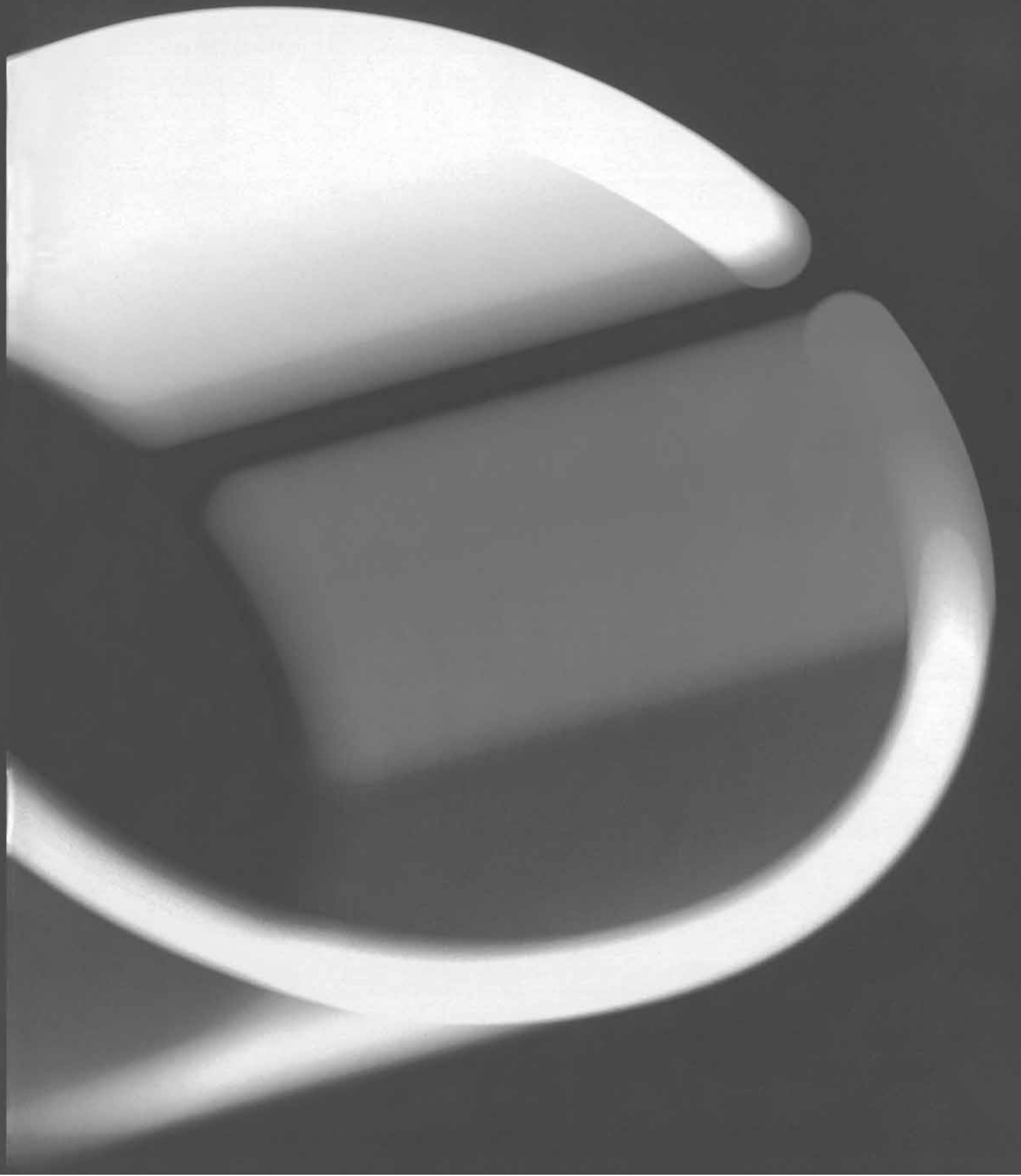
CAT. No. 9863 D

IHARA

IHARA SCIENCE CORPORATION

Fittings for High Pressure Application

高圧管継手



PRODUCT INDEX

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INTRODUCTION

Ihara Science Corporation Is the leading manufacturer of high pressure fittings in Japan with more than 40 years of experience in development, design and production of high pressure fittings backed by track records not only in the hydraulic related industries but also in power generation including nuclear power plants, LNG and chemical plants as well as in steel mills where these fittings have been enjoying a very high share of the market. Users both domestic and overseas have high appraisal for the performance and quality of Ihara's high pressure fittings.

■ FEATURES

(1) A Wide Range of Fittings

- We are striving to be able to perform prompt delivery for a wide range of commonly used fittings but with small volume requirements.
- The design series also include fittings that may not be listed in this catalogue but considered required for piping. Contact us with your requirements.
- Fittings are designed and produced to all standards (which include JIS, ANSI, DIN, ISO, etc.), material and configurations.

(2) All Piping Needs from Software to Hardware

- When the clients can present their specifications for their requirement, an optimum piping design and fabrication can be performed utilizing data accumulated through past experience (strength calculation, stress analysis, empirical values, etc.)
- Our associated company (Ihara Science Engineering) can provide a complete range of services from piping design and pipe preparation to surface treatment.

■ QUALIFICATIONS, APPROVALS AND CERTIFICATIONS

● Classification Societies

Nihon Kaiji Kyokai
American Bureau of Shipping
Det Norske Veritas

● Nuclear Power Approval and Registered Vendor

Mitsubishi Heavy Industries, Ltd.
Hitachi, Ltd.
Toshiba Corp.
Fuji Electric Co., Ltd.
JGC Corporation
Toyo Engineering Corp.

● General Contractors (Registered Vendor)

Shell Internationale Petroleum Maatschappij B.V.
Aramco Overseas Co.,
Bechtel International
Fluor International, Inc.
The M.W. Kellogg Co.,Inc.
Exxon Corp.

● Construction Work Approval

Minister of Construction Approval (General-56) No.6306 (Piping work and equipment and machinery installation work)

FAS STANDARDS (JAPAN HIGH PRESSURE FITTING ASSOCIATION STANDARDS)

Japan High Pressure Fitting Association was established in May, 1973 by 12 high pressure fitting manufacturers, and the Engineering Committee comprised by the member companies established the Japan High Pressure Fitting Association Standards (FAS Standards).
The following 4 Standards have been established by the Engineering Committee:

FAS 101: Steel Socket Weld Type Pipe Fittings for Special Piping Applications.
FAS 102: Steel Threaded Type Pipe Fittings for Special Piping Applications.
FAS 103: 35 MPa (350 kgf/cm^2) Butt Weld Type Pipe Flanges for Hydraulic Applications
FAS 104: 21 MPa (210 kgf/cm^2) Steel Socket Weld Type and Threaded Type Union Pipe Fittings for Special Piping Applications

Only members of the Society have the right to stamp FAS mark (registered trademark) on the products under these standards.

SOCKET WELD PIPE FITTINGS & THREADED PIPE FITTINGS

STANDARD SPECIFICATIONS

1. TYPES OF CONNECTING STEEL PIPES

JIS G3454 (Carbon Steel Pipes for Pressurized Piping) STPG
JIS G3455 (Carbon Steel Pipes for High Pressure Piping) STS
JIS G3456 (Carbon Steel Pipes for High Temperature Piping) STPT
JIS G3458 (Alloy Steel Pipes for Piping) STPA
JIS G3459 (Stainless Steel Pipes for Piping) SUS-TP
JIS G3460 (Steel Pipes for Low Temperature Piping) STPL

2. ASSOCIATED STANDARDS

- JIS B2316 Steel Socket Weld Type Pipe Fittings for Special Piping Applications
- JIS B2291 21 MPa Pipe Flanges for Hydraulic Applications
- JIS F7806 Socket Weld Type Flanges for 280K and 350K Hydraulic Steel Pipes for Ships
- FAS 101: Steel Socket Pipe Fitting Weld Type for Special Piping Applications
- FAS 102: Steel Threaded Pipe Fitting Weld Type for Special Piping Applications
- FAS 103: 35 MPa Butt Weld Type Pipe Flanges for Hydraulic Applications
- FAS 104: 21 MPa Steel Socket Weld Type and Threaded Type Union Pipe Fittings

3. MATERIAL FOR FITTINGS

The material of fittings shall be steel material equivalent to the connecting steel pipes in accordance with Table 1.

