	141	216	191	178
10"x 4"	273	114	216	184	178
12"x 12"	324	324	254	254	203
12"x 10"	324	273	254	241	203
12"x 8"	324	219	254	229	203
12"x 6"	324	168	254	219	203
12"x 5"	324	141	254	216	203
14"x 14"	356	356	279	279	330
14"x 12"	356	324	279	270	330
14"x 10"	356	273	279	257	330
14"x 8"	356	219	279	248	330
14"x 6"	356	168	279	238	330
16"x 16"	406	406	305	305	356
16"x 14"	406	356	305	305	356
16"x 12"	406	324	305	295	356
16"x 10"	406	273	305	283	356
16"x 8"	406	219	305	273	356
16"x 6"	406	168	305	264	356
18"x 18"	457	457	343	343	381
18"x 16"	457	406	343	330	381
18"x 14"	457	356	343	330	381
18"x 12"	457	324	343	321	381
18"x 10"	457	273	343	308	381
18"x 8"	457	219	343	298	381
20"x 20"	508	508	381	381	508
20"x 18"	508	457	381	368	508
20"x 16"	508	406	381	356	508
20"x 14"	508	356	381	356	508
20"x 12"	508	324	381	346	508
20"x 10"	508	273	381	333	508
20"x 8"	508	219	381	324	508
22"x 22"	559	559	419	419	508
22"x 20"	559	508	419	406	508
22"x 18"	559	457	419	394	508
22"x 16"	559	406	419	381	508
22"x 14"	559	356	419	381	508
22"x 12"	559	324	419	371	508
22"x 10"	559	273	419	359	508
24"x 24"	610	610	432	432	508
24"x 22"	610	559	432	432	508
24"x 20"	610	508	432	432	508
24"x 18"	610	457	432	419	508
24"x 16"	610	406	432	406	508
24"x 14"	610	356	432	406	508
24"x 12"	610	324	432	397	508
24"x 10"	610	273	432	384	508
26"x 26"	660	660	495	495	610
26"x 24"	660	610	495	483	610
26"x 22"	660	559	495	470	610
26"x 20"	660	508	495	457	610
26"x 18"	660	457	495	444	610

TEES and REDUCERS					
NOMINAL PIPE SIZE	OUTSIDE DIAMETER	OUTSIDE DIAMETER	CENTER to END	CENTER to END	LENGTH
	D	D1	C	M	H
28"x 28"	711	711	521	521	610
28"x 26"	711	660	521	521	610
28"x 24"	711	610	521	508	610
28"x 22"	711	559	521	495	610
28"x 20"	711	508	521	483	610
28"x 18"	711	457	521	470	610
30"x 30"	762	762	559	559	610
30"x 28"	762	711	559	456	610
30"x 26"	762	660	559	546	610
30"x 24"	762	610	559	533	610
30"x 22"	762	559	559	521	610
30"x 20"	762	508	559	508	610
30"x 18"	762	457	559	495	610
32"x 32"	813	813	597	597	610
32"x 30"	813	762	597	584	610
32"x 28"	813	711	597	572	610
32"x 26"	813	660	597	572	610
32"x 24"	813	610	597	559	610
32"x 22"	813	559	597	546	610
32"x 20"	813	508	597	533	610
34"x 34"	864	864	635	635	610
34"x 32"	864	813	635	622	610
34"x 30"	864	762	635	610	610
34"x 28"	864	711	635	597	610
34"x 26"	864	660	635	597	610
34"x 24"	864	610	635	584	610
34"x 22"	864	559	635	572	610
34"x 20"	864	508	635	559	610
36"x 36"	914	914	673	673	610
36"x 34"	914	864	673	660	610
36"x 32"	914	813	673	648	610
36"x 30"	914	762	673	635	610
36"x 28"	914	711	673	622	610
36"x 26"	914	660	673	622	610
36"x 24"	914	610	673	610	610
36"x 22"	914	559	673	597	610
36"x 20"	914	508	673	584	610
38"x 38"	965	965	711	711	610
38"x 36"	965	914	711	711	610
38"x 34"	965	864	711	698	610
38"x 32"	965	813	711	686	610
38"x 30"	965	762	711	673	610
38"x 28"	965	711	711	648	610
38"x 26"	965	660	711	648	610
38"x 24"	965	610	711	635	610
40"x 40"	1016	1016	749	749	610
40"x 38"	1016	965	749	749	610
40"x 36"	1016	914	749	737	610
40"x 34"	1016	864	749	724	610
40"x 32"	1016	813	749	711	610
40"x 30"	1016	762	749	698	610
40"x 28"	1016	711	749	673	610
40"x 26"	1016	660	749	673	610
40"x 24"	1016	610	749	660	610

