ADDISON SMITH

Mechanical Contractor, Inc.

HPPG 89ki EXPANSION PROJECT

Piping and Piping Specialties Submittal Data

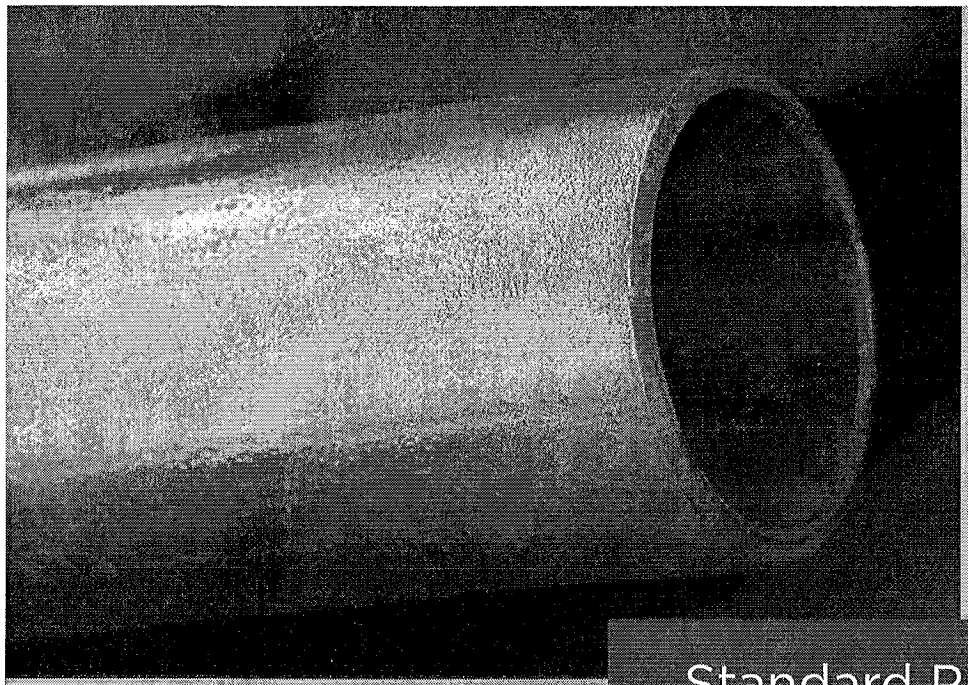
Spec 15090/15305/15311/15700/15705

HPPG DIE CAST AND QUALITY PROJECT

ADDISON SMITH MECHANICAL CONTRACTOR

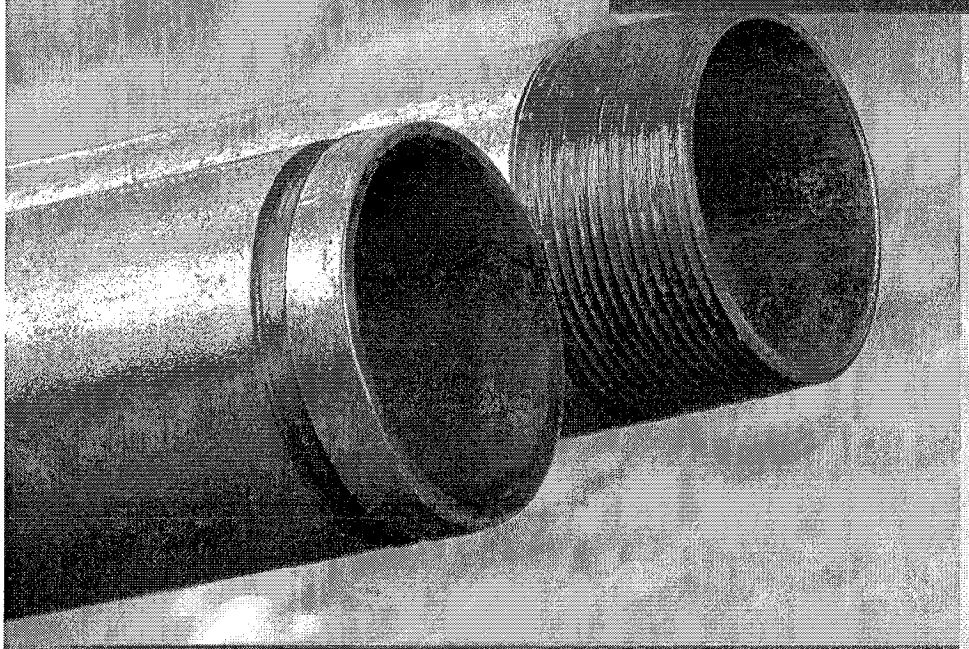
EASTERN INDUSTRIAL SUPPLIES

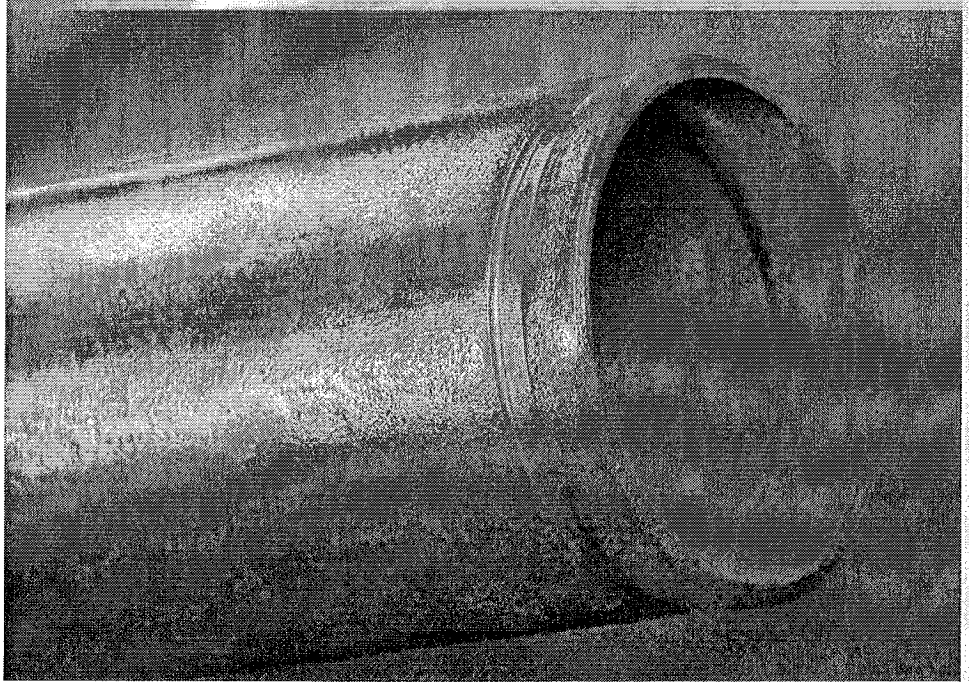
HEATING & COOLING WATER PIPING SUBMITTALS



OR EQUAL BY IMPORT MANUFACTURER

Standard Pipe A53 CW and ERW





Wheatland Tube
JMC STEEL GROUP

OR EQUAL BY IMPORT MANUFACTURER

A53 CW and ERW:

Setting the standard in the standard pipe industry

With a tradition of service and quality that's 80-plus years strong, Wheatland Tube is the only domestic, full-line producer of continuous weld (CW) and electric resistance weld (ERW) ¼ to 12 pipe today. Wheatland is also a worldwide leader in hot-dip galvanization technology.

¼ to 12 nominal sizes produced

⅛ to 12 sizes stocked in a variety of ASTM standards

Standard hot-dip galvanization to ASTM A53 requirements

