BRANCH FITTINGS AND SPECIALTY FORGED PRODUCTS

INTERNATIONAL WFI®

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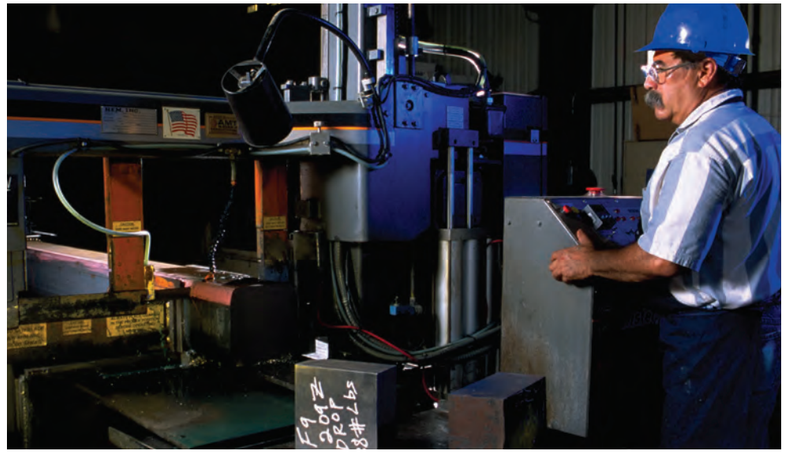
Expertise, capability and desire. These are the cornerstones for success. They are also the same three reasons why WFI has become a world leader in the design and manufacture of high quality forgings, fittings, flanges, and a wide variety of specialty items.

Founded in 1972, WFI has grown from a few employees and 2,800 square feet of office and production space to 150 employees and more than 120,000 square feet of space located on 13 acres.

Excellence in Quality is the Standard at WFI

Excellence in Quality is the standard at WFI. We are recognized in the industry for our superior Nuclear Quality Assurance Program. Originally awarded in 1977, WFI currently holds a Quality System Certificate (QSC 425) issued by ASME as a Material Organization manufacturing and supplying both ferrous and non-ferrous materials. WFI's Quality Assurance Program is written to meet



the most stringent requirements of ASME Section III, NCA3800, 10CFR50 Appendix B, 10CFR21, and ANSI N45.2. In addition to these nuclear standards, our quality program meets the ever increasing demands of the piping and pressure vessels codes including ASME Section I and VIII, B31.1, B31.3, B31.4, B31.8, API6A PED Annex I Paragraph 4.3, TuV AD-WO and the requirements of MIL-I-45208A and MIL-STD-6875F.

All of WFI products are competitively priced and we are at your service 24-hours-a-day, 7-days-a-week. We maintain one of the highest levels of on time deliveries in our industry and our professional sales and engineering staff can always be reached to assist you.

Our Mission

To be, today and in the future, the recognized leader in our industry, marketing and manufacturing forged fittings, branch connections and other related products to satisfy our customer's expectations.

To be cost effective through Total Quality performance of these operations, and thus provide the resources required to support our commitment to improve our products, processes and customer service.

To be a law abiding corporate citizen respecting the rights of individuals, contributing to the needs of the community and conserving the state of the environment.

The Best Value - *Price, Quality, Service* All The Time.

How To Order Branch Connections/WFI Pipets

1. Specify Run or Header Size (For Consolidated Run Sizes see pages 30-32)

2. Specify Branch/Outlet Size

3. Specify Class, Schedule or Thickness:

- Socket-weld & Threaded Branches: Specify Header Size, Branch Size and Class (3000, 6000 & 9000)
- Buttweld Branches: Specify Schedule or Thickness for both header and branch pipes: Std, XS, S160 etc.

4. Specify Branch Style

Pipet®
Buttweld Pipet® (BWP)
Threaded Pipet® (THP)
Socketweld Pipet® (SWP)
BW/SW/THD Elbo Pipet®
(BEP, SEP, TEP)
BW/SW/THD Lateral Pipet®
(BLP, SLP, TLP)

5. Select Material Specification

- Carbon Steel - SA/A105, SA/A105N, SA/A350-LF2 Class__, etc.
- Stainless Steels: SA/A 182 F304L, F316L, F347, F321, F317/L, etc.
- Chrome Moly: SA/A182 F11 Class___, F22 Class___, F5, F9, F91, etc.
- Other: High Yield, Nickel/Nickel Alloys, Copper Nickel, Nickel Copper, Duplex, 6 Moly, Super Duplex, Titanium, etc.

How To Order Branch Connections/WFI Pipets (Continued)

6. Specify Piping Code (if available):

Examples: ASME B31.1, B31.3, B31.4, B31.8, ASME See VIII & ASME Sec I

Branch Connection fittings are engineered fittings. Stock fittings are designed using "proof of design" Burst Tests. ASME B31.1 and ASME B31.3 codes accept Burst Test Design fittings. ASME Section III also accepts Burst Test Design fittings.

ASME Sec VIII, Sec I, B31.4 and B31.8 require additional design considerations and Burst Test design stock fittings may not meet specific code requirements in certain applications. They, as well as some specifications, require area replacement calculations as proof of adequacy. The requirements are project specific and WFI must be consulted and provided with the following additional ordering information:

Design Code & Edition/Addenda
Design Temperature
Design Pressure
Corrosion Allowance (if applicable)
Design/Location Factor (if applicable)

Quality Control

WFI International craftsmanship is combined with rigid quality control systems to provide complete assurance of the highest manufacturing standards and compliance with applicable ASME and ASTM specifications. Every fitting manufactured is subjected to three separate quality control systems: one for material control, one for manufacturing control, and one for design control.

All forgings are inspected before being passed to the shipping room. Frequent analyses are made to check against mill documents. Accurate records are kept of every fitting, from initial forging bar through forging, heat treatment, machining, storage and shipment. Every single fitting is traceable to the exact material and process used in its manufacture.

In-house testing capabilities include:

Mechanical Testing: Tensile/Yield, Hardness and Charpy
Chemical Product Analysis
Positive Material Identification (PMI)
Utrasonic Examination
Liquid Penetrant Examination
Magnetic Particle Examination
Corrosion Testing
Macrostructure Examination
Microstructure Examination
Ferrite Examination

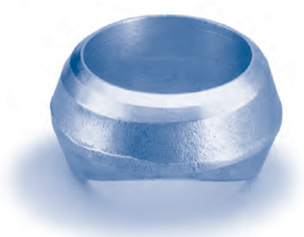
Butt-Weld Pipet®

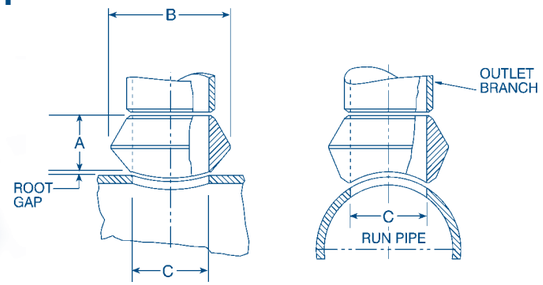
SA/A105 & SA/A350 LF2 CL1

Butt-Weld

Standard Weight

Extra Strong





Standard

Outlet Size Inches	Dimensions A	B	C*	Appx. Weight Pounds
1/8	5/8	7/8	0.269	0.08
1/4	5/8	7/8	0.364	0.08
3/8	3/4	1	0.493	0.10
1/2	3/4	1-1/8	0.622	0.12
3/4	7/8	1-1/2	0.824	0.22
1	1-1/16	1-13/16	1.062	0.32
1-1/4	1-1/4	2-1/4	1.38	0.64
1-1/2	1-5/16	2-9/16	1.625	0.78
2	1-1/2	3-5/16	2.313	1.14
2-1/2	1-5/8	3-21/32	2.500	1.94
3	1-3/4	4-9/32	3.125	2.60
3-1/2	1-7/8	5	3.548	4.45
4	2	5 -3/8	4.145	4.12
6	2-3/8	7-21/32	6.112	11.00
8	2-3/4	9-3/4	7.981	18.00
10	3-1/16	12	10.020	27.22
12	3-3/8	14-1/4	12.000	44.00
14	3-1/2	15-1/2	13.250	56.00
16	3-11/16	17-5/8	15.250	76.00
18	3-13/16	19-3/4	17.250	97.00
20	4	21-7/8	19.250	120.00
24	4-9/16	26	23.250	194.61
26	4-11/16	28-7/16	25.250	230.90
30	5-3/8	32-5/8	29.250	335.23
36	5-3/8	38-15/16	35.250	477.50

Larger outlet sizes available on application

Extra Strong

Outlet Size Inches	Dimensions A	B	C*	Appx. Weight Pounds
1/8	5/8	7/8	0.215	0.10
1/4	5/8	7/8	0.302	0.10
3/8	3/4	1	0.423	0.10
1/2	3/4	1-1/8	0.546	0.12
3/4	7/8	1-1/2	0.742	0.18
1	1-1/16	1-13/16	1.062	0.36
1-1/4	1-1/4	2-1/4	1.278	0.55
1-1/2	1-5/16	2-9/16	1.625	0.68
2	1-1/2	3-5/16	2.313	1.24
2-1/2	1-5/8	3-21/32	2.500	2.26
3	1-3/4	4-9/32	3.125	2.84
3-1/2	1-7/8	5	3.364	4.96
4	2	5-3/8	4.145	4.56
6	3-1/16	7-21/32	5.800	15.00
8	3-7/8	9-3/4	7.625	28.66
10	3-11/16	12	9.750	36.19
12	4-1/16	14-1/4	11.750	67.00
14	3-15/16	15-1/2	13.000	72.25
16	4-3/16	17-5/8	15.000	102.10
18	4-3/8	19-3/4	17.000	129.75
20	4-11/16	21-7/8	19.000	165.85
24	5-1/2	26	23.000	262.10
26	5-3/4	28-7/16	25.000	315.67

Larger outlet sizes available on application

Each outlet size listed is available to fit any run curvature.
BW Ends per B16.9 and B16.25. Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes 6" and less fit a number of run pipe sizes, and the fittings are marked accordingly. See page 30 for Pipet Consolidation Chart.

SCHEDULES — Standard Weight Fittings are the same as schedule 40 fittings through 10". A schedule 40 Butt-Weld Pipet for sizes 12" and larger is available. Dimensions and prices on application. Extra Strong Fittings are the same as schedule 80 fittings through 8". A schedule 80 Butt-Weld Pipet for sizes 10" and larger is available. Dimensions and prices on application. Pipe schedule numbers and weight designations are in accordance with ASME B36.10.

FLATS — A flat Butt-Weld Pipet fitting for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “B” and “C” dimensions as deemed necessary.

*The "C" dimension represents the waterway dimension of the fitting and does not include the minimal taper and radius required for manufacturing purposes. Installation holes in header should be based on actual fittings.