TEES and REDUCERS					
NOMINAL PIPE SIZE	OUTSIDE DIAMETER	OUTSIDE DIAMETER	CENTER to END	CENTER to END	LENGTH
	D	D1	C	M	H
42"x 42"	1067	1067	762	711	610
42"x 40"	1067	1016	762	711	610
42"x 38"	1067	965	762	711	610
42"x 36"	1067	914	762	711	610
42"x 34"	1067	864	762	711	610
42"x 32"	1067	813	762	711	610
42"x 30"	1067	762	762	711	610
42"x 28"	1067	711	762	698	610
42"x 26"	1067	660	762	698	610
42"x 24"	1067	610	762	660	610
44"x 44"	1118	1118	813	762	610
44"x 42"	1118	1067	813	762	610
44"x 40"	1118	1016	813	749	610
44"x 38"	1118	965	813	737	610
44"x 36"	1118	914	813	724	610
44"x 34"	1118	864	813	724	610
44"x 32"	1118	813	813	711	610
44"x 30"	1118	762	813	711	610
46"x 46"	1168	1168	851	800	711
46"x 44"	1168	1118	851	800	711
46"x 42"	1168	1067	851	787	711
46"x 40"	1168	1016	851	775	711
46"x 38"	1168	965	851	762	711
46"x 36"	1168	914	851	762	711
46"x 34"	1168	864	851	749	711
46"x 32"	1168	813	851	749	711
46"x 30"	1168	762	851	737	711
48"x 48"	1219	1219	889	838	711
48"x 46"	1219	1168	889	838	711
48"x 44"	1219	1118	889	838	711
48"x 42"	1219	1067	889	813	711
48"x 40"	1219	1016	889	813	711
48"x 38"	1219	965	889	813	711
48"x 36"	1219	914	889	787	711
48"x 34"	1219	864	889	787	711
48"x 32"	1219	813	889	787	711
48"x 30"	1219	762	889	762	711
50"x 50"	1270	1270	952	863	711
50"x 48"	1270	1219	952	863	711
50"x 46"	1270	1168	952	863	711
50"x 44"	1270	1118	952	838	711
50"x 42"	1270	1067	952	838	711
52"x 52"	1321	1321	990	889	711
52"x 50"	1321	1270	990	889	711
52"x 48"	1321	1219	990	863	711
52"x 46"	1321	1168	990	863	711
52"x 44"	1321	1118	990	863	711
54"x 54"	1372	1372	1028	914	762
54"x 52"	1372	1321	1028	914	762
54"x 50"	1372	1270	1028	889	762
54"x 48"	1372	1219	1028	863	762
54"x 46"	1372	1168	1028	863	762
56"x 56"	1422	1422	1067	914	762
56"x 54"	1422	1372	1067	914	762
56"x 52"	1422	1321	1067	914	762
56"x 50"	1422	1270	1067	889	762
56"x 48"	1422	1219	1067	889	762