Table 1

Division	Pipe Fittings Material	Symbol	Connecting Steel Pipe (reference)	
Carbon Steel	JIS G4051 S25C or ASTM A105	PT410	STPG410, STPT410	For pressurized piping
		———	STS370 STS410	For high pressure piping
Alloy Steel	ASTM A182 F11	PA23	STPA23	For high temperature piping
	ASTM A182 F22	PA24	STPA24	
	ASTM A182 F5	PA25	STPA25	
Stainless Steel	JIS G4303 SUS304	SUS304	SUS304TP	For corrosion resistance, For high temperature piping and low temperature piping
	JIS G4303 SUS304L	SUS304L	SUS304LTP	
	JIS G4303 SU316	SUS316	SUS316TP	
	JIS G4303 SUS316L	SUS316L	SUS316LTP	
	JIS G4303 SUS321	SUS321	SUS321TP	
	JIS G4308 SUS304	SUS304	SUS104TP	
	JIS G4308 SUS316	SUS316	SUS316TP	
	JIS G4318 SUS304	SUS304	SUS304TP	
	JIS G4318 SUS304L	SUS304L	SUS304LTP	
	JIS G4318 SUS316	SUS316	SUS316TP	
	JIS G4318 SUS316L	SUS316L	SUS316LTP	
	JIS G4318 SUS312	SUS321	SUS321TP	
Steel for low temperature	ASTM A350 LF2	PL380	STPL380	For low temperature piping

Note : Material of standard products shall be carbon steel, SUS394 and SUS316.
Note : The main carbon steel material for threaded type pipe fittings shall be S25C (A105).
Note : Threaded pipe fittings machined from hex bar material shall be S25C (JIS G40561), SGD4K (JISG3108) or S45C (JIS G4051) except for unions and air bleeders.
Note : Also material for cold formed nipples (SNP), etc. shall be SWCH25K (JIS G3539).

4. PRESSURE RESISTANCE

1. Socket weld pipe fittings are warranted to withstand pressure equivalent to the hydrostatic test pressure specified in Japanese Industrial Standard (Chapter 4 of JIS B2316) for steel pipes indicated in Table 1, except for unions and flanges.
2. Threaded pipe fittings are warranted not to burst at hydrostatic pressure of 320 kgf/cm^2 and not to leak when retained for 3 minutes except for unions.
3. Refer to applicable pages in regards to unions and flanges.

5. DIMENSIONS AND DIMENSIONAL TOLERANCES

The respective dimensions are noted in the applicable pages, and the applicable dimensional tolerances are as specified in Table 2 of the attached sheet.

Table 2

Items	Types of Pipe Fittings	Nominal Diameter			
		1/8 & 1/4	3/8 – 3/4	1 – 2	2 – 1/2 & 3
		Tolerances			
Socket bore (B)	All pipe fittings	+0.3 0			+0.4 0
Bore diameter (D)		+0.4			+0.8
Eccentricity of socket bore to bore diameter		±0.8			
Difference of socket bore axis to fitting bore axis		Less than 1.5/300			
Dimension from center to socket bottom shoulder (A)	45°elbow, 90°elbow, Tee, Cross	±0.8	±1.5	±2	±2.5
Dimension between socket bottom shoulders (E)	Coupling	±1.5	±3	±4	±5
Dimension from socket bottom shoulder to opposite end (F)	Half Coupling	±0.8	±1.5	±2	±2.5
Outer diameter of threaded pipe fitting	45°elbow, 90°elbow, Tee, Cross	+1.6 −0.5	+2.0 −0.5	+2.0 −1.0	
	Coupling, Boss, etc	+1 −0.5		± 1.8% of OD	
Width across flats	All pipe fittings	Tolerance of type 2, B1 of JIS B1002			
Dimensional tolerances for other than specified above		Class 18 of Table 1 of JIS B0404			

6. THREADS

Threads of the pipe fitting connection ends shall be JIS B0203 (taper threads for pipes) and JIS B0202 (parallel thread for pipes).
Threads for union nuts shall be JIS B0207 (metric fine screw threads).

7. MANUFACTURING PROCESS

1. Pipe fittings are produced by hot or cold forging or machining material specified in Par. 3
2. Pipe fittings are heat treated in accordance with Table 3 after being hot formed.
3. Heat treatment will be performed upon request for fittings made from cold drawn bar material.

Table 3

Material	Heat Treatment
JIS G4051 S25C ASTM A105	As produced Normalizing performed as optional requirement.
ASTM A350 LF2	Normalizing and tempering
ASTM A182 F5, F11, F22	Normalizing and tempering
JIS G4303 SUS304 SUS304L SUS316 SUS316L SUS321	Solution heat treatment

8. INSPECTION

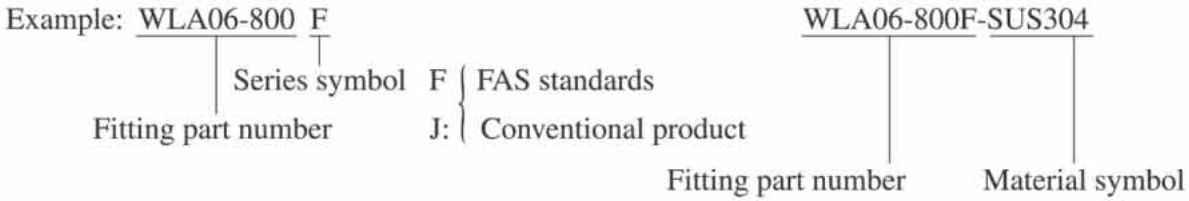
Pipe fittings are inspected at each production stage in accordance with applicable JIS and company inspection standards to insure uniform high quality.

1. Material inspection
   Material used for production of pipe fittings shall satisfy JIS or ASTM as well as company standards.
   Following material inspection shall be performed:
   a. Configuration and dimensional inspection
   b. Visual inspection
   c. Material confirmation inspection
   In additional, following tests shall be performed when required:
   - Liquid penetrant test
   - Ultrasonic test
   - Tensile test
   - Impact test
   - Corrosion test

2. Intermediate inspection
   a) Configuration and dimensional inspection
   b) Visual inspection
3. Final inspection
   a) Configuration and dimensional inspection
   b) Visual inspection

9. PART NUMBERS FOR PIPE FITTINGS

When placing your order indicate your requirements by part numbers shown in the respective pages of this catalogue together with the material symbols.
Material symbol indication is not required for carbon steel.



10. MARKINGS

In principle, pipe fittings shall bear following markings:

1. Socket weld pipe fittings
   a. Trademark
   b. Symbol indicating type of material
   c. Nominal size
   d. Schedule number
   e. Manufacturing lot number

   Note: Manufacturing number markings shall be in principle in accordance with JIS B2316.

