INTRODUCTION

BOTH-WELL is equivalent to Win-Win, existing in between both consumers and manufacturer, both devoted employers and valued employees, a bilateral satisfaction.
Ever since its establishment in 1985, with the spirit of pursuing most advanced technology and striving for the ultimate quality-oriented products, the company is continuously utilizing the most up-to-date hi-tech facilities and most sophisticated manufacturing techniques, on the basis of skilled manpower and accumulated experiences, BOTH-WELL has been well-recognized among customers worldwide for the excellence of Quality and Services which has enabled us to win the unrivalled reputation in our industries.

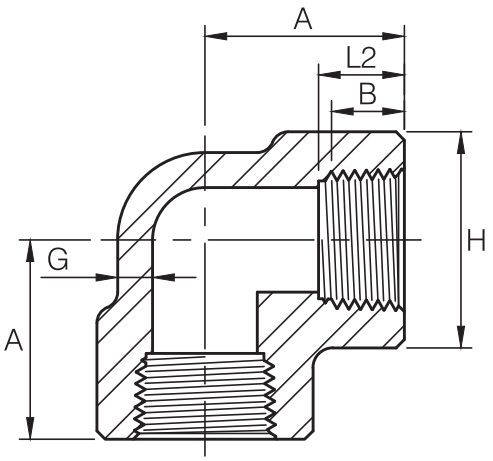
QUALITY ASSURANCE

It is our indelible belief in Quality First.
BOTH-WELL's Quality Management System has been certified with ISO 9001: 2015, PED, together with all major international-recognized certificates and being granted as an approval vendor for ARAMCO, also being listed on the Approval Supplier List of major domestic refineries, petro-chemical factories in Taiwan.
BOTH-WELL prides itself in having the best service performance in our industries which can only attribute it to the quality of people we employ and the amicable relationship and close partnership we have built-up with all our customers, and the company will continue its ultimate efforts to satisfy all its customers' demands by providing top quality products and high efficient services by anticipating the continued encouragement and supports from all its customers in the years ahead.

PRODUCTION RANGE AND SPECIFICATION :

TYPE	: A. ELBOW, TEE, COUPLING, HALF COUPLING, CAP, PLUG, BUSHING, UNION, OUTLET, SWAGE NIPPLE, BULL PLUG, REDUCER INSERT AND HEX. NIPPLE, STREET ELBOWS, BOSS,...ETC. B. SOCKET-WELD, THREADED (NPT, and PT, and BSP (ISO7-1, ISO228-1)), BUTT-WELDING.
SIZE	: NPS 1/8" ~ 4". DN 6 ~ 100
RATING	: PRESSURE : THREADED END - 2000 / 3000 / 6000 LBS. SOCKET-WELD END - 3000 / 6000 / 9000 LBS. BUTT WELD END - SCH40 / SCH80 / SCH160 / XXS.
SPECIFICATIONS	: A. DIM. SPEC. : ASME B16.11 MSS SP - 79, 83, 95, 97 and BS3799. B. MATERIAL SPEC : ASME/ASTM SA/A105,SA/A350 LF2,SA/A106,SA/A312,SA/A234,SA/A403. ASME/ASTM SA/A182 (F304, F304L, F316, F316L, F304H,F316H, F317L, F321, F5, F9, F11, F22, F44, F51/60, F53, F91). C. SIZE of RAW MATERIAL : DIA. 19 ~120mm ROUND BAR.
MARKING	: A. CARBON and ALLOY STEEL : MARKED BY STAMPING or LASER MARKING. B. STAINLESS STEEL : MARKED BY JET PRINTING or STAMPING or LASER MARKING. C. 3/8" UNDER : BRAND ONLY. D. 1/2" to 4" : MARKED WITH BRAND, MATERIAL, HEAT CODE, B16 (FOR ASME B16.11 PRODUCT), RATING and SIZE.
FINISHING	: CARBON STEEL - GALVANIZED, PHOSPHATE, or ANTI-RUST OIL COATING. LOW ALLOY STEEL - PHOSPHATE, or ANTI-RUST OIL COATING. STAINLESS STEEL - PICKLED.
PACKING	: CARTON / WOODEN CASE. PLYWOODEN CASE