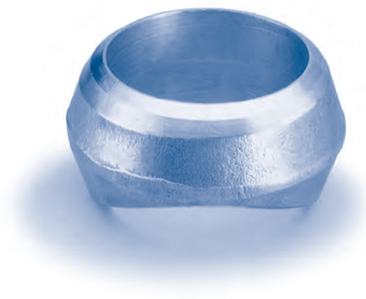
Butt-Weld Pipet®

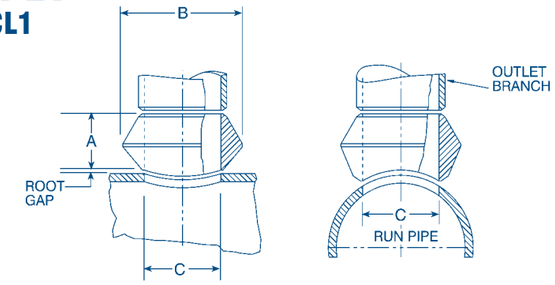
SA/A105 & SA/A350 LF2 CL1

Butt-Weld

Schedule 160

XXS





Schedule 160

Outlet Size Inches	Dimensions A	B	C*	Appx. Weight Pounds
1/2	1-1/8	1-1/4	0.464	0.24
3/4	1-1/4	1-1/2	0.612	0.39
1	1-1/2	1-3/4	0.815	0.62
1-1/4	1-3/4	2-1/4	1.160	1.16
1-1/2	2	2-3/4	1.338	1.80
2	2-3/16	3	1.689	2.29
2-1/2	2-7/16	4	2.125	3.02
3	2-7/8	4-7/16	2.624	6.34
4	3-5/16	5 -3/8	3.438	9.94
6	4-1/8	8-1/2	5.187	25.25

XXS

Outlet Size Inches	Dimensions A	B	C*	Appx. Weight Pounds
1/2	1-1/8	1-1/4	0.252	0.23
3/4	1-1/4	1-1/2	0.434	0.65
1	1-1/2	1-3/4	0.599	0.78
1-1/4	1-3/4	2-1/4	0.896	1.16
1-1/2	2	2-3/4	1.100	1.60
2	2-3/16	3	1.503	2.46
2-1/2	2-7/16	4	1.771	3.02
3	2-7/8	4-7/16	2.300	6.91
4	3-5/16	5 -3/8	3.152	11.00
6	4-1/8	8-1/2	4.897	32.94

Each outlet size listed is available to fit any run curvature.
BW Ends per B16.9 and B16.25. Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes 6" and less fit a number of run pipe sizes, and the fittings are marked accordingly. See page 30 for Pipet Consolidation Chart.

SCHEDULES — Pipe schedule numbers and weight designations are in accordance with ASME B36.10.

FLATS — A flat Butt-Weld Pipet fitting for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “B” and “C” dimensions as deemed necessary.

*The "C" dimension represents the waterway dimension of the fitting and does not include the minimal taper and radius required for manufacturing purposes. Installation holes in header should be based on actual fittings.

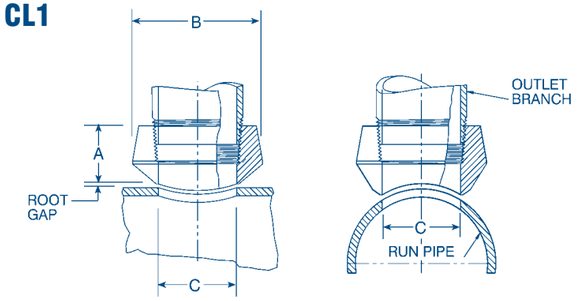
Threaded Pipet®

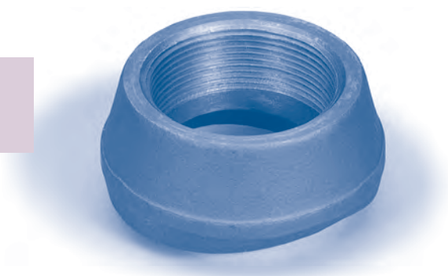
SA/A105 & SA/A350 LF2 CL1

Threaded

CL 3000

CL 6000





	Outlet Size Inches	Dimensions			Appx. Weight Pounds
		A	B	C*	
CL 3000	1/4	3/4	1-1/16	.437	0.14
	3/8	13/16	1-1/16	.563	0.14
	1/2	1	1-15/32	.718	0.28
	3/4	1-1/16	1-45/64	.922	0.39
	1	1-5/16	2-3/32	1.156	0.73
	1-1/4	1-5/16	2-17/32	1.500	0.96
	1-1/2	1-3/8	2-25/32	1.734	1.12
	2	1-1/2	3-5/16	2.218	1.66
	2-1/2	1-13/16	3-29/32	2.625	2.73
	3	2	4-21/32	3.250	3.88
	4	2-1/4	5-13/16	4.250	6.18

	Outlet Size Inches	Dimensions			Appx. Weight Pounds
		A	B	C*	
CL 6000	1/4	3/4	1-1/16	.437	0.14
	3/8	1-1/8	1-5/16	.563	0.14
	1/2	1-1/4	1-3/4	.718	0.28
	3/4	1-7/16	2-1/16	.922	0.39
	1	1-9/16	2-17/32	1.156	0.73
	1-1/4	1-5/8	2-1/2	1.484	0.96
	1-1/2	1-11/16	3-5/16	1.734	1.12
	2	2-1/16	3-31/32	2.218	1.66

Each outlet size listed is available to fit any run curvature.
Threaded ends are in accordance with ANSI/ASME B1.20.1
Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes noted above fit a number of run pipe sizes, and the fittings are marked accordingly. See page 30 for Pipet Consolidation Chart.

FLATS — A flat Threaded Pipet for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “B” and “C” dimensions as deemed necessary.

*The "C" dimension represents the waterway dimension of the fitting and does not include the minimal taper and radius required for manufacturing purposes. Installation holes in header should be based on actual fittings.

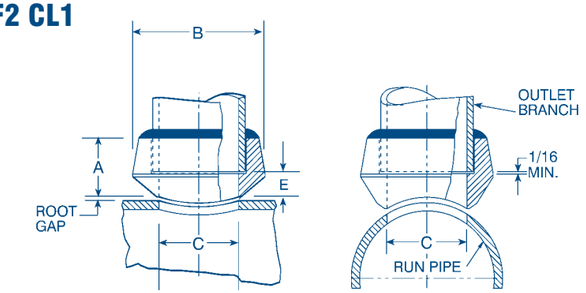
Socket-Weld Pipet®

SA/A105 & SA/A350 LF2 CL1

Socket Weld

CL 3000

CL 6000



	Outlet Size Inches	Dimensions				Appx. Weight Pounds
		A	B	C*	E	
CL 3000	1/4	3/4	1	0.364	3/8	0.14
	3/8	13/16	1-1/16	0.493	7/16	0.14
	1/2	1	1-15/32	0.622	9/16	0.28
	3/4	1-1/16	1-45/64	0.824	9/16	0.39
	1	1-5/16	2-3/32	1.049	25/32	0.73
	1-1/4	1-5/16	2-17/32	1.38	23/32	0.96
	1-1/2	1-3/8	2-25/32	1.61	3/4	1.12
	2	1-1/2	3-5/16	2.067	13/16	1.66
	2-1/2	1-13/16	3-29/32	2.469	3/4	2.73
	3	2	4-21/32	3.068	15/16	3.88
	4	2-1/4	5-13/16	4.026	1-1/16	6.60

	Outlet Size Inches	Dimensions				Appx. Weight Pounds
		A	B	C*	E	
CL 6000	1/2	1-1/4	1-3/4	0.464	13/16	0.28
	3/4	1-7/16	2-1/16	0.612	15/16	0.39
	1	1-9/16	2-17/32	0.815	1-1/32	0.73
	1-1/4	1-5/8	2-1/2	1.160	1-1/32	0.96
	1-1/2	1-5/8	3-5/16	1.338	1-1/16	1.63
	2	2-1/16	3-31/32	1.687	1-3/8	1.66

Each outlet size listed is available to fit any run curvature.
Socket dimensions are in accordance with ASME B16.11.
Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes noted above fit a number of run pipe sizes, and the fittings are marked accordingly. See page 30 for Pipet Consolidation Chart.

FLATS — A flat Socket-Weld Pipet for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “B” and “C” dimensions as deemed necessary.

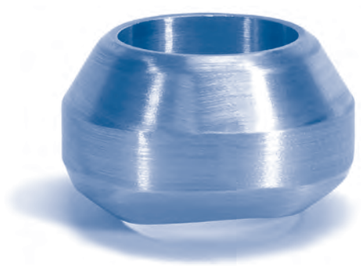
*The "C" dimension represents the waterway dimension of the fitting and does not include the minimal taper and radius required for manufacturing purposes. Installation holes in header should be based on actual fittings.

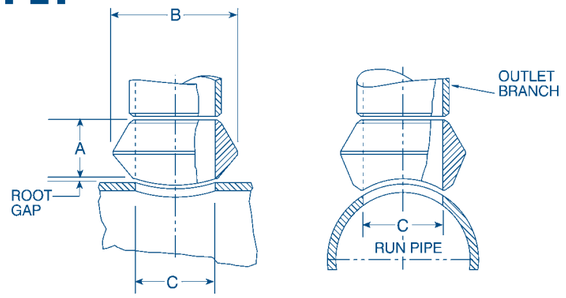
Butt-Weld Pipet®
Stainless & Alloy

Butt-Weld

Standard Weight

Extra Strong





	Outlet Size Inches	Dimensions A	B	C	Appx. Weight Pounds
Standard	3/8	3/4	1	0.493	0.09
	1/2	3/4	1-1/8	0.622	0.12
	3/4	7/8	1-1/2	0.824	0.28
	1	1-1/16	1-3/4	1.049	0.34
	1-1/4	1-1/4	2-1/4	1.38	0.72
	1-1/2	1-5/16	2-1/2	1.610	0.90
	2	1-1/2	3	2.067	1.12
	2-1/2	1-5/8	3-1/2	2.469	2.31
	3	1-3/4	4	3.068	2.50
	4	2	5	4.026	5.89
	6	2-3/8	7-1/2	6.065	10.50

	Outlet Size Inches	Dimensions A	B	C	Appx. Weight Pounds
Extra Strong	3/8	3/4	1	0.423	0.15
	1/2	3/4	1-1/8	0.546	0.12
	3/4	7/8	1-1/2	0.742	0.21
	1	1-1/16	1-3/4	0.957	0.43
	1-1/4	1-1/4	2-1/4	1.278	0.69
	1-1/2	1-5/16	2-1/2	1.500	0.89
	2	1-1/2	3	1.939	1.25
	2-1/2	1-5/8	3-1/2	2.323	2.63
	3	1-3/4	4	2.900	3.82
	4	2	5	3.826	6.17
	6	3-1/16	7-1/2	5.761	15.06

Each outlet size listed is available to fit any run curvature.
BW Ends per B16.9 and B16.25. Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes 6" and less fit a number of run pipe sizes, and the fittings are marked accordingly. See page 31 for Pipet Consolidation Chart.

SCHEDULES — Standard Weight Fittings are the same as schedule 40 fittings through 10". A schedule 40 Butt-Weld Pipet for sizes 12" and larger is available. Dimensions and prices on application. Extra Strong Fittings are the same as schedule 80 fittings through 8". A schedule 80 Butt-Weld Pipet for sizes 10" and larger is available. Dimensions and prices on application. Pipe schedule numbers and weight designations are in accordance with ASME B36.10.

FLATS — A flat Butt-Weld Pipet fitting for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

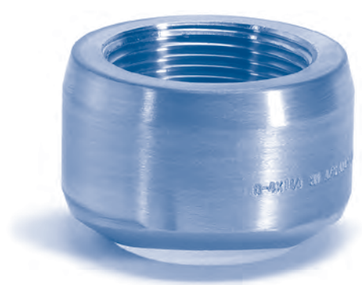
Although every attempt has been made to insure that the information contained in these tables is correct, Bonney Forge reserves the right to change the “B” and “C” dimensions as deemed necessary.