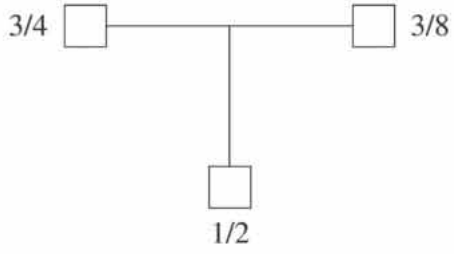
2. Threaded pipe fittings
   a. Trademark
   b. Symbol indicating type of material (not indicated for carbon steel)
   c. Nominal size
   d. Manufacturing lot number

11. OTHER MATTERS

1. Standard reduction fittings are limited to those listed in this catalogue, but other sizes can be made available upon request. When inquiring please observe the following rules:
   a. Two difference size bores
      Indicate the larger bore first ① followed by the smaller bore ②. Indicate in this numerical order.
   b. Three different size bores
      Indicate the larger bore of the two bores on the same center line first ① followed by the bore on the opposite end ②, and then the remaining bore ③.
      Indicate in the numerical order.
   c. Four different bores
      Indicate the largest bore first ① followed by the bore on the opposite end ②, and of the remaining two bores, indicate the larger bore ③ followed by the bore on the opposite end ④. Indicate in this numerical order.

   Example: Steel socket weld reduction Tee: 3/4x 3/8x 1/2 (sch.80)

   Note: In order to preclude any misunderstanding, a simple sketch with size indications as shown is recommended.



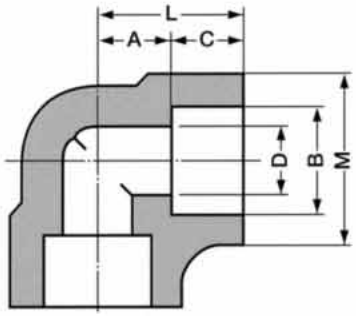
   When the outside bore diameter is the sane diameter as the largest bore diameter in principle, the outside bore diameter shall be the same as indicated in this catalogue in all of the above cases

2. Pipe fittings listed in this catalogue include fittings available from off-the-shelf stock as well as fittings made upon orders, and it is therefore recommended to confirm availability.

3. The manufacturer is constantly implementing improvements on their products, and therefore reserves the right to deviate the actual products to be delivered from the products of this catalogue.

WLA•WTA Socket Weld Pipe Fittings

90° Elbow WLA



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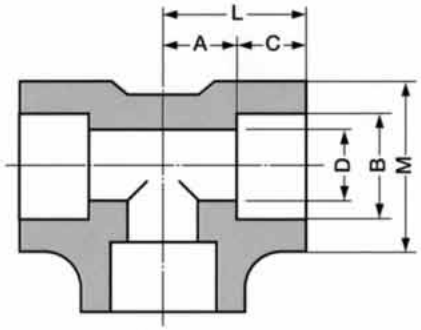
Part No.	Nominal sizes	B	C	D	M	A	L	Weight (kg)
Sch. 80								
WLA02−800F	1/4	14.3	10	9.4	23	11.1	21.1	0.097
WLA03−800F	3/8	17.8	11	12.7	28	13.5	24.5	0.13
WLA04−800F	1/2	22.2	13	16.1	34	15.9	28.9	0.24
WLA06−800F	3/4	27.7	14	21.4	39	19.1	33.1	0.33
WLA08−800F	1	34.5	16	27.2	47	22.2	38.2	0.52
WLA10−800F	1 1/4	43.2	18	35.5	57	27.0	45.0	0.82
WLA12−800F	1 1/2	49.1	19	41.2	64	31.8	50.8	1.05
WLA16−800F	2	61.1	22	52.7	77	38.1	60.1	1.81
WLA20−800F	2 1/2	77.1	26	65.9	96	41.3	67.3	3.17
WLA24−800F	3	90	29	78.1	110	57.2	86.2	5.14
Sch. 160								
WLA04−160F	1/2	22.2	14	12.3	39	19.1	33.1	0.46
WLA06−160F	3/4	27.7	16	16.2	47	22.2	38.2	0.90
WLA08−160F	1	34.5	18	21.2	57	27.0	45.0	1.22
WLA10−160F	1 1/4	43.2	19	29.9	64	31.8	50.8	1.65
WLA12−160F	1 1/2	49.1	22	34.4	77	38.1	60.1	2.95
WLA16−160F	2	61.1	26	43.1	96	41.3	67.3	5.53
WLA20−160F	2 1/2	77.1	29	57.3	110	57.2	86.2	7.93

Dimensions of C,L and M for alloy steel and stainless steel products deviate from the above dimensions.

Tee WTA



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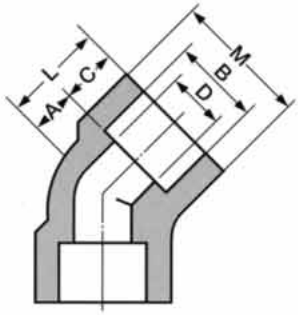
Part No.	Nominal sizes	B	C	D	M	A	L	Weight (kg)
Sch. 80								
WTA02−800F	1/4	14.3	10	9.4	23	11.1	21.1	0.11
WTA03−800F	3/8	17.8	11	12.7	28	13.5	24.5	0.19
WTA04−800F	1/2	22.2	13	16.1	34	15.9	28.9	0.30
WTA06−800F	3/4	27.7	14	21.4	39	19.1	33.1	0.39
WTA08−800F	1	34.5	16	27.2	47	22.2	38.2	0.61
WTA10−800F	1 1/4	43.2	18	35.5	57	27.0	45.0	0.93
WTA12−800F	1 1/2	49.1	19	41.2	64	31.8	50.8	1.18
WTA16−800F	2	61.1	22	52.7	77	38.1	60.1	2.06
WTA20−800F	2 1/2	77.1	26	65.9	96	41.3	67.3	3.51
WTA24−800F	3	90	29	78.1	110	57.2	86.2	5.97
Sch. 160								
WTA04−160F	1/2	22.2	14	12.3	39	19.1	33.1	0.64
WTA06−160F	3/4	27.7	16	16.2	47	22.2	38.2	0.99
WTA08−160F	1	34.5	18	21.2	57	27.0	45.0	1.53
WTA10−160F	1 1/4	43.2	19	29.9	64	31.8	50.8	1.80
WTA12−160F	1 1/2	49.1	22	34.4	77	38.1	60.1	3.70
WTA16−160F	2	61.1	26	43.1	96	41.3	67.3	5.90
WTA20−160F	2 1/2	77.1	29	57.3	110	57.2	86.2	8.98

Dimensions of C,L and M for alloy steel and stainless steel products deviate from the above dimensions.

WLB•WXA

Socket Weld Pipe Fittings

45° Elbow WLB



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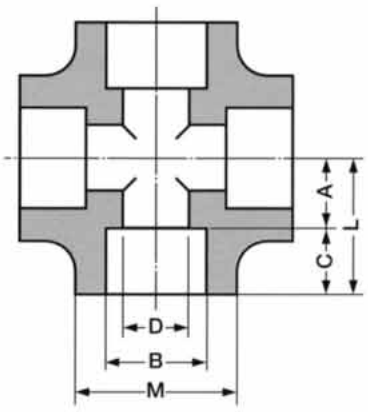
Part No.	Nominal sizes	B	C	D	M	A	L	Weight (kg)
Sch. 80								
WLB02—800F	1/4	14.3	10	9.4	23	7.9	17.9	0.087
WLB03—800F	3/8	17.8	11	12.7	28	7.9	18.9	0.11
WLB04—800F	1/2	22.2	13	16.1	34	11.1	24.1	0.20
WLB06—800F	3/4	27.7	14	21.4	39	12.7	26.7	0.29
WLB08—800F	1	34.5	16	27.2	47	14.3	30.3	0.45
WLB10—800F	1 1/4	43.2	18	35.5	57	17.5	35.5	0.69
WLB12—800F	1 1/2	49.1	19	41.2	64	20.6	39.6	0.92
WLB16—800F	2	61.1	22	52.7	77	25.4	47.4	1.48
WLB20—800F	2 1/2	77.1	26	65.9	96	28.6	54.6	2.38
WLB24—800F	3	90	29	78.1	110	31.8	60.8	3.04
Sch. 160								
WLB04—160F	1/2	22.2	14	12.3	39	12.7	26.7	0.41
WLB06—160F	3/4	27.7	16	16.2	47	14.3	30.3	0.66
WLB08—160F	1	34.5	18	21.2	57	17.5	35.5	1.04
WLB10—160F	1 1/4	43.2	19	29.9	64	20.6	39.6	1.28
WLB12—160F	1 1/2	49.1	22	34.4	77	25.4	47.4	2.24
WLB16—160F	2	61.1	26	43.1	96	28.6	54.6	4.04
WLB20—160F	2 1/2	77.1	29	57.3	110	31.8	60.8	5.92

Dimensions of C,L and M for alloy steel and stainless steel products deviate from the above dimensions.