CONCENTRIC REDUCERS

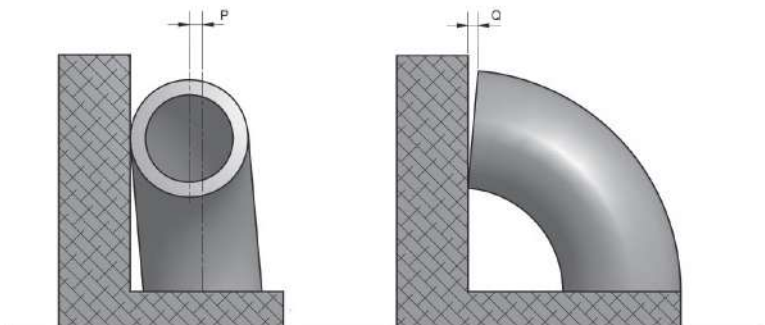


ECCENTRIC REDUCERS

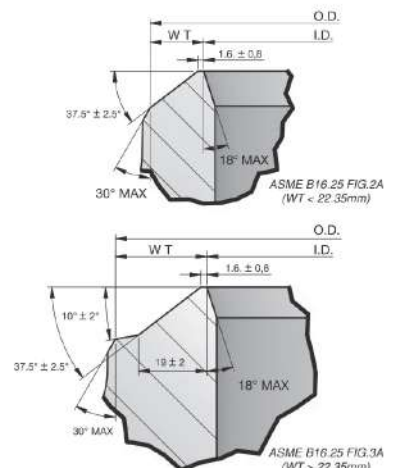
PRODUCTION SIZE RANGE ACCORDING TO ANSI B16.9

ASME B36.10														ASME B36.19					
NOMINAL PIPE SIZE	OUTSIDE DIAMETER	DN	NOMINAL WALL THICKNESS (mm)											NOMINAL WALL THICKNESS (mm)					
			Sch.10	Sch.20	Sch.30	STD	Sch.40	Sch.60	X5	Sch.80	Sch.100	Sch.120	Sch.140	Sch.160	XXS	Sch.55	Sch.105	Sch.405	Sch.805
1/2"	21,3	15				2,77	2,77		3,73	3,73				4,78	7,47	1,65	2,11	2,77	3,73
3/4"	26,7	20				2,87	2,87		3,91	3,91				5,56	7,82	1,65	2,11	2,87	3,91
1"	33,4	25				3,38	3,38		4,55	4,55				6,35	9,09	1,65	2,77	3,38	4,55
1-1/8"	42,2	32				3,56	3,56		4,85	4,85				6,35	9,7	1,65	2,77	3,56	4,85
1-1/2"	48,3	40				3,68	3,68		5,08	5,08				7,14	10,16	1,65	2,77	3,68	5,08
2"	60,3	50				3,91	3,91		5,54	5,54				8,74	11,07	1,65	2,77	3,91	5,54
2-1/2"	73	65				5,16	5,16		7,01	7,01				9,52	14,02	2,11	3,05	5,16	7,01
3"	88,9	80				5,49	5,49		7,62	7,62				11,13	15,24	2,11	3,05	5,49	7,62
3-1/2"	101,6	90				5,74	5,74		8,08	8,08						2,11	3,05	5,74	8,08
4"	114,3	100				6,02	6,02		8,56	8,56		11,13		13,49	17,12	2,11	3,05	6,02	8,56
5"	141,3	125				6,55	6,55		9,52	9,52		12,7		15,88	19,05	2,77	3,4	6,55	9,52
6"	168,3	150				7,11	7,11		10,97	10,97		14,27		18,26	21,95	2,77	3,4	7,11	10,97
8"	219,1	200		6,35	7,04	8,18	8,18	10,31	12,7	12,7	15,09	18,26	20,62	23,01	22,22	2,77	3,76	8,18	12,7
10"	273	250		6,35	7,8	9,27	9,27	12,7	12,7	15,09	18,26	21,44	25,4	28,58	25,4	3,4	4,19	9,27	12,7
12"	323,9	300		6,35	8,38	9,52	10,31	14,27	12,7	17,48	21,44	25,4	28,58	33,32	25,4	3,96	4,57	9,52	12,7
14"	355,6	350	6,35	7,92	9,52	9,52	11,13	15,09	12,7	19,05	23,83	27,79	31,75	35,71		3,96	4,78	9,52	12,7
16"	406,4	400	6,35	7,92	9,52	9,52	12,7	16,66	12,7	21,44	26,19	30,96	36,53	40,49		4,19	4,78	9,52	12,7
18"	457,2	450	6,35	7,92	11,13	9,52	14,27	19,05	12,7	23,83	29,36	34,92	39,67	45,24		4,19	4,78	9,52	12,7
20"	508	500	6,35	9,52	12,7	9,52	15,09	20,62	12,7	26,19	32,54	38,1	44,45	50,01		4,78	5,54	9,52	12,7
22"	558,8	550	6,35	9,52	12,7	9,52	15,88	22,22	12,7	28,58	34,92	41,28	47,62	53,89		4,78	5,54	9,52	12,7
24"	609,6	600	6,35	9,52	14,27	9,52	17,48	24,61	12,7	30,96	38,89	46,02	52,37	59,54		5,54	6,35	9,52	12,7
26"	660,4	650	7,92	12,7		9,52			12,7										
28"	711,2	700	7,92	12,7	15,88	9,52			12,7										
30"	762	750	7,92	12,7	15,88	9,52			12,7								7,92		
32"	812,8	800	7,92	12,7	15,88	9,52	17,48		12,7										
34"	863,6	850	7,92	12,7	15,88	9,52	17,48		12,7										
36"	914,4	900	7,92	12,7	15,88	9,52	19,05		12,7										