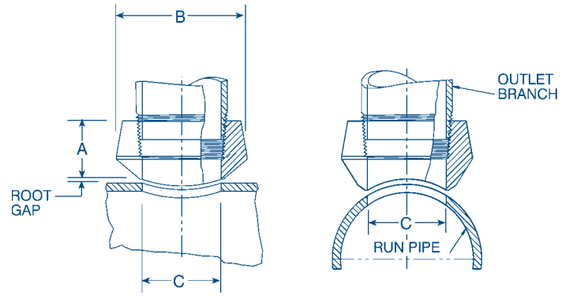
Threaded Pipet®
Stainless & Alloy

Threaded

CL 3000

CL 6000





	Outlet Size Inches	Dimensions A	B	C	Appx. Weight Pounds
CL 3000	1/4	3/4	7/8	.438	0.14
	3/8	13/16	1	.563	0.14
	1/2	1	1-1/4	.703	0.28
	3/4	1-1/16	1-1/2	.906	0.39
	1	1-5/16	1-7/8	1.141	0.73
	1-1/4	1-5/16	2-1/4	1.484	0.96
	1-1/2	1-3/8	2-1/2	1.719	1.12
	2	1-1/2	3	2.188	1.66

	Outlet Size Inches	Dimensions A	B	C	Appx. Weight Pounds
CL 6000	1/4	3/4	1	.438	0.14
	3/8	1-1/8	1-1/4	.563	0.14
	1/2	1-1/4	1-1/2	.703	0.28
	3/4	1-7/16	1-3/4	.906	0.39
	1	1-9/16	2-1/4	1.141	0.73
	1-1/4	1-5/8	2-1/2	1.484	0.96
	1-1/2	1-11/16	3	1.719	1.63
	2	2-1/16	3-5/8	2.188	1.66

Each outlet size listed is available to fit any run curvature.
Threaded ends are in accordance with ANSI/ASME B1.20.1
Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes noted above fit a number of run pipe sizes, and the fittings are marked accordingly. See page 31 for Pipet Consolidation Chart.

FLATS — A flat Threaded Pipet for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

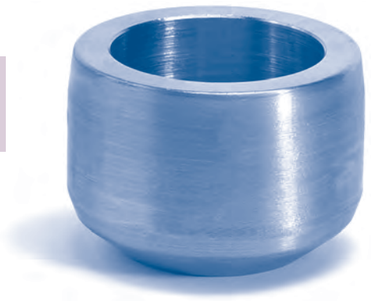
Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “B” and “C” dimensions as deemed necessary.

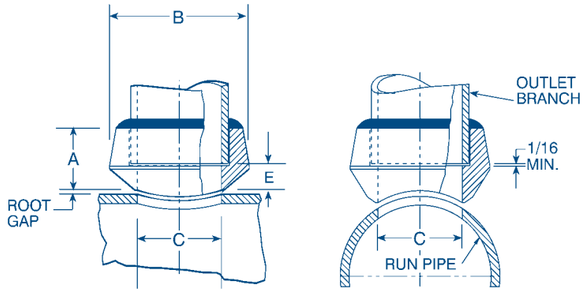
Socket-Weld Pipet®
Stainless & Alloy

Socket Weld

CL 3000

CL 6000





	Outlet Size Inches	Dimensions A	B	C	E	Appx. Weight Pounds
CL 3000	1/4	3/4	7/8	0.364	3/8	0.14
	3/8	13/16	1-1/16	0.493	7/16	0.14
	1/2	1	1-1/4	0.622	9/16	0.28
	3/4	1-1/16	1-1/2	0.824	9/16	0.39
	1	1-5/16	1-7/8	1.049	25/32	0.73
	1-1/4	1-5/16	2-1/4	1.38	23/32	0.96
	1-1/2	1-3/8	2-1/2	1.61	3/4	1.12
	2	1-1/2	3	2.067	13/16	1.66

	Outlet Size Inches	Dimensions A	B	C	E	Appx. Weight Pounds
CL 6000	1/2	1-1/4	1-3/8	.464	13/16	0.28
	3/4	1-7/16	1-3/4	.612	15/16	0.39
	1	1-9/16	2	.815	1-1/32	0.73
	1-1/4	1-5/8	2-1/2	1.16	1-1/32	0.96
	1-1/2	1-11/16	2-3/4	1.338	1-1/16	1.63
	2	2-1/16	3-3/8	1.687	1-3/8	1.66

Each outlet size listed is available to fit any run curvature.
Socket dimensions are in accordance with ASME B16.11.
Design per MSS-SP-97.

RUN PIPE SIZES — Outlet sizes noted above fit a number of run pipe sizes, and the fittings are marked accordingly. See page 31 for Pipet Consolidation Chart.

FLATS — A flat Socket-Weld Pipet for use on welding caps, elliptical heads and flat surfaces is available.

ORDERING — When ordering a fitting, see page 4.

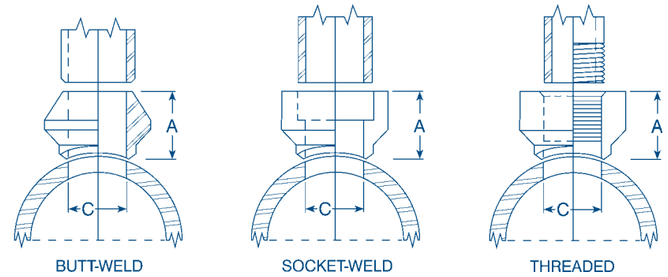
Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “B” and “C” dimensions as deemed necessary.

Lightweight Schedule 10s, LW, and CL300 Pipets®

Butt-Weld

Threaded

Socket Weld



Outlet Size Inches	BUTT-WELD Dimensions A	C	Appx. Wt/Lb	THREADED* Dimensions A	C	Appx. Wt/Lb	SOCKET WELD Dimensions A	C 3M	C 5s	C 10s	Appx. Wt/Lb
		C = ID of specified branch pipe						3M provided unless otherwise specified			
1/2	3/4		0.10	1	0.703	0.25	1	0.622	0.710	0.674	0.24
3/4	7/8		0.23	1-1/16	0.906	0.35	1-1/16	0.824	0.920	0.884	0.34
1	1-1/16		0.26	1-5/16	1.141	0.65	1-5/16	1.049	1.185	1.097	0.63
1-1/2	1-5/16		0.78	1-3/8	1.719	0.92	1-3/8	1.610	1.770	1.682	0.91
2	1-1/2		0.89	1-1/2	2.188	1.40	1-1/2	2.067	0.703	2.157	1.37
3	1-3/4		2.27								
4	2		4.37								
6	2-3/8		10.19								

*Branch dimensions are in accordance with ASME B16.11 CL 3M.

Benefits

• Reduces Welding	Reduces weld volume and welding time by more than 50% compared to traditional designs.
• Reduces Header Weld Cross Section	Allows full penetration groove welds without “suck in” or distortion.
• Reduces Heat Build Up	Reduces run pipe heat distortion.
• Is Used on All Run Pipe Thicknesses	(CL300) S5s/10s & LW design can be used with any schedule or thickness run pipe in B16.5 Class 150 & Class 300 piping systems.
• Meets Piping Codes & Standards	Burst Tests, Markl Fatigue Tests, Finite Element Analysis, MSS-SP-97, ASME B31.1 & B31.3, ASME/ANSI B16.9 & B16.11.

Identification

Specify Butt-Weld as follows:

Light Wall x Branch Schedule:	10" LW x 2" S10s
Run Schedule x Branch Schedule:	10" S10s x 2" S10s
CL300 x Branch Schedule:	10" CL300 x 2" Std Wt*

Specify Socket-Weld & Threaded as follows:

Light Wall x Branch Class:	10" LW x 2" CL 3M SWP
Run Wall x Branch Class:	10" S10s x 2" CL 3M THD 10" S40s x 2" CL 3M SWP S10s
CL300 x Branch Class:	10" CL300 x 2" CL 3M THD

*Fittings designated CL300 can be installed on any run pipe thickness (S10s, Std, XS, S160, XXS) in B16.5 Class 150 or Class 300 Piping Systems.

**To obtain S10s/LW/CL300 design for run pipes thicker than S10s, either LW or CL300 must be specified.

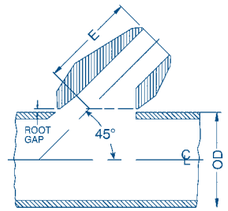
NOTE: Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the “C” dimension as deemed necessary.

See page 32 for consolidation chart.

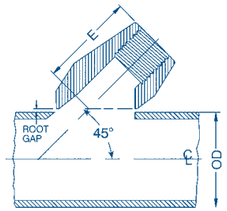
LATERAL PIPET®

45° CONNECTIONS

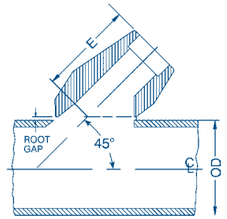
FORGED



BUTT WELD

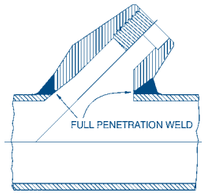


THREADED



SOCKET-WELD

45° BRANCH CONNECTIONS
THREADED, SOCKET-WELD AND BUTT-WELD ENDS



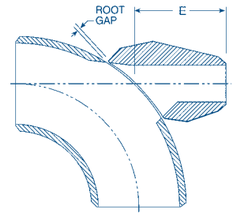
Nominal Run Pipe Size	Outlet Size	Dimensions			
		CL 3000 Threaded and Socket-Weld	CL 6000 Threaded and Socket-Weld	STD & XS Butt-Weld	Sch. 160 and XXS Butt-Weld
		E	E	E	E
2-1/2 - 1-1/4 12 - 3	1/4	1-9/16	1-9/16	1-9/16	
2-1/2 - 1-1/4 12 - 3	3/8	1-9/16	1-9/16	1-9/16	
2-1/2 - 1-1/4 12 - 3	1/2	1-9/16	1-15/16	1-9/16	1-7/8
1-1/2 - 1-1/4 5 - 2 12 - 6	3/4	1-15/16	2-1/4 2-1/4 2-5/16	1-15/16	2-1/8
2-1/2 - 2 5 - 3 12 - 6	1	2-1/4 2-1/4 2-5/16	2-1/2	2-1/4 2-1/4 2-5/16	2-7/16
2-1/2 - 2 5 - 3 12 - 6	1-1/4	2-1/2	2-11/16	2-1/2	2-15/16
2-1/2 - 2 5 - 3 12 - 6	1-1/2	2-11/16	3-3/16	2-11/16	3-1/4
5 - 4 8 - 6 12 - 10	2	3-3/16		3-7/16	
Order to Specific Run Pipe Sizes	3				
	4				

Also available for run sizes through 36".
See footnotes at bottom of page 15.

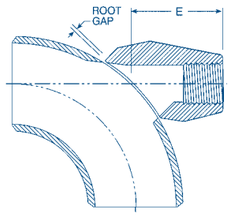
ELBO PIPET®

90° LONG RADIUS

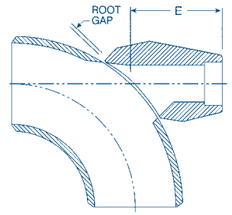
FORGED



BUTT-WELD

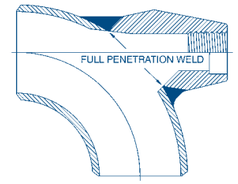


THREADED



SOCKET-WELD

FOR ELBOW OUTLETS
THREADED, SOCKET-WELD AND BUTT-WELD ENDS



Nominal Elbow Size Inches	Outlet Size Inches	Dimensions			
		STD. Buttweld	XS Buttweld	CL 3000 THD and Socketweld	CL 6000 THD and Socketweld
		E	E	E	E
36 thru 3/4 36 thru 1	1/2 3/4	1-3/8 1-11/16	1-3/8 1-11/16	1-19/32 1-7/8	1-7/8 2-1/4
36 thru 2 36 thru 2	1 1-1/4	1-15/16 2-1/8	1-15/16 2-1/8	2-1/4 2-1/2	2-1/2 2-11/16
36 thru 2 36 thru 2	1-1/2 2	2-5/16 2-3/4	2-5/16 2-3/4	2-11/16 3-1/4	3-1/4
Order to Specific Elbow Sizes	**2-1/2 **3 **4	3-3/16 3-1/2 4-5/16	3-3/16 3-1/2 4-5/16	**	**

Footnotes applying to the Elbo Pipet and Lateral Pipet:

Socket Dimensions to ASME B16.11
Thread Dimensions to ANSI/ASME B1.20.1
Butt-Weld End Dimensions to ASME B16.9 & B16.25
Each Elbo Pipet 2" & smaller is uniquely designed to fit all the elbow sizes shown. The complete size range interchangeability is so marked on the fitting.
**Available as Butt-Weld outlets only. Larger sizes available - STD/XS/S160/XXS.