350 combinations of finish, end treatments and lengths

A Full Line of Pipe Products for Any Application

Wheatland produces pipe of ¼ to 12 nominal sizes and stocks ⅛ to 12 pipe sizes in a variety of ASTM standards. ASTM A53 CW and ERW are used for mechanical and pressure applications, and for ordinary uses in steam, water, gas and air lines.

More than 350 different combinations of finish, end treatments and lengths are available on standard pipe. Our standard process is hot-dip galvanization to the ASTM A53 requirements.

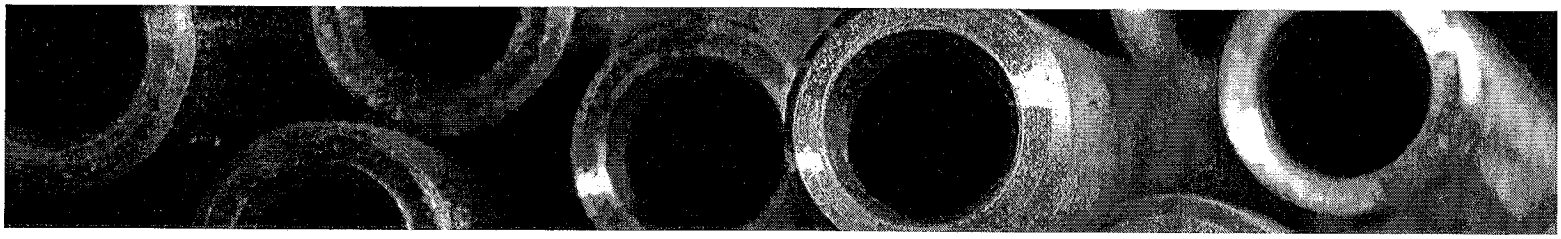
Surface finishes include black, passivate, galvanized, uncoated, pickled, pickled and oiled, bare and soluble oil. End finishes include plain-end, roll groove, cut groove, threaded and coupled, and threads only (one or both ends).

Documented Quality Assurance

Wheatland facilities have quality systems in place and are registered to ISO 9001:2008 Quality Management Systems at minimum. Strategically located in the U.S., we carry a large inventory and can ship quickly to meet your tight delivery schedules.