Cross WXA



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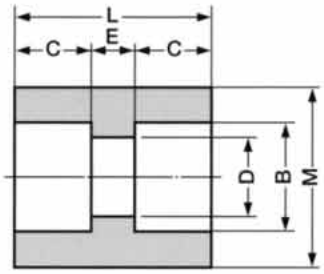
Part No.	Nominal sizes	B	C	D	M	A	L	Weight (kg)
Sch. 80								
WXA02—800J	1/4	14.3	12	9.4	23	11.1	23.1	0.16
WXA03—800J	3/8	17.8	13	12.7	27	13.5	26.5	0.25
WXA04—800J	1/2	22.2	13	16.1	33	15.9	28.9	0.42
WXA06—800J	3/4	27.7	16	21.4	39	19.1	35.1	0.60
Sch. 160								
WXA04—160J	1/2	22.2	15	12.3	39	19.1	34.1	0.78
WXA06—160J	3/4	27.7	16	16.2	47	22.2	38.2	1.20

WFC・WHC Socket Weld Pipe Fittings

Coupling WFC



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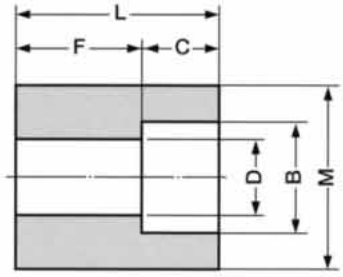
Part No.	Nominal sizes	B	C	D	E	M	L	Weight (kg)
Sch. 80								
WFC02−800F	1/4	14.3	10	9.4	6.4	22	26.4	0.049
WFC03−800F	3/8	17.8	10	12.7	6.4	26	26.4	0.064
WFC04−800F	1/2	22.2	10	16.1	9.5	32	29.5	0.11
WFC06−800F	3/4	27.7	13	21.4	9.5	38	35.5	0.17
WFC08−800F	1	34.5	13	27.2	12.7	46	38.7	0.25
WFC10−800F	1 1/4	43.2	13	35.5	12.7	55	38.7	0.33
WFC12−800F	1 1/2	49.1	13	41.2	12.7	63	38.7	0.43
WFC16−800F	2	61.1	16	52.7	19.1	75	51.1	0.71
WFC20−800F	2 1/2	77.1	16	65.9	19.1	95	51.1	1.17
WFC24−800F	3	90	16	78.1	19.1	110	51.1	1.50
Sch. 160								
WFC04−160F	1/2	22.2	13	12.3	9.5	34	35.5	0.17
WFC06−160F	3/4	27.7	13	16.2	9.5	42	35.5	0.25
WFC08−160F	1	34.5	13	21.2	12.7	52	38.7	0.42
WFC10−160F	1 1/4	43.2	13	29.9	12.7	60	38.7	0.49
WFC12−160F	1 1/2	49.1	16	34.4	12.7	68	44.7	0.70
WFC16−160F	2	61.1	16	43.1	19.1	85	51.1	1.32
WFC20−160F	2 1/2	77.1	16	57.3	19.1	100	51.1	1.60

Half Coupling WHC



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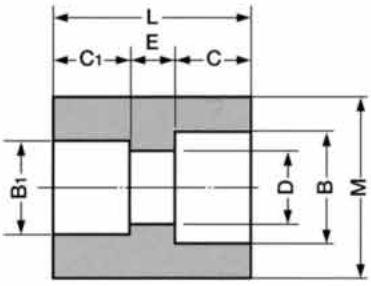
Part No.	Nominal sizes	B	C	D	F	M	L	Weight (kg)
Sch. 80								
WHC02−800F	1/4	14.3	10	9.4	15.9	22	25.9	0.055
WHC03−800F	3/8	17.8	10	12.7	17.5	26	27.5	0.077
WHC04−800F	1/2	22.2	10	16.1	22.2	32	32.2	0.14
WHC06−800F	3/4	27.7	13	21.4	23.8	38	36.8	0.20
WHC08−800F	1	34.5	13	27.2	28.6	46	41.6	0.31
WHC10−800F	1 1/4	43.2	13	35.5	30.2	55	43.2	0.42
WHC12−800F	1 1/2	49.1	13	41.2	31.8	63	44.8	0.57
WHC16−800F	2	61.1	16	52.7	41.3	75	57.3	0.91
WHC20−800F	2 1/2	77.1	16	65.9	42.9	95	58.9	1.56
WHC24−800F	3	90	16	78.1	44.5	110	60.5	2.04
Sch. 160								
WHC04−160F	1/2	22.2	13	12.3	22.2	34	35.2	0.19
WHC06−160F	3/4	27.7	13	16.2	23.8	42	36.8	0.30
WHC08−160F	1	34.5	13	21.2	28.6	52	41.6	0.52
WHC10−160F	1 1/4	43.2	13	29.9	30.2	60	43.2	0.64
WHC12−160F	1 1/2	49.1	16	34.4	31.8	68	47.8	0.89
WHC16−160F	2	61.1	16	43.1	41.3	85	57.3	1.71
WHC20−160F	2 1/2	77.1	16	57.3	42.9	100	58.9	2.18