ORDERING When ordering fittings - see page 4.

Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change dimensions as deemed necessary.

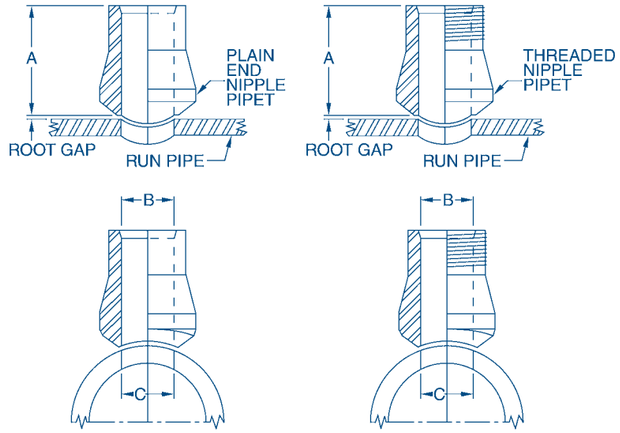
The values listed are based on long radius elbows, twice the branch size listed.

Nipple Pipet®

Plain End

Threaded End

Integrally reinforced branch connection of one piece construction which eliminates costly welds and provides convenience of socket-weld and threaded ends for valves and instruments. Available in standard lengths of 3 1/2" and 6 1/2". Special lengths on request.



Threaded & Plain End	Outlet Size Inches	Dimensions				Appx. Weight Pounds
		A*	B			
			S/80	S/160	XXS	
	1/2	3-1/2	0.546	0.464	0.252	0.45
	3/4	3-1/2	0.742	0.612	0.434	0.64
	1	3-1/2	0.957	0.815	0.599	0.92
	1-1/4	3-1/2	1.278	1.160	0.896	1.40
	1-1/2	3-1/2	1.500	1.338	1.100	1.72
	2	3-1/2	1.939	1.687	1.503	2.50

Threaded & Plain End	Outlet Size Inches	Dimensions				Appx. Weight Pounds
		A*	C			
			S/80	S/160	XXS	
	1/2	3-1/2	0.464	0.464	0.252	0.45
	3/4	3-1/2	0.612	0.612	0.434	0.64
	1	3-1/2	0.815	0.815	0.599	0.92
	1-1/4	3-1/2	1.160	1.160	0.896	1.40
	1-1/2	3-1/2	1.338	1.338	1.100	1.72
	2	3-1/2	1.687	1.687	1.503	2.50

*Available in lengths 4 1/2", 5 1/2" and 6 1/2"
Weights based on Carbon Steel (.283 lbs/in^3)

ORDERING When ordering fittings - see page 4.

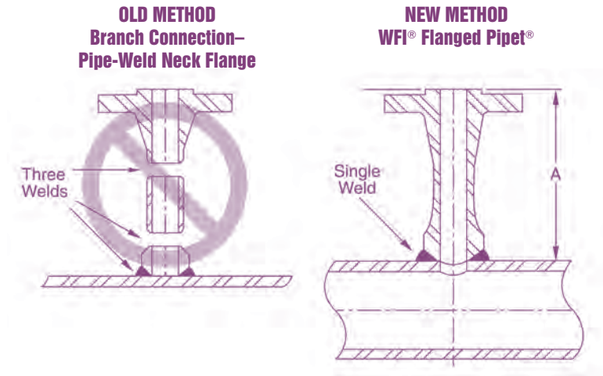
Although every attempt has been made to insure that the information contained in these tables is correct, WFI reserves the right to change the "C" dimension as deemed necessary.

Flanged Pipet®

Overview

ELIMINATE WELDS!

Don't waste time and money making **3 welds**... when the **single weld WFI® Flanged Pipet®** performs better!



FORGED ONE-PIECE CONSTRUCTION MEANS LESS WELDING.

WFI Flanged Pipets are available in any length, material, pipe wall thickness and flange rating.

WFI Flanged Pipets offer a simplified installation and provide more exacting tolerances where multiple flanges of constant height are required.

One-piece construction eliminates two extra stress points and the clean, seamless bore offers better performance. The base is contoured for attachment to a pipe, elbow or vessel.

RF, RTJ and other standard flanged faces are available.

- Excellent choice for **hot tap** applications. (When specified, hot tap configurations will be supplied.)
- Integrally reinforced, weld-on connection.
- Exclusive design distributes stress more evenly and removes flow interruptions.
- Available in all sizes, heights, wall thicknesses, and materials.

Ordering Information

Specify:

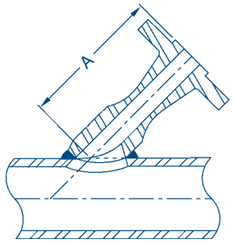
- Header Size and Schedule
- Outlet Size and Schedule
- Flange Rating and Bore
- Face Style (RF, RTJ, Etc.)
- Design Standard (ASME B16.5 unless otherwise requested)

Example: 6" Std. Wt. x 2" 300# RF S80 Bore

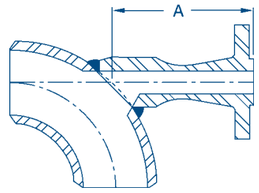
AVAILABLE IN ALL FORGING-QUALITY MATERIALS.

FLANGED PIPET®

- CL 150
- CL 300
- CL 400 & 600
- CL 900 & 1500
- CL 2500



45° FLANGED PIPET



ELBO-FLANGED PIPET

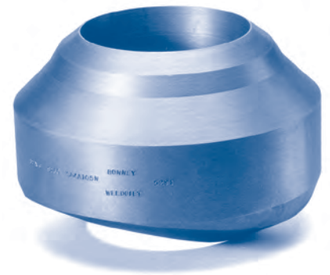
	Outlet Size	A	Flange O.D.	Flange Thk.	Bolt Circle	No. of Holes	Bolt Hole
CL 150	1/2	6	3.50	.44	2.38	4	.62
	3/4	6	3.88	.50	2.75	4	.62
	1	6	4.25	.56	3.12	4	.62
	1 1/4	6	4.62	.62	3.50	4	.62
	1 1/2	6	5.00	.69	3.88	4	.62
	2	6	6.00	.75	4.75	4	.75
CL 300	1/2	6	3.75	.56	2.62	4	.62
	3/4	6	4.62	.62	3.25	4	.75
	1	6	4.88	.69	3.50	4	.75
	1 1/4	6	5.25	.75	3.88	4	.75
	1 1/2	6	6.12	.81	4.50	4	.88
	2	6	6.50	.88	5.00	8	.75
CL 400 & 600	1/2	6	3.75	.56	2.62	4	.62
	3/4	6	4.62	.62	3.25	4	.75
	1	6	4.88	.69	3.50	4	.75
	1 1/4	6	5.25	.81	3.88	4	.75
	1 1/2	6	6.12	.88	4.50	4	.88
	2	6	6.50	1.00	5.00	8	.75
CL 900 & 1500	1/2	6*	4.75	.88	3.25	4	.88
	3/4	6*	5.12	1.00	3.50	4	.88
	1	6*	5.88	1.12	4.00	4	1.00
	1 1/4	6*	6.25	1.12	4.38	4	1.00
	1 1/2	6*	7.00	1.25	4.88	4	1.12
	2	9	8.50	1.50	6.50	8	1.00
CL 2500	1/2	6*	5.25	1.19	3.50	4	.88
	3/4	6*	5.50	1.25	3.75	4	.88
	1	6*	6.25	1.38	4.25	4	1.00
	1 1/4	6*	7.25	1.50	5.12	4	1.12
	1 1/2	9	8.00	1.75	5.75	4	1.25
	2	9	9.25	2.00	6.75	8	1.12

NOTES: Flange dimensions and tolerances are in accordance with published flange standards (ASME B16.5, API6A, etc.) Available in all standard facings
Outlet sizes greater than 2" NPS are available upon request.
"A" dimensions other than 6" are available upon request.
Flange thickness for Class 150 and Class 300 include 1/16" raised face.
Flange thickness for Class 600, 1500 and 2500 does not include 1/4" raised face.
Available under MIL-I-45208 and ASME Section III Quality Programs.

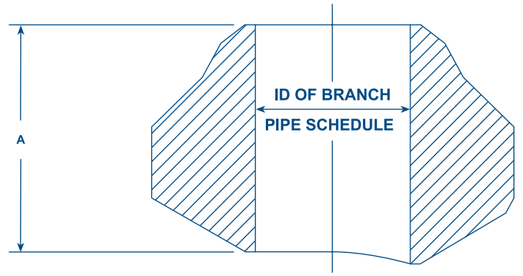
*For 1500 and 2500 Class when used as a Lateral Pipet or Elbo Pipet, the flange diameter may cause interference with the run pipe. For that reason in these products, WFI offers a standard "A" dimension of 9". If a shorter "A" dimension is required, it is recommended that you contact WFI.

PIPET®

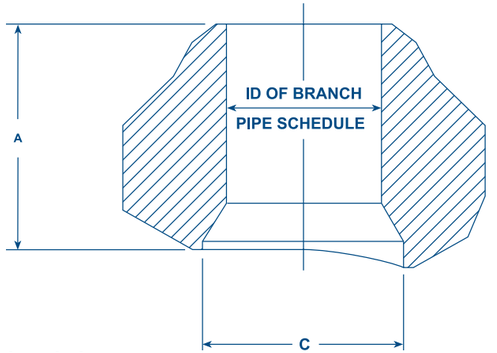
- HEAVY WALL
- FORGED



The Heavy Wall Forged Pipet® is an integrally reinforced branch connection. It provides the economical and engineering answer to the problem of welding outlet fittings on high pressure, high temperature piping and pressure vessels.