ANGULARITY TOLERANCES		
NOMINAL PIPE SIZE	OFF ANGLE Q	OFF PLANE P
1/2" to 4"	± 1	± 2
5" to 8"	± 2	± 4
10" to 12"	± 3	± 5
14" to 16"	± 3	± 7
18" to 24"	± 4	± 10
26" to 30"	± 5	± 10
32" to 42"	± 5	± 13
44" to 48"	± 5	± 20



TOLERANCES ASME B16.9										
NOMINAL PIPE SIZE	ALL FITTINGS			WALL THICKNESS	90° - 45° ELBOWS TEES	REDUCERS	CAPS	180° RETURN BENDS		
	OUTSIDE DIAMETER AT BEVEL	INSIDE DIAMETER AT BEVEL			CENTER TO END A - B - C - M	OVERALL LENGTH H	LENGTH E	CENTER TO CENTER O	BACK TO FACE	ALIGNMENT OF ENDS
1/2" to 2-1/2"	± 1	± 0.8	Not less than 87.5% of nominal wall thickness	± 2	± 2	± 4	± 7	± 7	± 1	
3" to 3-1/2"	± 1	± 1.6		± 2	± 2	± 4	± 7	± 7	± 1	
4"	+2 -1	± 1.6		± 2	± 2	± 4	± 7	± 7	± 1	
5" to 6"	+3 -1	± 1.6		± 2	± 2	± 7	± 7	± 7	± 1	
8"	± 2	± 1.6		± 2	± 2	± 7	± 7	± 7	± 1	
10"	+4 -3	± 3.2		± 2	± 2	± 7	± 10	± 7	± 2	
12" to 18"	+4 -3	± 3.2		± 3	± 3	± 7	± 10	± 7	± 2	
20" to 24"	+6 -5	± 4.8		± 3	± 3	± 7	± 10	± 7	± 2	
26" to 30"	+7 -5	± 4.8		± 3	± 3	± 10				
32" to 48"	+7 -5	± 4.8		± 5	± 5	± 10				



MAIN COMMON STEEL GRADES

Other steel grades available on demand.