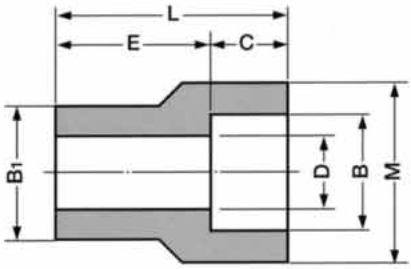
Reducer WRC



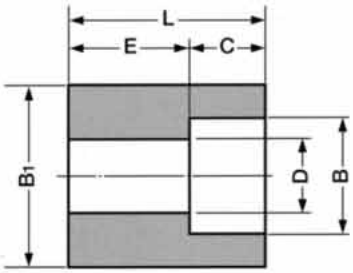
unit:mm

Part No.	Nominal sizes	B	B1	C	C1	D	E	M	L	Weight (kg)
Sch. 80										
WRC03—028F	3/8 × 1/4	17.8	14.3	10	10	9.4	6.4	26	26.4	0.074
WRC04—028F	1/2 × 1/4	22.2	14.3	10	10	9.4	9.5	32	29.5	0.14
WRC04—038F	1/2 × 3/8	22.2	17.8	10	10	12.7	9.5	32	29.5	0.13
WRC06—028F	3/4 × 1/4	27.7	14.3	13	10	9.4	12.5	38	35.5	0.24
WRC06—038F	3/4 × 3/8	27.7	17.8	13	10	12.7	12.5	38	35.5	0.22
WRC06—048F	3/4 × 1/2	27.7	22.2	13	10	16.1	12.5	38	35.5	0.20
WRC08—038F	1 × 3/8	34.5	17.8	13	10	12.7	15.7	46	38.7	0.37
WRC08—048F	1 × 1/2	34.5	22.2	13	10	16.1	15.7	46	38.7	0.35
WRC08—068F	1 × 3/4	34.5	27.7	13	13	21.4	15.7	46	38.7	0.31
WRC10—048F	1 1/4× 1/2	43.2	22.2	13	10	16.1	15.7	55	38.7	0.52
WRC10—068F	1 1/4× 3/4	43.2	27.7	13	13	21.4	12.7	55	38.7	0.47
WRC10—088F	1 1/4× 1	43.2	34.5	13	13	27.2	12.7	55	38.7	0.42
WRC12—068F	1 1/2× 3/4	49.1	27.7	13	13	21.4	12.7	63	38.7	0.66
WRC12—088F	1 1/2× 1	49.1	34.5	13	13	27.2	12.7	63	38.7	0.60
WRC12—108F	1 1/2×1 1/4	49.1	43.2	13	13	35.5	12.7	63	38.7	0.51
WRC16—088F	2 × 1	61.1	34.5	16	13	27.2	22.1	75	51.1	1.21
WRC16—108F	2 ×1 1/4	61.1	43.2	16	13	35.5	22.1	75	51.1	1.08
WRC16—128F	2 ×1 1/2	61.1	49.1	16	13	41.2	22.1	75	51.1	0.98
WRC20—108F	2 1/2×1 1/4	77.1	43.2	16	13	35.5	22.1	95	51.1	1.94
WRC20—128F	2 1/2×1 1/2	77.1	49.1	16	13	41.2	22.1	95	51.1	1.83
WRC20—168F	2 1/2× 2	77.1	61.1	16	16	52.7	19.1	95	51.1	1.56
WRC24—128F	3 ×1 1/2	90	49.1	16	13	41.2	22.1	110	51.1	2.59
WRC24—168F	3 × 2	90	61.1	16	16	52.7	19.1	110	51.1	2.32
WRC24—208F	3 ×2 1/2	90	77.1	16	16	65.9	19.1	110	51.1	1.92
Sch. 160										
WRC06—046F	3/4 ×1/2	27.7	22.2	13	13	12.3	9.5	42	35.5	0.28
WRC08—066F	1 ×3/4	34.5	27.7	13	13	16.2	12.7	52	38.7	0.47
WRC10—046F	1 1/4× 1/2	43.2	22.2	13	13	12.3	2.7	60	38.7	0.66
WRC10—066F	1 1/4× 3/4	43.2	27.7	13	13	16.2	12.7	60	38.7	0.63
WRC10—086F	1 1/4× 1	43.2	34.5	13	13	21.2	12.7	60	38.7	0.58
WRC12—066F	1 1/2× 3/4	49.1	27.7	16	13	16.2	15.7	68	44.7	0.95
WRC12—086F	1 1/2× 1	49.1	34.5	16	13	21.2	15.7	68	44.7	0.90
WRC12—106F	1 1/2×1 1/4	49.1	43.2	16	13	29.9	15.7	68	44.7	0.80
WRC16—086F	2 × 1	61.1	34.5	16	13	21.2	22.1	85	51.1	1.75
WRC16—106F	2 ×1 1/4	61.1	43.2	16	13	29.9	22.1	85	51.1	1.64
WRC16—126F	2 ×1 1/2	61.1	49.1	16	16	34.4	19.1	85	51.1	1.53
WRC20—106F	2 1/2×1 1/4	77.1	43.2	16	13	29.9	22.1	100	51.1	2.29
WRC20—126F	2 1/2×1 1/2	77.1	49.1	16	16	34.4	19.1	100	51.1	2.19
WRC20—166F	2 1/2× 2	77.1	61.1	16	16	43.1	19.1	100	51.1	1.98

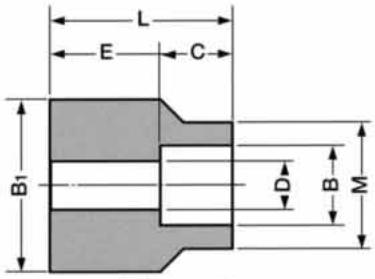
Reducing Insert WRM



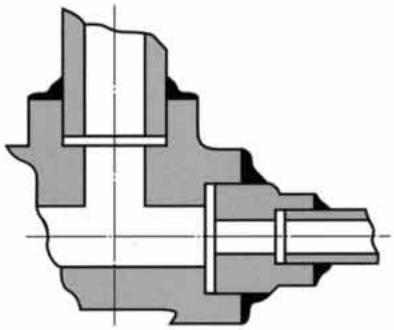
Type 1



Type 2



Type 3



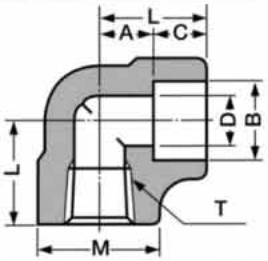
Example of Connection

unit:mm

Part No.	Nominal sizes	TYPE	B	B1	C	D	E	M	L	Weight (kg)
Sch. 80										
WRM03—028J	3/8 × 1/4	1	14.3	17.3	10	9.4	21	22	31	0.049
WRM04—028J	1/2 × 1/4	2	14.3	21.7	10	9.4	15	—	25	0.051
WRM04—038J	1/2 × 3/8	1	17.8	21.7	10	12.7	24	26	34	0.071
WRM06—028J	3/4 × 1/4	2	14.3	27.2	10	9.4	19	—	29	0.11
WRM06—038J	3/4 × 3/8	2	17.8	27.2	10	12.7	19	—	29	0.093
WRM06—048J	3/4 × 1/2	1	22.2	27.2	10	16.1	26	32	36	0.12
WRM08—038J	1 × 3/8	3	17.8	34	10	12.7	28	26	38	0.18
WRM08—048J	1 × 1/2	2	22.2	34	10	16.1	22	—	32	0.16
WRM08—068J	1 × 3/4	1	27.7	34	13	21.4	29	38	42	0.19
WRM10—048J	1 1/4× 1/2	3	22.2	42.7	10	16.1	32	32	42	0.32
WRM10—068J	1 1/4× 3/4	2	27.7	42.7	13	21.4	24	—	37	0.29
WRM10—088J	1 1/4× 1	1	34.5	42.7	13	27.2	28	46	41	0.27
WRM12—068J	1 1/2× 3/4	3	27.7	48.6	13	21.4	36	38	49	0.47
WRM12—088J	1 1/2× 1	2	34.5	48.6	13	27.2	26	—	39	0.36
WRM12—108J	1 1/2×1 1/4	1	43.2	48.6	13	35.5	33	55	46	0.36
WRM16—088J	2 × 1	3	34.5	60.5	13	27.2	35	46	48	0.71
WRM16—108J	2 ×1 1/4	2	43.2	60.5	13	35.5	29	—	42	0.57
WRM16—128J	2 ×1 1/2	1	49.1	60.5	13	41.2	33	63	46	0.54
WRM20—108J	2 1/2×1 1/4	3	43.2	76.3	13	35.7	47	55	60	1.34
WRM20—128J	2 1/2×1 1/2	3	49.1	76.3	13	41.2	42	63	55	1.16
WRM20—168J	2 1/2× 2	2	61.1	76.3	16	52.7	39	—	55	0.94
WRM24—128J	3 ×1 1/2	3	49.1	89.1	13	41.2	51	63	64	2.01
WRM24—168J	3 × 2	3	61.1	89.1	16	52.7	43	75	59	1.56
WRM24—208J	3 ×2 1/2	1	77.1	89.1	16	65.9	44	95	60	1.36
Sch. 160										
WRM06—046J	3/4 ×1/2	1	22.2	27.2	13	12.3	26	34	39	0.16
WRM08—046J	1 ×1/2	2	22.2	34	13	12.3	22	—	35	0.19
WRM08—066J	1 ×3/4	1	27.7	34	13	16.2	29	42	42	0.26
WRM10—046J	1 1/4× 1/2	3	22.2	42.7	13	12.3	29	34	42	0.37
WRM10—066J	1 1/4× 3/4	2	27.7	42.7	13	16.2	27	—	40	0.32
WRM10—086J	1 1/4× 1	1	34.5	42.7	13	21.2	32	52	45	0.43
WRM12—066J	1 1/2× 3/4	3	27.7	48.6	13	16.2	35	42	48	0.55
WRM12—086J	1 1/2× 1	1	34.5	48.6	13	21.2	38	52	51	0.58
WRM12—106J	1 1/2×1 1/4	1	43.2	48.6	13	29.9	36	60	49	0.53
WRM16—086J	2 × 1	3	34.5	60.5	13	21.2	39	52	52	0.92
WRM16—106J	2 ×1 1/4	2	43.2	60.5	13	29.9	37	—	50	0.83
WRM16—126J	2 ×1 1/2	1	49.1	60.5	16	34.4	38	70	54	0.88
WRM20—106J	2 1/2×1 1/4	3	43.2	76.3	13	29.9	46	60	59	1.58
WRM20—126J	2 1/2×1 1/2	3	49.1	76.3	16	34.4	46	68	62	1.58
WRM20—166J	2 1/2× 2	1	61.1	76.3	16	43.1	54	85	70	1.74