TYPE 1



TYPE 2

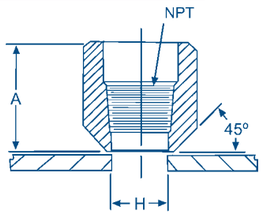
Type 1 - Straight thru bore design

Type 2 - Conventional tapered bore design

Run Wall Thickness	3/4		1		1 1/4		1 1/2		1 3/4		2		2 1/4		2 1/2		2 3/4		3	
Branch Pipe Size	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C
3	2-7/8	2.906	3-7/32	2.900	3-3/8	2.906	3-5/8	2.900	4-1/8	2.900	4-9/16	2.900	5	2.900	5-1/2	2.900	5-7/8	2.900	6-1/16	2.900
3-1/2	3-1/8	3.359	3-1/4	3.359	3-7/16	3.359	3-3/4	3.359	4-3/16	3.359	4-5/8	3.359	5-1/16	3.359	5-9/16	3.359	6	3.359	6-5/16	3.359
4	3-5/16	3.843	3-3/8	3.826	3-1/2	3.828	3-7/8	3.826	4-3/4	3.826	4-3/4	3.826	5-3/16	3.826	5-5/8	3.826	6-1/8	3.826	6-9/16	3.826
5	3-3/4	4.812	3-3/4	4.812	4	4.812	4-1/4	4.812	4-3/4	4.812	5-1/4	4.812	5-3/4	4.812	6-1/4	4.812	6-5/8	4.812	7-3/16	4.812
6	4-1/8	5.750	4-11/32	5.761	4-1/2	5.760	4-11/16	5.760	5-1/4	5.760	5-3/4	5.760	6-1/4	5.760	6-3/4	5.760	7-1/4	5.760	7-13/16	5.760
8	4-3/16	7.625	4-5/8	7.625	4-7/8	7.625	5-5/32	7.625	5-3/4	7.625	6-11/32	7.625	6-15/16	7.625	7-17/32	7.625	8-3/32	7.625	8-11/16	7.625
10	4-1/4	9.750	4-27/32	9.750	5	9.562	5-5/16	9.562	5-15/16	9.562	6-9/16	9.562	7-3/16	9.562	7-13/16	9.562	8-7/16	9.562	9-1/16	9.562
12	4-3/8	11.750	5-3/32	11.750	5-3/8	11.375	5-11/16	11.375	6-5/16	11.375	6-15/16	11.375	7-9/16	11.375	8-3/16	11.375	8-13/16	11.375	9-7/16	11.375
14	4-1/2	13	5-1/4	13	5-1/2	12.500	5-13/16	12.500	6-5/16	12.500	6-15/16	12.500	7-9/16	12.500	8-3/16	12.500	8-13/16	12.500	9-7/16	12.500
16	4-11/16	15	5-7/8	15	6	14.312	6-7/16	14.310	6-5/8	14.310	7-1/4	14.310	7-7/8	14.310	8-1/2	14.310	9-1/8	14.310	9-3/4	14.310
18	5-1/8	17	6-1/2	17	6-1/2	16.125	6-1/2	16.126	6-13/16	16.126	7-7/16	16.126	8-7/32	16.126	8-13/16	16.126	9-13/32	16.126	10-1/32	16.126
20	5-5/8	19	6-3/4	19	7	17.937	7-9/16	17.938	7-25/32	17.938	8-3/32	17.938	8-21/32	17.938	9-1/4	17.938	9-29/32	17.938	10-15/32	17.938
24	6-1/2	23	7-5/8	23	8	21.564	8-23/32	21.564	8-31/32	21.564	9-13/16	21.568	10-1/2	21.568	11	21.564	12-9/16	21.564	10-21/32	21.564

B-1 BOSSET

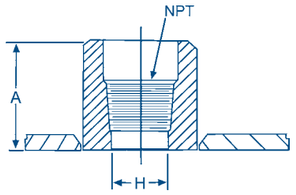
Combination Socket-Weld & Threaded Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	38.1	50.8	50.8	50.8	50.8	63.5
	IN	1 1/2	2	2	2	2	2 1/2
H	MM	17.9	23.4	29.4	37.7	43.7	56.0
	IN	45/64	59/64	1 5/32	1 31/64	1 23/32	2 13/64

B-1-F BOSSET

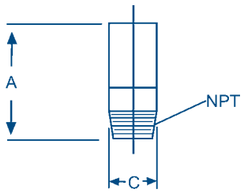
Combination Socket-Weld & Threaded Insert Type Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	38.1	50.8	50.8	50.8	50.8	63.5
	IN	1 1/2	2	2	2	2	2 1/2
H	MM	17.9	23.4	29.4	37.7	43.7	56.0
	IN	45/64	59/64	1 5/32	1 31/64	1 23/32	2 13/64

PLUG

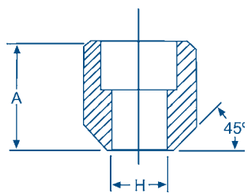
for Combination Socket-Weld & Threaded Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	44.5	46.0	52.4	52.4	52.4	65.1
	IN	1 3/4	1 13/16	2 1/16	2 1/16	2 1/16	2 9/16
H	MM	21.3	26.7	33.4	42.2	48.3	60.3
	IN	.840	1.050	1.315	1.660	1.900	2.375

B-2 BOSSET

Socket-Weld Boss

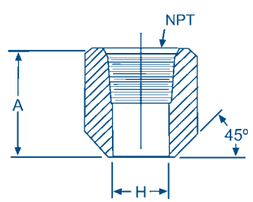


3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A 3000 LB	MM	40	65.1	65.1	65.1	65.1	63.5
	IN	1 1/2	2	2	2	2	2 1/2
A 6000 LB	MM	65.1	65.1	65.1	65.1	65.1	85.7
	IN	2	2	2	2	2	3 3/8
H	BRANCH PIPE I.D.						

- Designed in accordance with ANSI B16.11
- Available in Class 3000-6000-9000-10000
- Available in over 60 different materials
- A weld-on connection in socket-weld, threaded or combination threaded and socket-weld designs
- Forty different designs and combinations available. Please contact WFI for further details or visit our web site at www.wfi-intl.com.

B-3 BOSSET

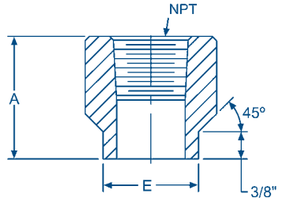
Threaded Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	38.1	50.8	50.8	50.8	50.8	63.5
	IN	1 1/2	2	2	2	2	2 1/2
H	MM	17.9	23.4	29.4	37.7	43.7	56.0
	IN	45/64	59/64	1 5/32	1 31/64	1 23/32	2 13/64

B-4 BOSSET

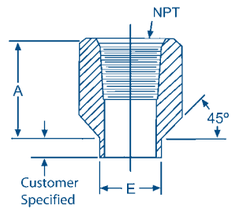
Threaded Boss with Weld Ring



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	33.3	34.9	42.9	47.6	50.8	57.2
	IN	1 5/16	1 3/8	1 11/16	1 7/8	2	2 1/4
E	MM	23.8	27.0	33.3	42.9	49.2	61.9
	IN	15/16	1 1/16	1 5/16	1 11/16	1 15/16	2 7/16

B-5 BOSSET

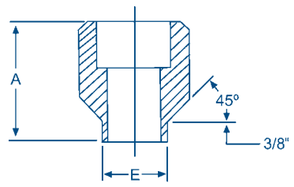
Threaded Thermowell Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	47.6	50.8	60.3	66.7	79.4	85.7
	IN	1 7/8	2	2 3/8	2 5/8	3 1/8	3 3/8
E	MM	25.4	30.2	36.5	44.5	50.8	63.5
	IN	1	1 3/16	1 7/16	1 3/4	2	2 1/2

B-6 BOSSET

Socket-Weld Boss with Weld Ring



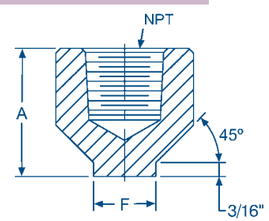
3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	33.3	34.9	42.9	47.6	50.8	57.2
	IN	1 5/16	1 3/8	1 11/16	1 7/8	2	2 1/4
E	MM	23.8	27.0	33.3	42.9	49.2	61.9
	IN	15/16	1 1/16	1 5/16	1 11/16	1 15/16	2 7/16

- Designed in accordance with ANSI B16.11
- Available in Class 3000-6000-9000-10000
- Available in over 60 different materials
- A weld-on connection in socket-weld, threaded or combination threaded and socket-weld designs
- Forty different designs and combinations available. Please contact WFI for further details or visit our web site at www.wfi-intl.com.

BOSSET®

B-11 BOSSET

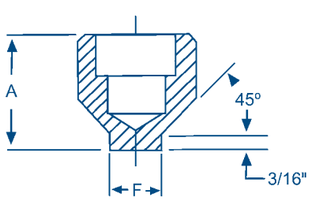
Threaded Drill-Thru Extended Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	47.6	50.8	60.3	66.7	79.4	85.7
	IN	1 7/8	2	2 3/8	2 5/8	3 1/8	3 3/8
F	MM	5.6	9.5	15.1	22.2	26.2	35.7
	IN	7/32	3/8	19/32	7/8	1 1/32	1 13/32

B-12 BOSSET

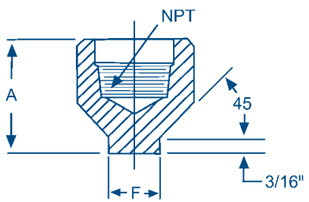
Socket-Weld Drill-Thru Extended Boss



3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	47.6	50.8	60.3	66.7	79.4	85.7
	IN	1 7/8	2	2 3/8	2 5/8	3 1/8	3 3/8
F	MM	5.6	9.5	15.1	22.2	26.2	35.7
	IN	7/32	3/8	19/32	7/8	1 1/32	1 13/32

B-13 BOSSET

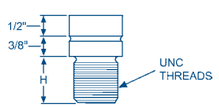
Combination Socket-Weld & Threaded Drill-Thru Extended Boss



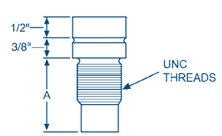
3000 LB 6000 LB	Outlet Size						
	DN	15	20	25	32	40	50
	NPS	1/2	3/4	1	1 1/4	1 1/2	2
A	MM	47.6	50.8	60.3	66.7	79.4	85.7
	IN	1 7/8	2	2 3/8	2 5/8	3 1/8	3 3/8
F	MM	5.6	9.5	15.1	22.2	26.2	35.7
	IN	7/32	3/8	19/32	7/8	1 1/32	1 13/32

- Designed in accordance with ANSI B16.11
- Available in over 60 different materials
- A weld-on connection in socket-weld, threaded or combination threaded and socket-weld designs
- Forty different designs and combinations available.

ACCESS HOLE X-RAY PLUGS



1" (25) For pipe wall thickness
5/8" - 1 3/8" (15.9 - 34.9)



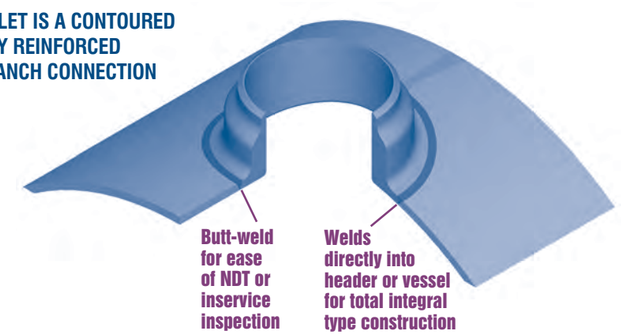
H = Customer Specified Length

1" (25) For pipe wall thickness over 1 3/8" (34.9 - 76.2)
1 1/2" (40) For pipe wall thickness over 3" - 5" (76.2 - 127.0)
2" (50) For pipe wall thickness over 5" (127.0)

VESSELET®

OVERVIEW

THE VESSELET IS A CONTOURED INTEGRALLY REINFORCED INSERT BRANCH CONNECTION



WHEN DO YOU SPECIFY A VESSELET®?

When you need:
- Fully interpretable radiographic or ultrasonic weld examination
- Longer life under cyclic fatigue loading
- An insert fitting that is fully engineered and supported by Markl fatigue tests, burst tests, finite element analysis and years of successful experience in actual service

FEATURES OF THE VESSELET®

- True butt-weld installation in header
- Outlets available in butt-weld, socket-weld, threaded & flanged configurations
- Designed for easy installation
- Low stress intensification factor (sif)
- Available in outlet size range to 60”
- Available in over 60 different alloys
- Meets all the requirements of the applicable codes & standards

ORDERING INFORMATION

Required for all Codes:

1. **Header (run) size & schedule or wall thickness**
2. **Outlet size & schedule or wall thickness**
3. **Material**
4. **Quantity**

Note: In the absence of any other information, WFI will supply fittings proven by burst test. Applicable codes are B131.1, B31.3 & ASME III

For ASME VIII, ASME Sec. 1, B31.4 & 8, additional service conditions are required. This enables WFI to insure that the Vesselet® provided meets the code requirements. These codes do not accept product line proof testing. They, as well as some specifications, require area replacement as proof of adequacy. These requirements are project specific and require additional ordering information as listed below.

1. **Design Code**
2. **Design temperature**
3. **Design pressure**
4. **Corrosion allowance (if applicable)**

VESSELET®

CONFIGURATIONS

SIZES, WEIGHTS & DIMENSIONS

LATERAL & ELBO VESSELETS®

Integrally reinforced, contoured-insert type branch connection ideally suited for cyclical and high pressure/temperature services. Patented design reduces weld volume, and lends itself to non-destructive examination. May be used to replace seamless reducing laterals. Available in butt-weld, socket-weld, threaded, and flanged configurations.