90° ELBOW

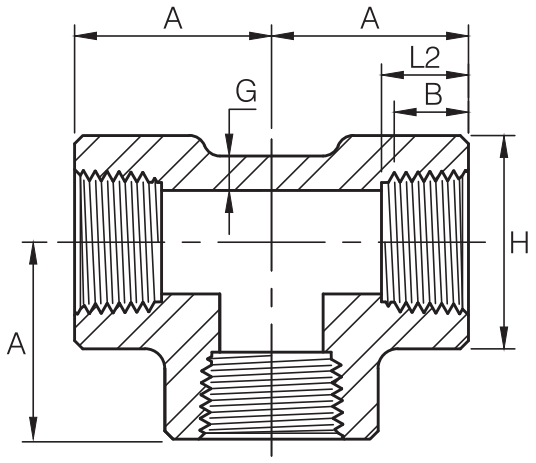


Dimensions are in millimeters.

Threaded						
DN	Nom. Pipe Size	Length of Thread. (Min)		A	G (Min)	H
		$B^{(*)}$	$L2^{(*)}$			
3000Lb						
6	1/8	6.4	6.7	21	3.18	22
8	1/4	8.1	10.2	25	3.30	25
10	3/8	9.1	10.4	28	3.51	33
15	1/2	10.9	13.6	33	4.09	38
20	3/4	12.7	13.9	38	4.32	46
25	1	14.7	17.3	44	4.98	56
32	1-1/4	17.0	18.0	51	5.28	62
40	1-1/2	17.8	18.4	60	5.56	75
50	2	19.0	19.2	64	7.14	84
65	2-1/2	23.6	28.9	83	7.65	102
80	3	25.9	30.5	95	8.84	121
100	4	27.7	33.0	114	11.18	152

$^{(*)}$ Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1) .

TEE

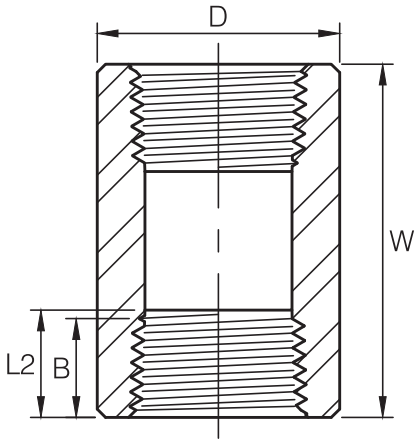


Dimensions are in millimeters.

Threaded						
DN	Nom. Pipe Size	Length of Thread. (Min)		A	G (Min)	H
		$B^{(*)}$	$L2^{(*)}$			
3000Lb						
6	1/8	6.4	6.7	21	3.18	22
8	1/4	8.1	10.2	25	3.30	25
10	3/8	9.1	10.4	28	3.51	33
15	1/2	10.9	13.6	33	4.09	38
20	3/4	12.7	13.9	38	4.32	46
25	1	14.7	17.3	44	4.98	56
32	1-1/4	17.0	18.0	51	5.28	62
40	1-1/2	17.8	18.4	60	5.56	75
50	2	19.0	19.2	64	7.14	84
65	2-1/2	23.6	28.9	83	7.65	102
80	3	25.9	30.5	95	8.84	121
100	4	27.7	33.0	114	11.18	152

$^{(*)}$ Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1) .

COUPLING

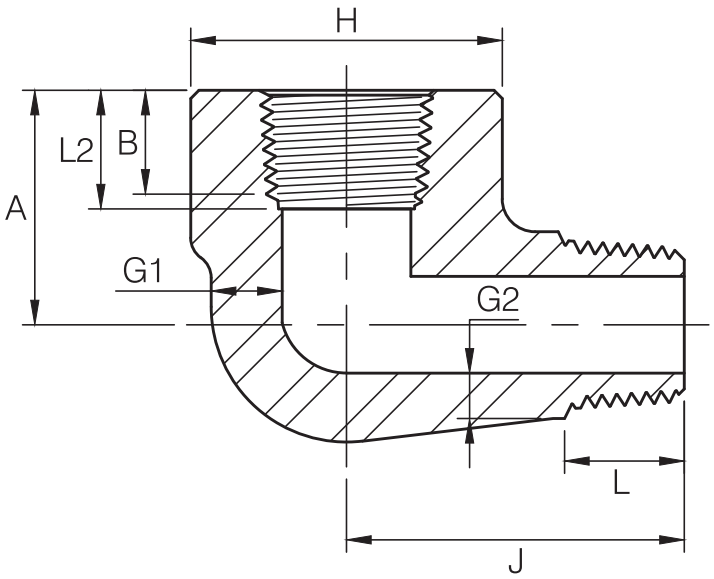


Dimensions are in millimeters.