SLD·SLE·STD Socket Weld Pipe Fittings

90° Elbow for Special Use SLD

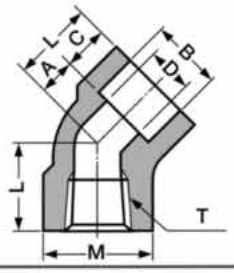


unit:mm

Part No.	Nominal sizes	B	C	D	M	A	L	T (Rc)	Weight (kg)
SLD02—028F	1/4	14.3	10	9.4	23	11.1	21.1	1/4	0.088
SLD03—038F	3/8	17.8	11	12.7	28	13.5	24.5	3/8	0.14
SLD04—048F	1/2	22.2	13	16.1	34	15.9	28.9	1/2	0.21
SLD06—068F	3/4	27.7	14	21.4	39	19.1	33.1	3/4	0.35
SLD08—088F	1	34.5	16	27.2	47	22.2	38.2	1	0.52
SLD10—108F	1 1/4	43.2	18	35.5	57	27.0	45	1 1/4	0.83
SLD12—128F	1 1/2	49.1	19	41.2	64	31.8	50.8	1 1/2	1.15
SLD16—168F	2	61.1	22	52.7	77	38.1	60.1	2	1.93

Dimensions of C,L and M for alloy steel and stainless steel products deviate from the above dimensions.

45° Elbow for Special Use SLE

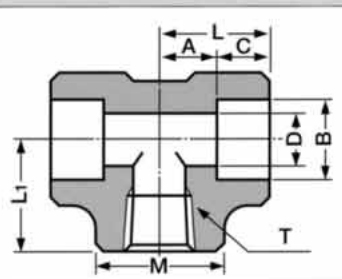


unit:mm

Part No.	Nominal sizes	B	C	D	M	A	L	T (Rc)	Weight (kg)
SLE02—028F	1/4	14.3	10	9.4	23	7.9	17.9	1/4	0.098
SLE03—038F	3/8	17.8	11	12.7	28	7.9	18.9	3/8	0.11
SLE04—048F	1/2	22.2	13	16.1	34	11.1	24.1	1/2	0.18
SLE06—068F	3/4	27.7	14	21.4	39	12.7	26.7	3/4	0.29
SLE08—088F	1	34.5	16	27.2	47	14.3	30.3	1	0.47
SLE10—108F	1 1/4	43.2	18	35.5	57	17.5	35.5	1 1/4	0.70
SLE12—128F	1 1/2	49.1	19	41.2	64	20.6	39.6	1 1/2	0.89
SLE16—168F	2	61.1	22	52.7	77	25.4	47.4	2	1.49

Dimensions of C,L and M for alloy steel and stainless steel products deviate from the above dimensions.

Tee for Special Use STD



unit:mm

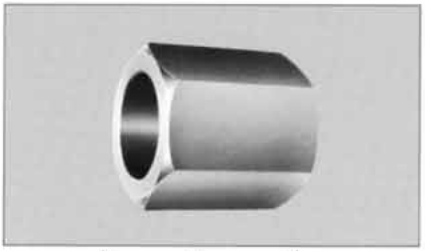
Part No.	Nominal sizes	B	C	D	M	A	L	L1	T (RC)	Weight (kg)
STD02—028F	1/4	14.3	10	9.4	23	11.1	21.1	21.1	1/4	0.12
STD03—038F	3/8	17.8	11	12.7	28	13.5	24.5	24.5	3/8	0.20
STD04—048F	1/2	22.2	13	16.1	34	15.9	28.9	28.9	1/2	0.27
STD06—068F	3/4	27.7	14	21.4	39	19.1	33.1	33.1	3/4	0.41
STD08—088F	1	34.5	16	27.2	47	22.2	38.2	38.2	1	0.66
STD10—108F	1 1/4	43.2	18	35.5	57	27	45	45	1 1/4	0.98
STD12—128F	1 1/2	49.1	19	41.2	64	31.8	50.8	50.8	1 1/2	1.29
STD16—168F	2	61.1	22	52.7	77	38.1	60.1	60.1	2	2.05

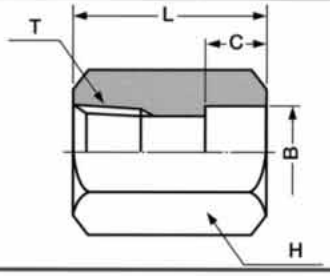
Dimensions of C,L and M for alloy steel and stainless steel products deviate from the above dimensions.

SFD·WLF·SLF

Socket Weld Pipe Fittings

Coupling for Special Use SFD

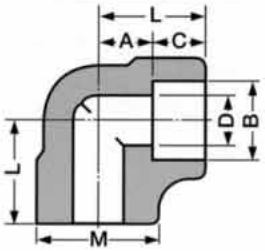




unit:mm

Part No.	Nominal sizes	B	C	L	H (HEX)	T (Rc)	Weight (kg)
SFD02—020J	1/4	14.3	10	30	22	1/4	0.069
SFD03—030J	3/8	17.8	10	30	27	3/8	0.10
SFD04—040J	1/2	22.2	10	40	32	1/2	0.18
SFD06—060J	3/4	27.7	13	43	41	3/4	0.32
SFD08—080J	1	34.5	13	50	46	1	0.41
SFD10—100J	1 1/4	43.2	13	55	55	1 1/4	0.60
SFD12—120J	1 1/2	49.1	13	55	65	1 1/2	0.89
SFD16—160J	2	61.1	16	64	75	2	1.17

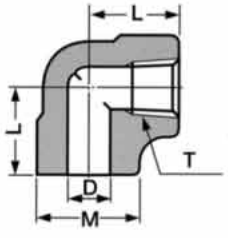
Cylinder Elbow WLF



unit:mm

Part No.	Nominal sizes	B	C	D	M	A	L	Weight (kg)
WLF02—000F	1/4	14.3	10	9	23	11.1	21.1	0.089
WLF03—000F	3/8	17.8	11	11.5	28	13.5	24.5	0.14
WLF04—000F	1/2	22.2	13	15	34	15.9	28.9	0.23
WLF06—000F	3/4	27.7	14	19.5	39	19.1	33.1	0.38
WLF08—000F	1	34.5	16	25	47	22.2	38.2	0.58