FLANGED VESSELET®

Integrally reinforced contoured insert type branch connections with integral flange outlet (class 150 thru class 2500). Eliminates flange attachment weld. Customized projection heights available.

STUDDET®

Designed for mating flanges to vessels or tanks utilizing contoured insert type connection. Available in all flange sizes and pressure ratings. Patented design reduces weld volume, and lends itself to non-destructive examination.

Special Shapes and Configurations for Problems Specific to the Piping Industry

The following patents apply: 262,397 274,549 4,438,955 282,867 4,450,613 (foreign patents also)

THERMALET®

Integrally reinforced contoured-insert type branch connections, threaded (class 3000 and class 6000) and flanged (class150 thru class 2500) for thermowells in heavily insulated pipes. Moves attachment weld away from instrument tap. Patented design reduces weld volume, and lends itself to non-destructive examination.

Butt-Weld Vesselet - Sizes, Weights & Dimensions

Outlet Size Inches	Dimensions A	Dimensions Installation OD	Appx. Weight Pounds
1/2	1-1/4	OD's vary by application	0.80
3/4	1-1/4		0.90
1	1-1/4		1.10
1-1/4	1-1/4		1.30
1-1/2	1-3/4		1.75
2	1-1/2		3.19
3	1-11/16		6.90
4	2-1/16		12.03
6	2-11/16		24.45
8	3		44.14
10	3-1/8		63.33
12	3-5/16		98.37
14	3-5/8		122.00
16	3-3/4		141.90
18	4-5/8		173.70
20	5-1/8		208.00
24	5-5/8		313.00

"A" Dimensions shown are nominal for STD x STD and XS x XS.
Other Schedules may vary.

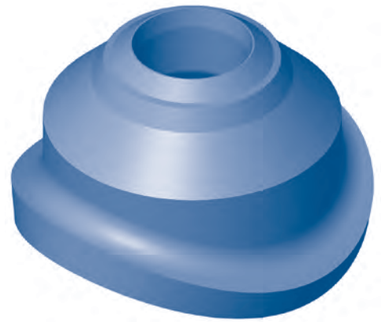
Backed by complete testing program

WFI has conducted comprehensive burst tests of Vesselts®. Additionally, WFI has conducted fatigue tests to offer more directly applicable data for stress intensification factor (sif) calculations, which are of major importance in piping system analysis.

WFI offers full engineering capability to develop special configurations and designs, and to perform analysis of those designs using in-house finite element analysis.

SAFETY RELIEF VALVE VESSELET®

OVERVIEW



Safety Relief Valve Vesselets®

Special support nozzle designed to reduce flow induced vibrations. Engineered for temperature, pressure and flow conditions. Also considers fatigue and is designed to accommodated stresses induced from opening and closing of the valve and seismic conditions.

Designed by WFI utilizing proven technology from ASME, WRC and SwRI.

A safety relief valve requires more from its attachment nozzle than pressure/temperature protection.

WFI's Safety Relief Valve Vesselt® (SRVV) adds protection for:

- Flow induced vibration
- Seismic loads
- Reaction forces
- Premature Seat failure

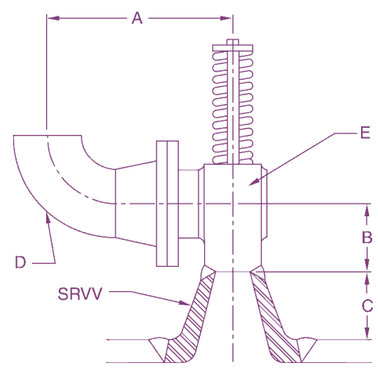
FILL OUT THE INFORMATION BELOW AND RETURN TO WFI FOR A QUOTE:

Process	Fill in below
Line Size/Wall Thickness	
Steam Flow (lbs/hr)	
Steam Pressure	
Steam Temperature	
Material	
Line Material	
SRVV Material	
Valve	
Weight	
Set Pressure	
Rated Capacity (lbs/hr)	
Inlet ID	
Weld Prep (if required)	
Outlet ID	

In order to do seismic analysis, WFI needs either the seismic acceleration or Universal Building Code Zone.

In order to analyze the reaction forces, WFI needs a sketch of your layout or the dimensions listed on the typical layout sketch (Figure 1).

Figure 1



A Offset of Discharge Elbow (24" Default) _____

B Height of Seat _____

DEFAULTS	
Outlet Nom. Size	Height Used
3"	6"
4"	8"
6"	8"
8"	10"

C Max, Min, or WFI Optimizes _____

D Elbow Schedule (S/40 Default) _____

E Valve Lift Time (from Valve Mfg. .04 sec. Default) _____

Note: Default Valves are used when none are given to complete the analysis

SRVV Designed for Vibration Control plus Pressure/Temperature and Fatigue Endurance

Seamless Forged Special Tees

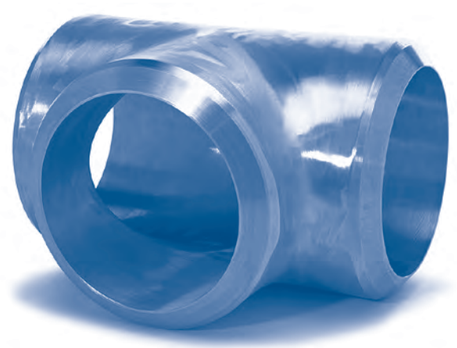
Overview

WFI designs and manufactures Seamless Tees to meet all ASME Code requirements including ASME Section I, Section III, Section VIII, ASME B31 Codes, ASME B16.9, WFI's Tees are also broadly used in API and MSS applications.

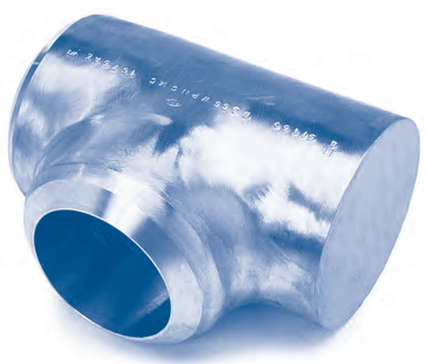
WFI Seamless Tees are ideal for high pressure process and refinery piping, subsea lines, topside manifold piping, subsea risers, steam lines and boiler piping. Our manufacturing process allows us to quickly make tees with heavy walls, tees with non standard reductions, and tees in hard to find material grades.

WFI also manufactures true "Seamless" Barred and Target/Cushion tees. WFI Seamless Barred Tees have integral bars that are not welded into the branch. These are ideal for subsea corrosion resistant alloy tees where welding may affect material properties in heat affected zones. WFI Seamless Target/Cushion Tees are forged with one end of the run solid. This provides a 90 degree flow path through one end of the run and out the branch. Target Tees are normally provided with center to end dimensions in accordance with ASME B16.9 dimensions for buttwelding tees for new piping installations. They can also be manufactured with center to end dimensions equal to those required for buttweld elbows to replace elbows in existing piping systems. Target tees are broadly used for erosive flow conditions such as those found in topside or subsea manifolds in offshore oil and gas production.

WFI Tees are available in Carbon Steel, Low Temp, High Yield, Chrome Moly, Stainless, 6 Moly, Duplex, Super Duplex, Nickel, Nickel Alloys, Nickel Copper and Copper Nickel.



SEAMLESS SIZE-ON-SIZE TEE



SEAMLESS TARGET TEE

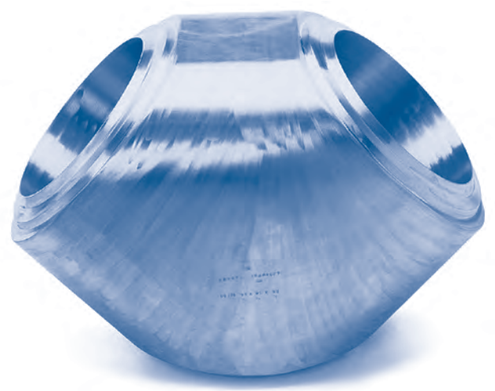
Seamless Forged Wyes and Laterals

Overview

During the last 5 years, WFI has invested more than $4 million in new NC/CNC machine tools and forging dies to more efficiently produce large seamless Wyes and Laterals for the power and energy industries. WFI also utilizes in house programs including Finite Element Analysis and Three-Dimensional CAD/CAM to assist in the drawing, design and machining of these parts.

These investments give WFI the ability to produce fittings such as Wyes and Laterals with as near as uniform wall as possible while maintaining the strength of the fitting using the pressure area method of design and finite element analysis where required. WFI understands that uniform wall thickness and smooth rounded external and internal surfaces are extremely important as they relate to both thermal stress and stresses from external forces that these parts experience in service. Seamless Laterals and Wyes, used primarily in high pressure steam lines and in high pressure subsea piping are subject to high thermal and reaction stresses due to excessive section thickness compared to the mating pipe. WFI's unique manufacturing process allows us to produce these parts with maximum radiuses and a more uniform wall thickness which results in greatly reducing these stresses.

SEAMLESS REDUCING LATERAL



SEAMLESS SIZE-ON-SIZE WYE

Specialty Products

WFI specializes in special forgings and fittings of any shape, size or material. Modern forging and machining equipment, in-house engineering and design, in-house heat treatment and a complete metallurgical testing lab make WFI a fast, reliable source for virtually any type of piping or pressure vessel component. We can build from your drawings and specifications or help recommend a stronger, more versatile design.

Swage Nipples*

WFI design provides special integral reinforcement at critical stress concentration areas. Available as concentric and eccentric in all material grades. All end finishes and special reductions are available. Complies to MSS-SP-95.

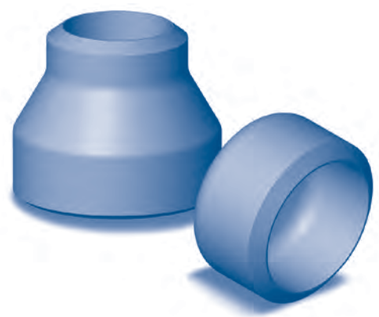
Forged Shapes

Available in hard to find material grades and in reducing sizes. Designed in accordance with B16.9, B16.11 and B16.28. WFI forged shapes guaranteed to meet minimum wall thickness with no thinning.

Stub Ends

Designed in accordance with B16.9 (ASA) or MSS-SP-43. Available in all sizes and material grades.

Reducers & Caps

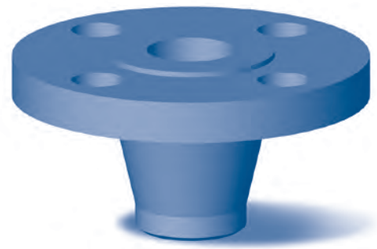


Forged seamless concentric and eccentric reducers designed in accordance with B16.9 and MSS-SP-75. Caps available in butt-weld and threaded configurations in accordance with B16.9, B16.11, ASME Sec I and Sec VIII. These products available in all material grades and sizes.

* Non Commodity Items

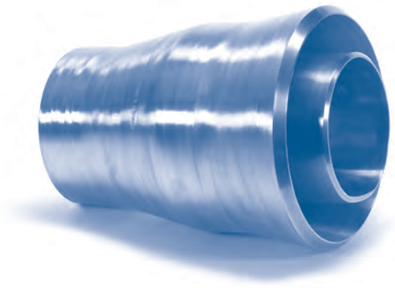
Specialty Products

Flanges



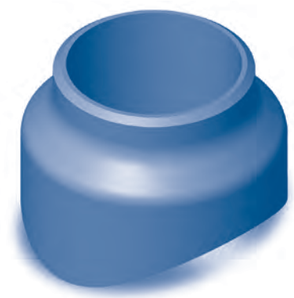
Forged flanges available in all B16, MSS, API, AWWA, and METRIC standards including orifice and anchor flanges. Project specific designs, special materials, and rush deliveries available.