Threaded					
DN	Nom. Pipe Size	Length of Thread. (Min)		W	D
		$B^{(*)}$	$L2^{(*)}$		
3000Lb					
6	1/8	6.4	6.7	32	16
8	1/4	8.1	10.2	35	19
10	3/8	9.1	10.4	38	22
15	1/2	10.9	13.6	48	28
20	3/4	12.7	13.9	51	35
25	1	14.7	17.3	60	44
32	1-1/4	17.0	18.0	67	57
40	1-1/2	17.8	18.4	79	64
50	2	19.0	19.2	86	76
65	2-1/2	23.6	28.9	92	92
80	3	25.9	30.5	108	108
100	4	27.7	33.0	121	140

$^{(*)}$ Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1) .

STREET ELBOW



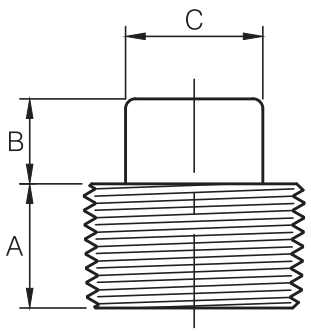
Dimensions are in millimeters.

DN	Nom. Pipe Size	H	A	J	G1 (Min)	G2(1) (Min)	B(2) (Min)	L2(2) (Min)	L (Min)
3000Lb									
6	1/8	19	19	25	3.18	2.74	6.4	6.7	10.0
8	1/4	25	22	32	3.30	3.22	8.1	10.2	11.0
10	3/8	32	25	38	3.51	3.50	9.1	10.4	13.0
15	1/2	38	28	41	4.09	4.16	10.9	13.6	14.0
20	3/4	44	35	48	4.32	4.88	12.7	13.9	16.0
25	1	51	44	57	4.98	5.56	14.7	17.3	19.0
32	1-1/4	62	51	66	5.28	5.56	17.0	18.0	21.0
40	1-1/2	70	54	71	5.56	6.25	17.8	18.4	21.0
50	2	84	64	84	7.14	7.64	19.0	19.0	22.0

(1) Wall thickness before threading.

(2) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1) .

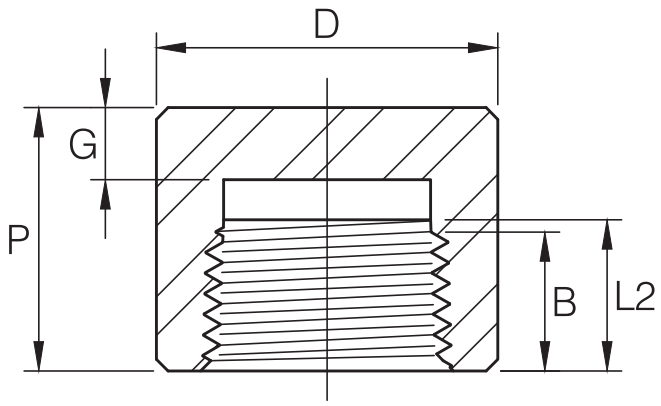
SQUARE HEAD PLUG



Dimensions are in millimeter

Square Head Plug				
DN	Nom. Pipe Size	A (Min)	B (Min)	C (Min)
6	1/8	10	6	7.15
8	1/4	11	6	9.55
10	3/8	13	8	11.11
15	1/2	14	10	14.29
20	3/4	16	11	15.88
25	1	19	13	20.64
32	1-1/4	21	14	23.81
40	1-1/2	21	16	28.58
50	2	22	18	33.27
65	2-1/2	27	19	38.10
80	3	28	21	42.86
100	4	32	25	63.50