Cylinder Elbow SLF

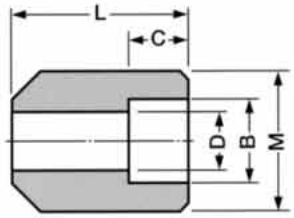


unit:mm

Part No.	Nominal sizes	D	M	L	T (Rc)	Weight (kg)
SLF02—000F	1/4	9	23	$21.1^{\pm 0.8}$	1/4	0.09
SLF03—000F	3/8	11.5	28	$24.5^{\pm 1}$	3/8	0.14
SLF04—000F	1/2	15	34	$28.9^{\pm 1}$	1/2	0.22
SLF06—000F	3/4	19.5	39	$33.1^{\pm 1}$	3/4	0.37
SLF08—000F	1	25	47	$38.2^{\pm 1.5}$	1	0.54

WBA•WBR Socket Weld Pipe Fittings

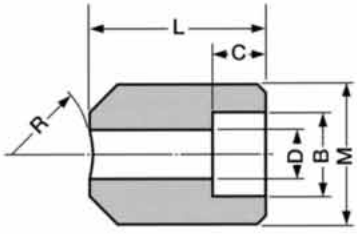
Boss Type A WBA



unit:mm

Part No.	Nominal sizes	B	C	D	M	L	Weight (kg)
Sch. 80							
WBA02—800J	1/4	14.3	10	9.4	22	40	0.085
WBA03—800J	3/8	17.8	10	12.7	26	47	0.13
WBA04—800J	1/2	22.2	10	16.1	32	47	0.19
WBA06—800J	3/4	27.7	13	21.4	38	50	0.26
WBA08—800J	1	34.5	13	27.2	46	50	0.36
WBA10—800J	1 1/4	43.2	13	35.5	55	50	0.45
WBA12—800J	1 1/2	49.1	13	41.2	65	50	0.65
WBA16—800J	2	61.1	16	52.7	75	60	0.88

Boss Type R WBR

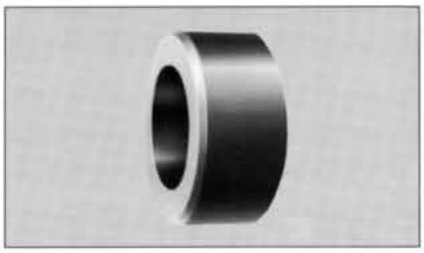


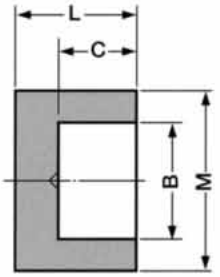
unit:mm

Part No.	Nominal sizes	B	C	D	M	L	R	Weight (kg)
Sch. 80								
WBR02—800J	1/4	14.3	10	9.4	22	40	25	0.085
WBR03—800J	3/8	17.8	10	12.7	26	47	25	0.13
WBR04—800J	1/2	22.2	10	16.1	32	47	30	0.19
WBR06—800J	3/4	27.7	13	21.4	38	50	30	0.26
WBR08—800J	1	34.5	13	27.2	46	50	40	0.35
WBR10—800J	1 1/4	43.2	13	35.5	55	50	45	0.45
WBR12—800J	1 1/2	49.1	13	41.2	65	50	55	0.63
WBR16—800J	2	61.1	16	52.7	75	60	60	0.81

WCA•WUA Socket Weld Pipe Fittings

Cap WCA

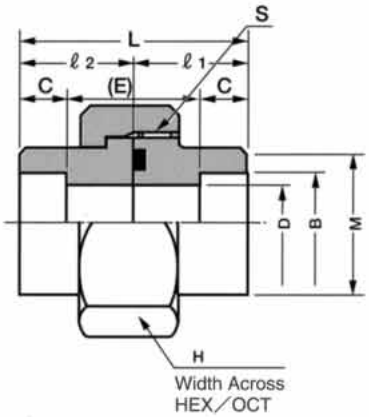




unit:mm

Part No.	Nominal sizes	B	C	M	L	Weight (kg)
Sch. 80						
WCA02—800J	1/4	14.3	10	22	14.5	0.047
WCA03—800J	3/8	17.8	10	26	15.0	0.063
WCA04—800J	1/2	22.2	10	32	19.5	0.095
WCA06—800J	3/4	27.7	13	38	20.0	0.16
WCA08—800J	1	34.5	13	46	21.3	0.25
WCA10—800J	1 1/4	43.2	13	55	22.6	0.41
WCA12—800J	1 1/2	49.1	13	63	23.5	0.54
WCA16—800J	2	61.1	16	75	28.2	0.88
WCA20—800J	2 1/2	77.1	16	95	31.3	1.64
WCA24—800J	3	90	16	110	33.3	2.19
Sch. 160						
WCA04—160J	1/2	22.2	13	34	20.2	0.15
WCA06—160J	3/4	27.7	13	42	21.8	0.23
WCA08—160J	1	34.5	13	52	23.6	0.41
WCA10—160J	1 1/4	43.2	13	60	24.8	0.56
WCA12—160J	1 1/2	49.1	16	68	29.3	0.79
WCA16—160J	2	61.1	16	85	32.4	1.37
WCA20—160J	2 1/2	77.1	16	100	35.2	2.07

Union Type A WUA Based on FAS 104-1994



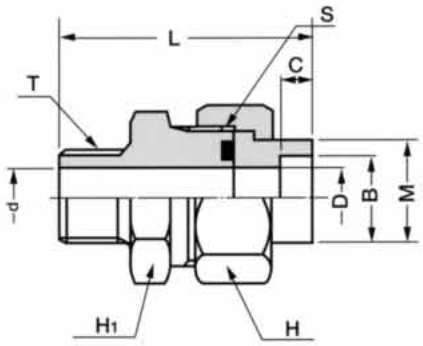
unit:mm

Part No.	Nominal sizes	B	C	D	E	M	ℓ_1	ℓ_2	L	H	S	O-Ring
WUA02—000F	1/4	14.3	10	9.4	22	22	22	20	42	36 (HEX)	M28×1.5	P16
WUA03—000F	3/8	17.8	10	12.7	22	26	22	20	42	41 (HEX)	M32×1.5	P20
WUA04—000F	1/2	22.2	10	16.1	22	32	22	20	42	46 (HEX)	M38×1.5	G25
WUA06—000F	3/4	27.7	13	21.4	30	38	30	26	56	55 (HEX)	M45×2	G30
WUA08—000F	1	34.5	13	27.2	30	46	30	26	56	65 (HEX)	M55×2	G35
WUA10—000F	1 1/4	43.2	14	35.5	30	55	30	28	58	80 (HEX)	M65×2	G45
WUA12—000F	1 1/2	49.1	16	41.2	42	63	38	36	74	85 (OCT)	M72×2	G50
WUA16—000F	2	61.1	16	52.7	42	75	38	36	74	100 (OCT)	M85×2	G65

Note; O-ring is JIS B2401-1B. Rated pressure: 21MPa (210kgs/cm²),operating temperature:Below 120℃
For stainless steel, the nut configuration up to 1[B] (08) is hex.