Safe End/Transition Piece



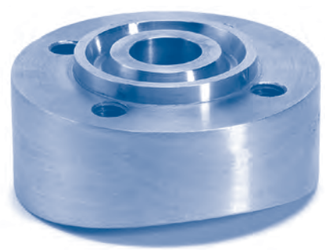
Designed and engineered by WFI or to customers specifications. Available in all material grades and sizes.

Nozzelet®



A traditional insert welding outlet contoured to fit the inside diameter of the run pipe vessel wall. Available in butt-weld and flanged configurations.

Studding Outlet



Designed for mating flanges to vessels or tanks economically. Manufactured for either I.D. or O.D. installation. Available in all flange sizes and pressure ratings. Provides the strength and safety the vessel code requires.

Anchor Flanges

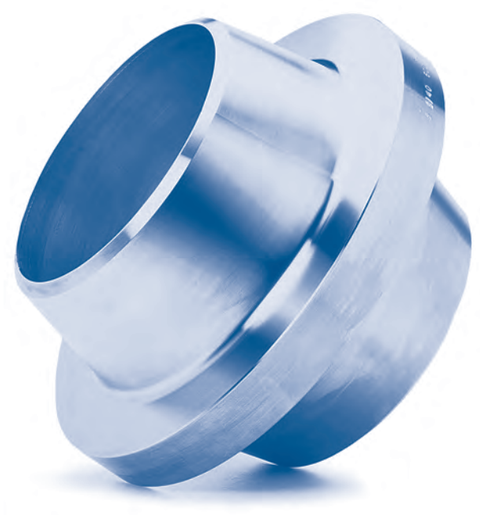
Overview

WELDING NECK ANCHOR FLANGES

Anchor flanges are important elements in many thrust-control systems, especially those protecting pipeline pumping stations. Welded into the line and encased in concrete, they immobilize the pipe at predetermined locations and transfer built-up stresses to external structures.

For example, in cross-county pipelines end forces of considerable magnitude are generated by internal pressure and temperature changes. A 24" O.D. x 0.594" wall pipe in a pipeline operating at 1100 psi and subjected to a 90° rise in metal temperature, for example, will develop total thrust of 1,000,000 lbs. Unless these forces are properly controlled, they can damage pumps, valves and other close-tolerance equipment.

Anchor Flanges may be used to secure subsea piping and risers to platform structures.



Ordering Information

REQUIRED FOR ALL CODES

1. Design Code
2. Material
3. Design Pressure
4. Design Temperature
5. Installation Temperature
6. Allowable Concrete Bearing Stress
7. Corrosion Allowance
8. Run Pipe Diameter
9. Run Pipe Schedule Thickness
10. Other applicable moment and load information

Engineering Specifications

Pipet® Consolidation Chart A105/350 LF2

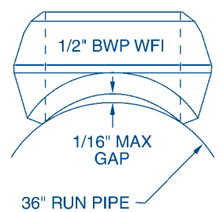
Outlet Size Inches											
1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6
Butt-Weld Pipet, STD (BWP)											
		1 - 1/2 36 - 1 1/4	2 - 3/4 36 - 2 1/2	1 3 1/2 - 1 1/4 36 - 4	1 1/4 2 - 1 1/2 6 - 2 1/2 36 - 8	1 1/2 3 1/2 - 2 36 - 4	2 3 - 2 1/2 6 - 3 1/2 36 - 8	2 1/2 4 - 3 10 - 5 36 - 12	3 4 - 3 1/2 6 - 5 14 - 8 36 - 16	4 6 - 5 10 - 8 20 - 12 36 - 22	6 8 10 14 - 12 18 - 16 24 - 20 34 - 26 42 - 36
Butt-Weld Pipet, XS (BWP)											
		3/4 - 1/2 36 - 1	1 1/2 - 3/4 36 - 2	1 3 -1 1/4 36 - 3 1/2	2 - 1 1/4 5 - 2 1/2 36 - 6	1 1/2 3 1/2 - 2 36 - 4	2 3 - 2 1/2 6 - 3 1/2 36 - 8	2 1/2 4 - 3 10 - 5 36 - 12	3 4 - 3 1/2 6 - 5 14 - 8 36 - 16	4 6 - 5 10 - 8 20 - 12 36 - 22	6 8 10 14 - 12 18 - 16 24 - 20 34 - 26 42 - 36
Socket-Weld Pipet, 3000# (SWP)											
1/4 36 - 3/8	1/2 - 3/8 36 - 3/4	1 - 1/2 36 - 3/4	1 1/4 - 3/4 36 - 1 1/2	1 2 1/2 - 1 1/4 36 - 3	1 1/4 2 - 1 1/2 3 1/2 - 2 36 - 4	1 1/2 2 1/2 - 2 5 - 3 36 - 6	2 3 1/2 - 2 1/2 6 - 4 36 - 8	2 1/2 3 1/2 - 3 6 - 4 36 - 8	3 4 - 3 1/2 6 - 5 14 - 6 36 - 16	4 6 - 5 10 - 8 20 - 12 36 - 22	
Socket-Weld Pipet, 6000# (SWP)											
36 - 1/4	36 - 3/8	1/2 36 - 3/4	1 - 3/4 36 - 1 1/4	1 2 1/2 - 1 1/4 36 - 3	1 - 1/4 4 - 1 1/2 36 - 5	1 - 1/2 2 1/2 - 2 5 - 3 36 - 6	2 3 1/2 - 2 1/2 6 - 4 36 - 8	2 1/2 3 1/2 - 3 6 - 4 18 - 8 36 - 20	3 1/2 - 3 5 - 4 10 - 6 26 - 12 36 - 28	4 5 8 - 6 14 - 10 36 - 16	
Threaded Pipet, 3000# (THP)											
3/8 - 1/4 36 - 1/2	1 - 3/8 36 - 1 1/4	1/2 36 - 3/4	1 1/4 - 3/4 36 - 1 1/2	1 2 1/2 - 1 1/4 36 - 3	1 1/2 - 1 1/4 3 1/2 - 2 36 - 4	1 - 1/2 2 1/2 - 2 5 - 3 36 - 6	2 3 1/2 - 2 1/2 6 - 4 36 - 8	2 1/2 3 1/2 - 3 6 - 4 36 - 8	3 4 - 3 1/2 14 - 6 36 - 16	4 6 - 5 10 - 8 12 16 - 14 20 - 18 36 - 22	
Threaded Pipet, 6000# (THP)											
3/8 - 1/4 36 - 1/2	1 - 3/8 36 - 1 1/4	1/2 36 - 3/4	3/4 2 1/2 - 1 36 - 1 1/2	1 1/4 - 1 2 1/2 - 1 1/4 36 - 3	1 1/2 - 1 1/4 3 1/2 - 2 8 - 4 36 - 10	1 - 1/2 2 1/2 - 2 5 - 3 36 - 6	2 3 1/2 - 2 1/2 6 - 4 36 - 8	2 1/2 3 1/2 - 3 5 - 4 10 - 6 26 - 12 36 - 28	3 3 1/2 4 6 - 5 12 - 8 36 - 14	4 5 6 10 - 8 18 - 12 36 - 20	
45° Lateral Pipets, (BLP-SLP-TLP)											
3/8 - 1/4 36 - 1/2	1 - 3/8 36 - 1 1/4	1/2 36 - 3/4	3/4 2 1/2 - 1 36 - 1 1/2	1 1/4 - 1 2 1/2 - 1 1/4 36 - 3	1 1/2 - 1 1/4 3 1/2 - 2 8 - 4	1 - 1/2 2 1/2 - 2 5 - 3	2 3 1/2 - 2 1/2 6 - 4				

THE PIPET MEANS REDUCED INVENTORY

The chart above outlines the full range of THP, SWP and BWP size consolidation. This chart has been devised and the fitting designed to substantially minimize warehouse inventory. All fittings are manufactured and marked as shown on the chart.

HOW IT WORKS

Each outlet size indicated on the chart is designed to fit a number of Run Pipe sizes, e.g., the 1/2" fitting marked 36 - 1 1/4" x 1/2" will fit all Run Pipe sizes from 1 1/4" to 36". When placed on a 36" Run Pipe, there will be a maximum radial gap of 1/16" between the top of the Run Pipe and the base of the fitting at the crotch as shown on the sketch. This gap is negligible when welding.



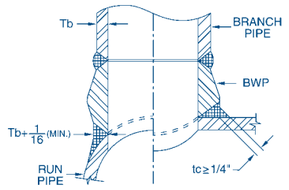
For Run Pipe Consolidations and Branch Pipe Sizes not listed on chart, please contact WFI.

STAINLESS - CHROME - ALLOY PIPET® CONSOLIDATION CHART

Outlet Size Inches											
1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Butt-Weld Pipet, STD (BWP) & Socket-Weld Pipet, 3000# (SWP)											
1/4 36 - 3/8	1/2 - 3/8 36 - 3/4	1 - 1/2 36 - 1 1/4	2 - 3/4 36 - 2 1/2	1 3 1/2 - 1 1/4 36 - 4	1 1/4 2 - 1 1/2 6 - 2 1/2 36 - 8	1 1/2 3 - 2 8 - 3 1/2 36 - 10	2 3 - 2 1/2 6 - 3 1/2 16 - 8 36 - 18	2 1/2 3 1/2 - 3 5 - 4 12 - 6 24 - 14 36 - 26	3 4 - 3 1/2 6 - 5 14 - 8 36 - 16	3 1/2 4 6 - 5 10 - 8 24 - 12 36- 26	4 5 6 10 - 8 20 - 12 36 - 22
Butt-Weld Pipet, XS (BWP)											
36 - 1/4	3/8 36 - 1/2	3/4 - 1/2 36 - 1	1 1/2 - 3/4 36 - 2	1 3 - 1 1/4 36 - 3 1/2	2 - 1 1/4 5 - 2 1/2 36 - 6	1 1/2 2 1/2 - 2 8 - 3 36 - 10	2 3 - 2 1/2 6 - 3 1/2 14 - 8 36 - 16	2 1/2 4 - 3 8 - 5 20 - 10 36 - 22	3 4 - 3 1/2 6 - 5 16 - 8 32 - 18 36 - 34	3 1/2 4 6 - 5 12 - 8 34 - 14 36	4 5 6 10 - 8 20 - 12 36 - 22
Butt-Weld Pipet, S160 (BWP)											
		1/2 36 - 3/4	1 - 3/4 36 - 1 1/4	2 - 1 36 - 2 1/2	1 1/4 4 - 1 1/2 36 - 5	2 1/2 - 1 1/2 6 - 3 36 - 8	2 3 - 2 1/2 10 - 3 1/2 36 - 12	3 - 2 1/2 5 - 3 1/2 18 - 6 36 - 20	3 1/2 - 3 5 - 4 10 - 6 26 - 12 36 - 28		4 5 6 8 14 - 10 36 - 16
Socket-Weld Pipet, 6000# (SWP)											
36 - 1/4	36 - 3/8	1/2 36 - 3/4	1 - 3/4 36 - 1 1/4	2 - 1 36 - 2 1/2	1 1/4 4 - 1 1/2 36 - 5	2 1/2 - 1 1/2 6 - 3 36 - 8	2 3 - 2 1/2 10 - 3 1/2 36 - 12	2 1/2 3 - 3 1/2 6 - 4 18 - 8 36 - 20	3 3 1/2 4 5 6 10 - 8 22-12 26 - 24 36 - 30		4 5 6 8 10 14 - 12 20 - 16 36 - 22
Butt-Weld Pipet, XXS (BWP)											
		36 - 1/2	36 - 3/4	1 36 - 1 1/4	2 1/2 - 1 1/4 36 - 3	4 - 1 1/2 36 - 5	3 1/2 - 2 8 - 4 36 -10	4 - 2 1/2 10 - 5 36 - 12	4 - 3 10 - 5 20 -12 36 - 22		4 6 - 5 14 - 8 36 -16
Socket-Weld Pipet, 9000# (SWP)											
		36 - 1/2	36 - 3/4	1 36 - 1 1/4	2 1/2 - 1 1/4 36 - 3	4 - 1 1/2 36 - 5	3 1/2 - 2 8 - 4 36 -10				
Threaded Pipet, 3000#, 6000# (THP)											
3/8 - 1/4 36 - 1/2	1 - 3/8 36 -1 1/4	1/2 1 1/2 - 3/4 36 - 2	3/4 2 1/2 - 1 36 - 3	1 1/4 - 1 4 - 1 1/2 36 - 5	1 1/2 - 1 1/4 3 1/2 - 2 8 - 4 36 - 10	1 1/2 2 3 1/2 - 2 1/2 10 - 4 36 - 12	2 2 1/2 4 -3 10 - 5 18 - 12 36 - 20	2 1/2 3 1/2 - 3 5 - 4 10 - 6 26 - 12 36 - 28	3 3 1/2 4 6 - 5 12 - 8 36 - 14		4 5 6 10 - 8 18 - 12 36 - 20