CAP



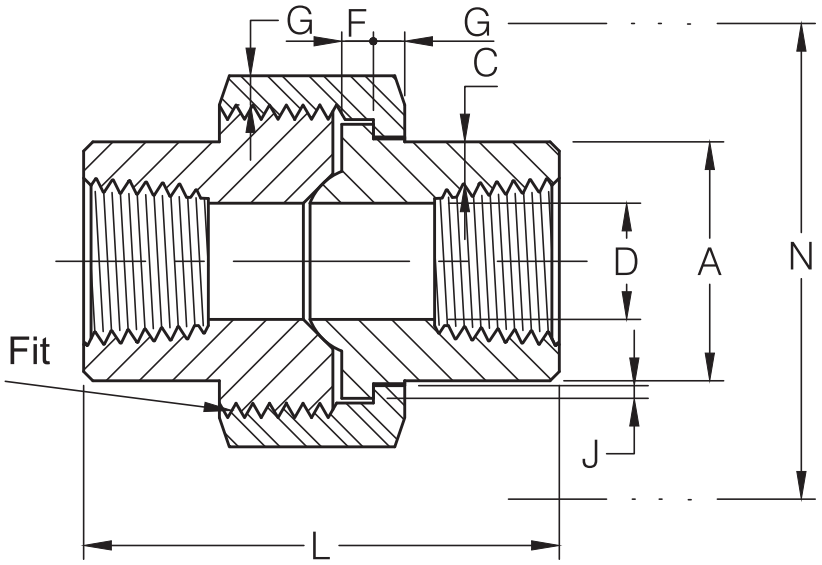
Dimensions are in millimeters.

Threaded						
DN	Nom. Pipe Size	Length of Thread. (Min)		P	D	G (Min)
		B(*)	L2(*)			
3000Lb						
6	1/8	6.4	6.7	19	16	4.8
8	1/4	8.1	10.2	25	19	4.8
10	3/8	9.1	10.4	25	22	4.8
15	1/2	10.9	13.6	32	28	6.4
20	3/4	12.7	13.9	37	35	6.4
25	1	14.7	17.3	41	44	9.7
32	1-1/4	17.0	18.0	44	57	9.7
40	1-1/2	17.8	18.4	44	64	11.2
50	2	19.0	19.2	48	76	12.7
65	2-1/2	23.6	28.9	60	92	15.7
80	3	25.9	30.5	65	108	19.0
100	4	27.7	33.0	68	140	22.4

(*) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1) .

THREADED END UNION

H-Thrd's
Minimum 4 Full Thrd's
Engagement Class 2A / 2B Fit
ANSI B1.1



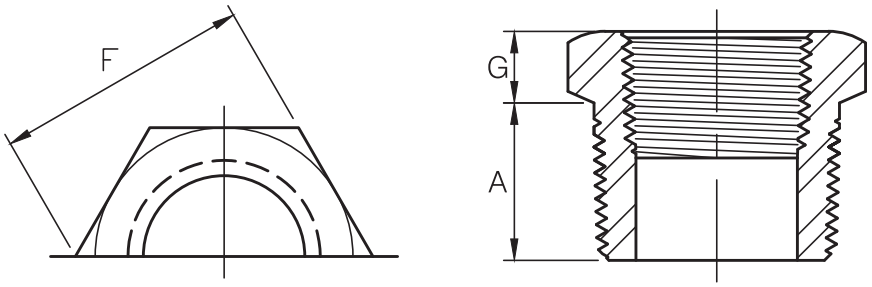
3000 Lb

Dimensions are in millimeters.

Nom. Pipe Size	Pipe End (Min) A	Wall (Min) C	Water Way Bore D(1)	Male Flange (Min) F	Nut (Min) G	Thrds. Per 25.4mm H	Bearing (Min) J	Length Assem. Nom. L	Clear Assem. Nut N
1/8	14.7	2.41	8.43 6.43	3.18	3.18	16	1.24	41.4	50.8
1/4	19.0	3.02	11.13 9.45	3.18	3.18	16	1.24	41.4	50.8
3/8	22.9	3.20	14.27 13.51	3.43	3.43	14	1.37	46.0	55.9
1/2	27.7	3.73	17.86 17.07	3.68	3.68	14	1.50	49.0	58.4
3/4	33.5	3.91	23.01 21.39	4.06	4.06	11	1.68	56.9	66.0
1	41.4	4.55	28.98 27.74	4.57	4.45	11	1.85	62.0	78.7
1-1/4	50.5	4.85	37.69 35.36	5.33	5.21	10	2.13	71.1	94.0
1-1/2	57.2	5.08	43.54 41.20	5.84	5.59	10	2.31	76.5	111.8
2	70.1	5.54	55.58 52.12	6.60	6.35	10	2.69	86.1	132.1
2-1/2	85.3	7.01	66.27 64.31	7.49	7.11	8	3.07	102.4	149.9
3	102.4	7.62	82.55 77.27	8.26	8.00	8	3.53	109.0	175.3

(1) Upper and lower values for each size are the respective maximum and minimum dimensions.