WUB•WUC Socket Weld Pipe Fittings

Union Type B WUB Based on FAS 104

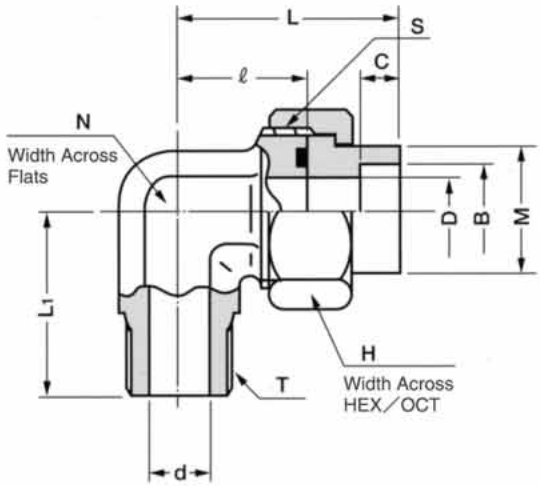


unit:mm

Part No.	Nomimal sizes	Pipe O.D.	D	B	d	M	L	C	H1 (HEX)	H	T (R)	S	O-Ring
WUB02-020F	1/4	13.8	9.4	14.3	7	22	56	10	30	36 (HEX)	1/4	M28X1.5	P18
WUB02-030F	1/4	13.8	9.4	14.3	9	22	61	10	30	36 (HEX)	3/8	M28X1.5	P18
WUB03-030F	3/8	17.3	12.7	17.8	9	26	58	10	36	41 (HEX)	3/8	M32X1.5	P20
WUB03-040F	3/8	17.3	12.7	17.8	12	26	65	10	36	41 (HEX)	1/2	M32X1.5	P20
WUB04-040F	1/2	21.7	16.1	22.2	12	32	63	10	41	46 (HEX)	1/2	M38X1.5	G25
WUB04-060F	1/2	21.7	16.1	22.2	16	32	68	10	41	46 (HEX)	3/4	M38X1.5	G25
WUB06-060F	3/4	27.2	21.4	27.7	16	38	76	13	46	55 (HEX)	3/4	M45X2	G30
WUB06-080F	3/4	27.2	21.4	27.7	20	38	83	13	46	55 (HEX)	1	M45X2	G30
WUB08-080F	1	34.0	27.2	34.5	20	46	82	13	60	65 (HEX)	1	M55X2	G35
WUB08-100F	1	34.0	27.2	34.5	25	46	88	13	60	65 (HEX)	1 1/4	M55X2	G35
WUB10-100F	1 1/4	42.7	35.5	43.2	28	55	89	14	70	80 (HEX)	1 1/4	M65X2	G45
WUB10-120F	1 1/4	42.7	35.5	43.2	32	55	92	14	70	80 (HEX)	1 1/2	M65X2	G45
WUB12-120F	1 1/2	48.6	41.2	49.1	32	63	103	16	75	85 (OCT)	1 1/2	M72X2	G50
WUB12-160F	1 1/2	48.6	41.2	49.1	38	63	108	16	75	85 (OCT)	2	M72X2	G50
WUB16-160F	2	60.5	52.7	61.1	40	75	109	16	90	100 (OCT)	2	M85X2	G65

Rated pressure: 21 MPa (210kgs/cm²)
Operating temperature: Less than 120℃
Note: O-ring is JIS B2401. For stainless steel, the nut configuration up to 1B (08) is hex.

Union Type C WUC Based on FAS 104



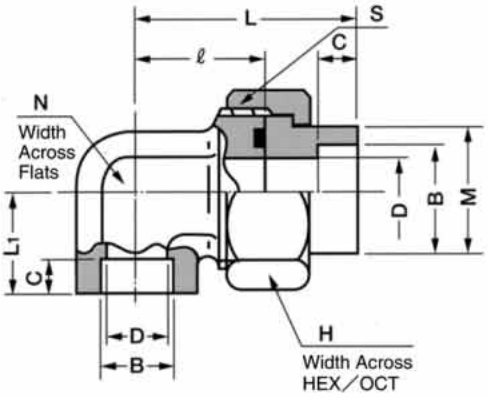
unit:mm

Part No.	Nomimal sizes	Pipe O.D.	B	d	M	L	L1	C	ℓ	N	H	T (R)	S	D	O-Ring
WUC02-020F	1/4	13.8	14.3	7	22	49	32	10	29	22	36 (HEX)	1/4	M28X1.5	9.4	P18
WUC02-030F	1/4	13.8	14.3	9	22	49	33	10	29	22	36 (HEX)	3/8	M28X1.5	9.4	P18
WUC03-030F	3/8	17.3	17.8	9	26	50	38	10	30	27	41 (HEX)	3/8	M32X1.5	12.7	P20
WUC03-040F	3/8	17.3	17.8	12	26	50	40	10	30	27	41 (HEX)	1/2	M32X1.5	12.7	P20
WUC04-040F	1/2	21.7	22.2	12	32	53	45	10	33	30	46 (HEX)	1/2	M38X1.5	16.1	G25
WUC04-060F	1/2	21.7	22.2	16	32	53	47	10	33	30	46 (HEX)	3/4	M38X1.5	16.1	G25
WUC06-060F	3/4	27.2	27.7	16	38	66	52	13	40	36	55 (HEX)	3/4	M45X2	21.4	G30
WUC06-080F	3/4	27.2	27.7	20	38	66	54	13	40	36	55 (HEX)	1	M45X2	21.4	G30
WUC08-080F	1	34.0	34.5	20	46	71	60	13	45	46	65 (HEX)	1	M55X2	27.2	G35
WUC08-100F	1	34.0	34.5	28	46	71	63	13	45	46	65 (HEX)	1 1/4	M55X2	27.2	G35
WUC10-100F	1 1/4	42.7	43.2	28	55	76	72	14	48	50	80 (HEX)	1 1/4	M65X2	35.5	G45
WUC10-120F	1 1/4	42.7	43.2	32	55	76	72	14	48	50	80 (HEX)	1 1/2	M65X2	35.5	G45
WUC12-120F	1 1/2	48.6	49.1	32	63	93	72	16	57	60	85 (OCT)	1 1/2	M72X2	41.2	G50
WUC12-160F	1 1/2	48.6	49.1	40	63	93	82	16	57	60	85 (OCT)	2	M72X2	41.2	G50
WUC16-160F	2	60.5	61.1	40	75	96	82	16	60	65	100 (OCT)	2	M85X2	52.7	G65

Rated pressure: 21 MPa (210kgs/cm²),
Operating temperature: Less than 120℃
Note: O-ring is JIS B2401. For stainless steel, the nut configuration up to 1B (08) is hex.
Also the configuration and dimension of the body are not the same.

WUD•WUH Socket Weld Pipe Fittings

Union Type D WUD Based on FAS 104



unit:mm

Part No.	Nomimal sizes	Pipe O.D.	B	M	L	L1	C	ℓ	N	H	S	O-Ring	D
WUD02—020F	1/4	13.8	14.3	22	50	21	10	30	22	36 (HEX)	M28X1.5	P18	9.4
WUD03—030F	3/8	17.3	17.8	26	52	24	10	32	27	41 (HEX)	M32X1.5	P20	12.7
WUD04—040F	1/2	21.7	22.2	32	54	26	10	34	32	46 (HEX)	M38X1.5	G25	16.1
WUD06—060F	3/4	27.2	27.7	38	67	32	13	41	36	55 (HEX)	M45X2	G30	21.4
WUD08—080F	1	34.0	34.5	46	72	35	13	46	41	65 (HEX)	M55X2	G35	27.2
WUD10—100F	1 1/4	42.7	43.2	55	78	40	14	50	50	80 (HEX)	M65X2	G45	35.5
WUD12—120F	1 1/2	48.6	49.1	63	94	45	16	58	60	85 (OCT)	M72X2	G50	41.2
WUD16—160F	2	60.5	61.1	75	100	55	16	64	70	100 (OCT)	M85X2	G65	52.7

Rated pressure: 21 MPa (210kgs/cm²),
Operating temperature: Less than 120℃
Note: O-ring is JIS B2401. For stainless steel, the nut configuration up to 1B (08) is hex.
Also the configuration and dimension of the body are not the same.