MATERIAL	MAIN APPLICATION	STANDARD	GRADE
CARBON STEEL	PROCESS PIPING / GENERAL CONSTRUCTION	ASTM A/ASME SA 234 EN10253-2 ASTM A 860	WPB, WPC P235GH, P265GH, L290NB WPHY42, WPHY52
	OIL & GAS PIPELINE	EN10253-2	L360NB, L360QB
LOW TEMPERATURE CARBON STEEL	PROCESS PIPING / GENERAL CONSTRUCTION / LOW TEMPERATURE	ASTM A/ASME SA 420	WPL3, WPL6, WPL8
HIGH YIELD CARBON STEEL	OIL & GAS PIPELINE / PETROCHEMICAL / PENSTOCK / PROCESS PIPING / SOUR SERVICE	ASTM A 860 MSS SP75	WPHY60, WPHY65, WPHY70
	OIL & GAS PIPELINE	EN10253-2	L415QB, L450QB
ALLOY STEEL	PETROCHEMICAL / POWER & PROCESS PIPING	ASTM A/ASME SA 234 EN10253-2 ASTM A/ASME SA 182 EN10222-2	WP1, WP11CL1/2/3, WP12CL1/2, WP22CL1/3, WP5CL1/3, WP9CL1/3 16M03, 10CrMo5-5, 13CrMo4-5, 10CrMo9-10, 15NiCuMoNb5-6-4 (WB36) F22V 14MoV6-3
	POWER PLANTS	ASTM A/ASME SA 234 EN10253-2 ASTM A234 ASME B31.1 EN10253-2 EN10222-2	WP91 X10CrMoVNb9-1 WP92 B31 CASE 183--2 X10CrWMoVNb9-2 X20CrMoV11-1
AUSTENITIC STAINLESS STEEL	CHEMICAL / PETROCHEMICAL / GENERAL ANTI CORROSION	ASTM A/ASME SA 403	WP304/304L/304H, WP316/316L/316H/316LN, WP317L
	CHEMICAL / PETROCHEMICAL / HIGH TEMPERATURE	ASTM A/ASME SA 403	WP321/321H, WP347/347H
SUPER AUSTENITIC STAINLESS STEEL	WATER TREATMENT / OFFSHORE / FLOWLINES	ASTM A/ASME SA 403	WP904L, UNS31254 (254 SMO)
AUSTENITIC STAINLESS STEEL/ UREA GRADE	UREA PLANTS	ASTM A/ASME SA 403	UNS31050, WP316L UREA GRADE
AUSTENITIC/FERRITIC (DUPLEX) STAINLESS STEEL	WATER TREATMENT / OFFSHORE / FLOWLINES	ASTM/ASME A/SA 815	UNS31803, UNS32205, UNS32750, UNS32760
NICKEL ALLOYS	HIGH RESISTANT CORROSION / HIGH TEMPERATURE	ASTM/ASME B/SB 366	Monel 400 (UNS N04400), Alloy 600 (UNS N06600), Alloy 625(UNS N06625), Alloy 20 (UNS N08020), Alloy 800 (UNS N08800), Alloy 800H (UNS N08810), Alloy 800HT (UNS N08811), Alloy 825 (UNS N08825), Alloy C276 (UNS N10276)
TITANIUM	PETROCHEMICAL / OFF-SHORE FIRE PREVENTION SYSTEM	ASTM B363	WPT2

FITTINGS TO CUSTOMER DRAWING

Beyond the standard dimensions and grades, full commercial, technical and manufacturing support is offered for all kinds of unusual dimensions, calculation requirements and special materials in the production of fittings to customer drawings.



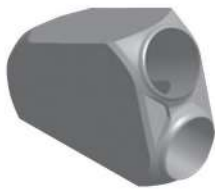
EXTRUDED MANIFOLD



COMPLETE SPOOL OF
SPECIAL EXTRUDED TEE



BARRED TEE



PIGGABLE WYE



WYE PIECE



WYE PIECE



WYE PIECE



60° LATERAL TEE



SPECIAL FLOW TEE



EXTRUDED TEE



EXTRUDED SPECIAL ELBOW



SPECIAL HEADER