HEX HEAD BUSHING

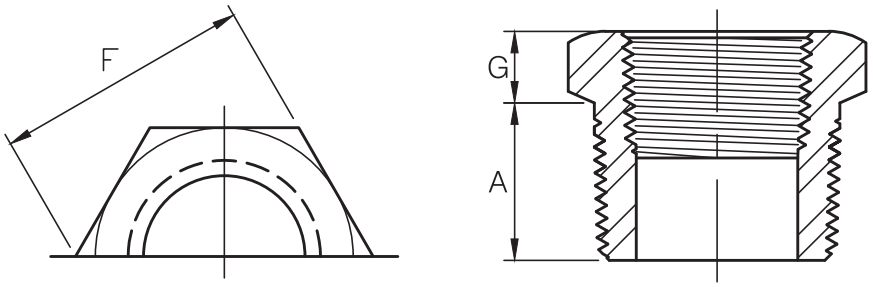


Dimensions are in millimeters.

Hex Head Bushing				
DN	Nom. Pipe Size	A (Min)	F (Nom.)	G (Min)
8	1/4	11	15.88	3
10	3/8	13	17.46	4
15	1/2	14	22.23	5
20	3/4	16	26.99	6
25	1	19	34.93	6
32	1-1/4	21	44.45	7
40	1-1/2	21	50.80	8
50	2	22	63.50	9
65	2-1/2	27	76.20	10
80	3	28	88.90	10
100	4	32	117.48	13

(1) CAUTIONARY NOTE REGARDING HEX BUSHINGS.
Hex Head Bushings of one-size reduction should not be used in services where they might be subject to harmful loads and forces than internal pressures.

HEX HEAD BUSHING

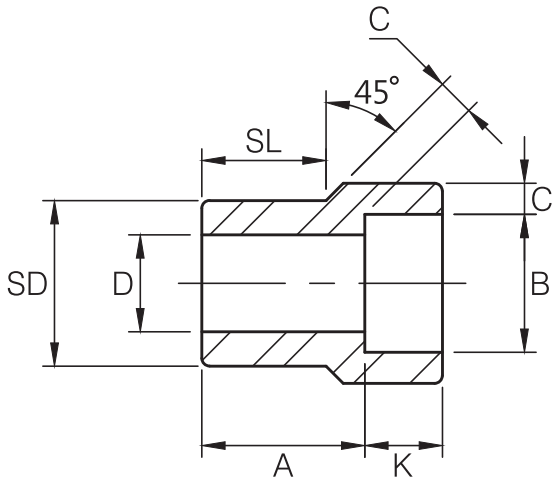


Dimensions are in millimeters.

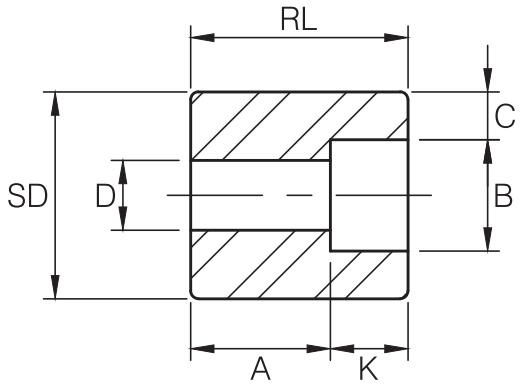
Hex Head Bushing				
DN	Nom. Pipe Size	A (Min)	F (Nom.)	G (Min)
8	1/4	11	15.88	3
10	3/8	13	17.46	4
15	1/2	14	22.23	5
20	3/4	16	26.99	6
25	1	19	34.93	6
32	1-1/4	21	44.45	7
40	1-1/2	21	50.80	8
50	2	22	63.50	9
65	2-1/2	27	76.20	10
80	3	28	88.90	10
100	4	32	117.48	13

(1) CAUTIONARY NOTE REGARDING HEX BUSHINGS.
Hex Head Bushings of one-size reduction should not be used in services where they might be subject to harmful loads and forces than internal pressures.