THE PIPET MEANS REDUCED INVENTORY

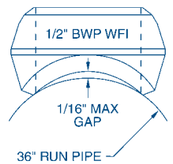
The chart above outlines the full range of THP, SWP and BWP size consolidation. This chart has been devised and the fitting designed to substantially minimize warehouse inventory. All fittings are manufactured and marked as shown on the chart.



REF. FIG. UW-16.1(a) SECTION VIII DIVISION 1

HOW IT WORKS

Each outlet size indicated on the chart is designed to fit a number of Run Pipe sizes, e.g., the 1/2" fitting marked 36 - 1 1/4" x 1/2" will fit all Run Pipe sizes from 1 1/4" to 36". When placed on a 36" Run Pipe, there will be a maximum radial gap of 1/16" between the top of the Run Pipe and the base of the fitting at the crotch as shown on the sketch. This gap is negligible when welding.



For Run Pipe Consolidations and Branch Pipe Sizes not listed on chart, please contact WFI.

ENGINEERING SPECIFICATIONS

LIGHTWEIGHT SCHEDULE 10S, LW, AND CLASS 300 - STAINLESS PIPET CONSOLIDATION CHART

Outlet Size Inches						
1/2	3/4	1	1 1/2	2	3	4
Butt-Weld Pipet, LW or CL300 and Sch. 10S						
1 1/4 - 1/2 36 - 1 1/2	2 1/2 - 1 36 - 3	1 1/2 - 1 4 - 2 36 - 5	2 3 - 2 1/2 10 - 3 1/2 36 - 12	3 - 2 1/2 5 - 3 1/2 18 - 6 36 - 20	3 1/2 4 5 8 - 6 14 - 10 42 - 16	5 6 10 - 8 18 - 12 44 - 20 72 - 46
Butt-Weld Pipet, CL300 x STD.						
1 -1/2 36 - 1 1/4	2 - 3/4 36 - 2 1/2	3 1/2 - 1 1/4 36 - 4	3 - 2 8 - 3 1/2 36 - 10	3 - 2 1/2 6 - 3 1/2 16 - 8 36 - 18	4 - 3 1/2 6 - 5 14 - 8 36 - 16	5 6 10 - 8 20 - 12 36 - 22
Socket Weld Pipet, LW or CL300 x CL 3000, and 10S x CL3000						
1 -1/2 36 - 1 1/4	2 - 3/4 36 - 2 1/2	3 1/2 - 1 1/4 36 - 4	3 - 2 8 - 3 1/2 36 - 10	3 - 2 1/2 6 - 3 1/2 16 - 8 36 - 18	4 - 3 1/2 6 - 5 14 - 8 36 - 16	5 6 10 - 8 18 - 12 44 - 20 72 - 46
Threaded Pipet, LW or CL300 x CL 3000, and 10S x CL3000						
1 1/2 - 3/4 36 - 2	2 1/2 - 1 36 - 3	1 1/4 - 1 4 - 1 1/2 36 - 5	2 3 1/2 - 2 1/2 10 - 4 36 - 12	2 1/2 4 - 3 10 - 5 18 - 12 36 -20	3 1/2 4 6 - 5 12 - 8 36 - 14	4 5 6 10 - 8 18 - 12 36 - 20

THE PIPET MEANS REDUCED INVENTORY

The chart above outlines the full range of THP, SWP and BWP size consolidation. This chart has been devised and the fitting designed to substantially minimize warehouse inventory. All fittings are manufactured and marked as shown on the chart.

HOW IT WORKS

Each outlet size indicated on the chart is designed to fit a number of Run Pipe sizes, e.g., the 1/2" fitting marked 36 - 1 1/4" x 1/2" will fit all Run Pipe sizes from 1 1/4" to 36". When placed on a 36" Run Pipe, there will be a maximum radial gap of 1/16" between the top of the Run Pipe and the base of the fitting at the crotch as shown on the sketch. This gap is negligible when welding.

For Run Pipe Consolidations and Branch Pipe Sizes not listed on chart, please contact WFI.

Notes

Notes

Notes

GENERAL TERMS AND CONDITIONS OF SALE OF: WFI INTERNATIONAL (HEREAFTER REFERRED TO AS "WFI")

WARRANTY	All products are warranted to be free from manufacturing defects for a period of one (1) year from date of shipment, and any found to be defective within that period will be replaced without charge, provided (1) that the product was used as recommended and in accordance with approved installation and operating practices, (2) that its failure resulted from a manufacturing defect and not from damage due to corrosive, abrasive, or other wear normally to be expected in the services involved, (3) that the product was not modified or changed (unless written approval was given by WFI), and (4) that written notice of such defect is delivered to WFI during such one (1) year period. No labor costs or other expense or liability is assumed. The Uniform Commercial Code shall not apply to the sale, nor the Michigan statutes adopting the Uniform Commercial Code. This express warranty is in lieu of and excludes all other warranties, guarantees, or representations, expressed or implied. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.
EXCLUSIONS	Do not use WFI products in aircraft or aerospace applications. No warranties, guarantees or representations of any kind are made with respect to such applications. Purchaser assumes all risks of any use in such applications and will indemnify and hold harmless WFI against and from any claims, costs (including attorney's fees) and liabilities arising out of such use.
PURCHASER'S REMEDIES	The Purchaser's remedies with respect to any product furnished by WFI hereunder that is found not to be in conformity with the terms and conditions of the contract because of breach of contract, breach of express or implied warranty, or negligence shall be limited exclusively to the right of replacement of such defective product or, at our option, repayment of our sale price of the product. In no event shall WFI be liable for claims (based upon breach of contract, breach of express or implied warranty, or negligence) for any other damages, whether direct, immediate, foreseeable, consequential, or special or for any expenses incurred by reason of the use or misuse, sale or fabrication of products which do or do not conform to the terms and conditions of the contract.
PRICES	Prices, and other terms of sale and payment, are subject to change without notice. Unless a contrary provision appears in this price schedule, quotation or order acknowledgment, prices may be withdrawn without notice at any time. Stenographic or clerical errors are subject to correction.
ACCEPTANCE OF ORDERS	All orders are subject to WFI credit department approval prior to acceptance by WFI. No assignment of the Purchaser's rights may be made without the written consent of WFI.
REMITTANCES	All accounts are payable in United States funds, free of exchange, collection, or any other charges. If, in the sole discretion of WFI, the financial condition of the Purchaser at any time so requires, WFI retains the right to require full or partial payment in advance.
PARTIAL SHIP-MENTS AND PAYMENTS	WFI reserves the right to make partial shipments from time to time, and to render invoices therefore, which shall be due and payable as provided in said invoices and the paragraph entitled "Remittances". If the Purchaser becomes overdue in any such partial payment, WFI shall be entitled to suspend work and/or avail itself of other legal remedies.
TAXES	Unless otherwise specifically noted, the amount of any sale, use, occupancy, excise tax, or other tax, of any nature, federal, state, or local for which WFI is legally liable, either initially or through failure of payment by Purchaser, shall be added or be in addition to the price quoted and Purchaser agrees to pay the same to WFI.
SHORTAGES & DAMAGES IN TRANSIT	Claims for shortages must be made in writing within ten days after receipt of shipment, but loss of or damage to material in transit is the responsibility of the carrier.
DELAYS	All promises of shipment are estimated as closely as possible, and we will use our best efforts to ship within the time promised but do not guarantee to do so, and assume no liability for not doing so. Materials stated to be in stock are subject to prior sale.
CANCELLATION & SUSPENSION	The order or contract is subject to cancellation or instructions to suspend or delay work or delivery only upon receipt of written notification and with our consent, and upon agreement to pay WFI's adjustment charge. Orders for special products (usually "price on application" items) may be changed and/or cancelled only upon receipt of written instructions with an expressed agreement to make payment for material used and work already performed.
RETURN OF MATERIAL	No product of our manufacture may be returned without written consent. All goods returned are subject to a handling charge plus freight in both directions and charges for any required reconditioning, unless otherwise specified in writing by WFI.
PATENTS	Purchaser will indemnify and hold harmless WFI against and from any claims, costs (including attorney's fees) and liabilities arising out of any suit alleging infringement of any patents, by any product supplied by WFI under the contract and made in accordance with the design and/or specification furnished by the Purchaser to WFI.
GOVERNING LAW	The contract shall be governed by, construed, and enforced in accordance with the laws of the Commonwealth of Pennsylvania, without regard to conflict of law principles.
NO WAIVER	The failure of WFI to insist, in any one or more instances upon the performance of any of the terms, covenants, or conditions of the contract or to exercise any right thereunder shall not be construed as a waiver or relinquishment of the future performance of any such term, covenant, or condition or the future exercise of such rights, nor shall it be deemed to be a waiver or relinquishment of any other term, covenant, or condition or the exercise of any other rights under the contract.
DIES, TOOLS AND PATTERNS	Dies, tools and patterns required to produce the article quoted on shall remain the property of WFI. Preparation charges for dies, tools and patterns represent only a portion of cost. Payment of such charge does not give you any right, title, or interest in such dies, tools, or other products of preparation. We will not be responsible for retention of dies or patterns on which no orders are received for two years or more.
FORCE MAJEURE	Any delays in or failure of performance of WFI shall not constitute default or give rise to any claims or damages if and to the extent that such delay or failure is caused by occurrences beyond the control of WFI, including but not limited to acts of God or the public enemy, expropriation or confiscation of facilities, compliance with any order or request of any governmental authority, acts of war, rebellion or sabotage or damage resulting therefrom, embargoes or other export restrictions, fires, floods, explosions, accidents, breakdowns, riots or strikes or other conceived acts of workmen, whether direct or indirect, or any other causes whether or not of the same class or kind as those specifically above named which are not within the control of WFI and which by the exercise of reasonable diligence, WFI is unable to prevent or provide against.
PURCHASER'S ACCEPTANCE OF ABOVE CONDITIONS	The contract shall be subject to the terms and conditions contained or referred to in WFI's price schedule, quotation or order acknowledgment and to no others whatsoever. No waiver, alteration, or modification of the terms and conditions in this pri ce schedule, quotation or order acknowledgment shall be binding unless in writing and signed by an authorized representative of WFI.

Note: The material in this catalog is for general information. For specific performance data and proper material selection, consult your WFI representative. Although every attempt has been made to ensure that the information contained in this catalog is correct, WFI reserves the right to change designs, materials or specifications without notice.

WFI 9/17

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