REDUCER INSERT



TYPE 1



TYPE 2 (1)

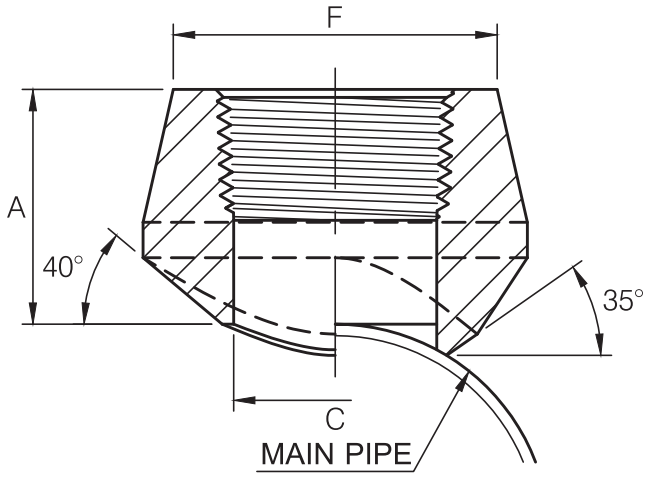
Dimensions are in millimeters.

Nom. Pipe Size	Type(2)		Socket		Shank Dia.	Laying Length A		Bore D		Wall (Min) C		Length SL		Length RL (Min)	
	3M	6M	Dia. B	Depth (Min) K	SD	3M	6M	3M	6M	3M	6M	3M	6M	3M	6M
3/8 × 1/4	1	1	14.4	9.5	17.1	19.0	21.3	9.2	6.3	3.78	4.60	14.2	15.7	—	—
1/2 × 3/8	1	1	17.8	9.5	21.3	20.6	23.1	12.5	9.1	4.01	5.03	15.7	15.7	—	—
1/2 × 1/4	1	1	14.4	9.5	21.3	20.6	20.6	9.2	6.3	3.78	4.60	15.7	15.7	—	—
3/4 × 1/2	1	1	22.0	9.5	26.7	22.4	25.4	15.8	11.7	4.67	5.97	17.5	19.0	—	—
3/4 × 3/8	2	1	17.8	9.5	26.7	15.7	22.4	12.5	9.1	4.01	5.03	—	19.0	26.9	—
3/4 × 1/4	2	2	14.4	9.5	26.7	17.5	22.4	9.2	6.3	3.78	4.60	—	—	26.9	32.0
1 × 3/4	1	1	27.4	12.5	33.4	23.9	28.4	20.9	15.5	4.90	6.96	19.0	20.6	—	—
1 × 1/2	2	1	22.0	9.5	33.4	15.7	28.4	15.8	11.7	4.67	5.97	—	20.6	28.4	—
1 × 3/8	2	2	17.8	9.5	33.4	17.5	22.4	12.5	9.1	4.01	5.03	—	—	28.4	33.2
1 × 1/4	2	2	14.4	9.5	33.4	19.0	23.9	9.2	6.3	3.78	4.60	—	—	28.4	33.2
1-1/4 × 1	1	1	34.1	12.5	42.2	25.4	30.2	26.6	20.7	5.69	7.92	20.6	22.4	—	—
1-1/4 × 3/4	2	2	27.4	12.5	42.2	17.5	20.6	20.9	15.5	4.90	6.96	—	—	31.7	34.7
1-1/4 × 1/2	2	2	22.0	9.5	42.2	19.0	22.4	15.8	11.7	4.67	5.97	—	—	31.7	34.7
1-1/4 × 3/8	2	2	17.8	9.5	42.2	20.6	23.9	12.5	9.1	4.01	5.03	—	—	31.7	34.7
1-1/4 × 1/4	2	2	14.4	9.5	42.2	22.4	25.4	9.2	6.3	3.78	4.60	—	—	31.7	34.7
1-1/2 × 1-1/4	1	1	42.9	12.5	48.2	28.4	35.0	35.0	29.4	6.07	7.92	22.4	25.4	—	—
1-1/2 × 1	2	1	34.1	12.5	48.2	17.5	29.2	26.6	20.7	5.69	7.92	—	25.4	33.2	—
1-1/2 × 3/4	2	2	27.4	12.5	48.2	19.0	25.4	20.9	15.5	4.90	6.96	—	—	33.2	39.6
1-1/2 × 1/2	2	2	22.0	9.5	48.2	20.6	26.9	15.8	11.7	4.67	5.97	—	—	33.2	39.6
1-1/2 × 3/8	2	2	17.8	9.5	48.2	22.4	28.4	12.5	9.1	4.01	5.03	—	—	33.2	39.6
2 × 1-1/2	1	1	49.0	12.5	60.3	31.8	38.9	40.8	33.9	6.35	8.92	25.4	28.7	—	—
2 × 1-1/4	2	2	42.9	12.5	60.3	20.6	23.9	35.0	29.4	6.07	7.92	—	—	38.1	41.1
2 × 1	2	2	34.1	12.5	60.3	22.4	25.4	26.6	20.7	5.69	7.92	—	—	38.1	41.1
2 × 3/4	2	2	27.4	12.5	60.3	23.9	26.9	20.9	15.5	4.90	6.96	—	—	38.1	41.1
2 × 1/2	2	2	22.0	9.5	60.3	25.4	28.4	15.8	11.7	4.67	5.97	—	—	38.1	41.1

(1) At the option of the manufacturer Type 2 Reducers may be furnished in Type 1 configuration.

(2) 3M & 6M symbols denote 3000 and 6000 classes.

THREADED END 90 BRANCH OUTLET



STRAIGHT WAY

Dimensions are in millimeters.

Straight way			
OutLet Pipe (in)	A	C	F
3000Lb			
1/4	19.0	11.5	22.0
3/8	20.6	14.5	25.9
1/2	25.4	16.5	31.4
3/4	26.9	21.5	37.1
1	33.3	27.2	45.5
1-1/4	33.3	36.0	57.0
1-1/2	35.0	42.0	64.0
2	38.1	53.0	76.0
2-1/2	46.0	65.0	92.0
3	50.8	80.0	109.2
4	57.2	104.0	140.0

(1) Thread in accordance with ASME B1.20.1.

DIMENSIONAL TOLERANCE

MSS SP-97-2012 Unit : mm

Item	1/8"~3/4"	1"~4"
Face of fitting to crotch (A)	±0.8	±1.6

CONVENTIONAL RUN PIPE SIZE COMBINATIONS

3000Lb THREAD/SOCKET-WELD END STD/XS BUTT WELDING END

		OUTLET SIZE										
		1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
RUN SIZE (MAIN PIPE)	Reducing way	3/8"~3/4" 1"~36"	1/2" 3/4"~1-1/4" 1-1/2"~36"	3/4" 1" 1-1/4" 1-1/2"~3" 3-1/2"~36"	1" 1-1/4" 1-1/2" 2"~3" 3-1/2"~6" 8"~36"	1-1/4" 1-1/2" 2" 2-1/2" 3" ~4" 5"~10" 12"~36"	1-1/2" 2" 2-1/2" 3" 3-1/2"~5" 6"~8" 10"~36"	2" 2-1/2" 3" 3-1/2" 4"~5" 6"~10" 12"~36"	2-1/2" 3" 3-1/2" 4" 5"~6" 8"~10" 12"~18" 20"~36"	3" 3-1/2" 4" 5" 6" 8" 10"~14" 16"~36"	3-1/2" 4" 5" 6" 8" 10" 12"~16" 18"~36"	5" 6" 8" 10" 12"~14" 16"~18" 20"~24" 26"~36"
	Straight way	3/8"~36"	1/2"~36"	3/4"~36"	1"~36"	1-1/4"~1-1/2" 2"~36"	1-1/2" 2"~3" 3-1/2"~36"	2" 2-1/2"~4" 5"~36"	2-1/2" 3"~3-1/2" 4"~6" 8"~36"	3" 3-1/2"~4" 5"~8" 10"~36"	3-1/2" 4" 5" 6" 8"~12" 14"~36"	5" 6" 8" 10" 12"~16" 18"~36"

Each charted outlet size is designed to fit a number of run pipe sizes.