MADE AND MELTED IN AMERICA

For more information, call **800.257.8182** or visit **wheatland.com**



A53 Electric Resistance Weld Pipe, Type E, Grade B

OR EQUAL BY IMPORT MANUFACTURER

Suitable for welding, threading and grooving

Finish options:
Black and hot-dip galvanized

Sizes:
Schedule 40, 2–12

Produced to ASTM A53/53M, federal specification WW-P404 and ASME B36.10M

ASTM A53 TYPE E WEIGHTS AND DIMENSIONS

TRADE SIZE	OD	NOMINAL WALL THICKNESS	WEIGHT
	in.	in.	lbs./ft.
2	2.375	0.154	3.66
2½	2.875	0.203	5.80
3	3.500	0.216	7.58
4	4.500	0.237	10.80
5	5.563	0.258	14.63
6	6.625	0.280	18.99
8	8.625	0.322	28.58
10	10.750	0.365	40.52
12	12.750	0.375	49.61

HYDROSTATIC AND NON-DESTRUCTIVE ELECTRIC TESTING

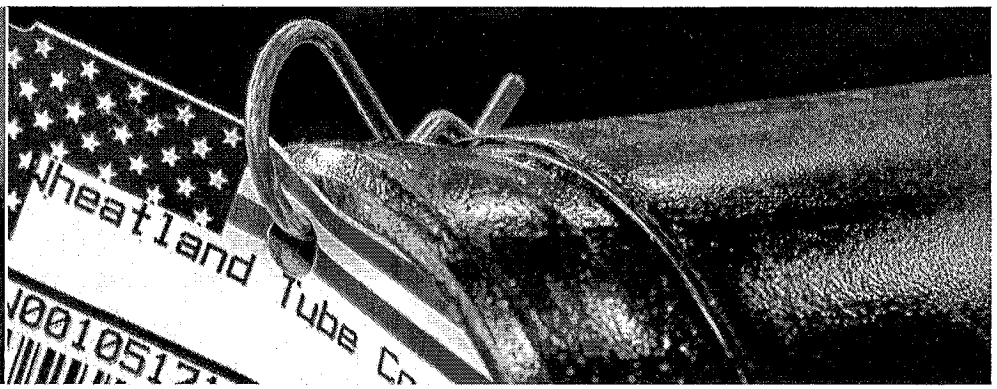
Hydrostatic inspection test pressures for plain-end pipe are listed in Table X 2.2 of the A53/A53M industry specification. Test pressures are maintained for a minimum of five seconds. Non-destructive electric testing of the weld seam is required on each length of ERW pipe NPS 2 and larger.

TENSILE REQUIREMENTS

TENSILE STRENGTH, MIN.	YIELD STRENGTH, MIN.
60,000 psi	35,000 psi

BENDING TEST (COLD)

DEGREE OF BEND	DIAMETER OF MANDREL
90°	12x pipe OD



The continuous weld process creates a uniform grain structure to make bending, cutting and threading easier

Ideal for applications with frequent threading, grooving and bending requirements

Finish options:
Black, passivate, bare, pickled and oiled, and hot-dip galvanized

Sizes:
¼ to 4

Standard and extra heavy

Produced to ASTM A53A 53M, federal specification WW-P404 and ASME B36.10M

TEST PRESSURES (GRADE A)

NOMINAL SIZE	TEST PRESSURE (psi)
¼	700 psi
½	700 psi
¾	700 psi
1	700 psi
1¼	1200 psi
1½	1200 psi
2	2300 psi
2½	2500 psi
3	2220 psi
3½	2030 psi
4	1900 psi

ASTM A53 TYPE F WEIGHTS AND DIMENSIONS

TRADE SIZE	OD	SCHEDULE 40		SCHEDULE 80	
	in.	Wall Inches	Weight lbs./ft.	Wall Inches	Weight lbs./ft.
¼	0.54	0.088	0.43	0.119	0.54
½	0.84	0.109	0.85	0.147	1.09
¾	1.05	0.113	1.13	0.154	1.48
1	1.315	0.133	1.68	0.179	2.17
1¼	1.66	0.14	2.27	0.191	3
1½	1.900	0.145	2.72	0.2	3.63
2	2.375	0.154	3.66	0.218	5.03
2½	2.875	0.203	5.8	0.276	7.67
3	3.5	0.216	7.58	0.3	10.26
3½	4	0.226	9.12	0.318	12.52
4	4.5	0.237	10.8	0.337	15

TENSILE REQUIREMENTS

TENSILE STRENGTH, MIN.	YIELD STRENGTH, MIN.	ELONGATION IN 2
48,000 psi	30,000 psi	Refer to A53 table x 4.1, latest revisions—ASTM A53/A53M

BENDING TEST (Less than NPS 2)

	DEGREE OF BEND	DIAMETER OF MANDREL
Standard	90°	12x pipe OD
Close Coiling	90°	8x pipe OD

FLATTENING TEST—NPS 2 AND GREATER

To test the quality of the weld, we position the weld at 90° from the direction of force and flatten until the OD is ¾ of the original outside diameter. No cracks should occur along the inside or outside surface of the weld.

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STANDARD PIPE SCHEDULE 40 — ASTM A53 GRADES A AND B

TRADE SIZE	DN DESIGNATOR	OD		ID		WALL THICKNESS		NOMINAL WEIGHT (MASS) PER UNIT LENGTH			
		in.	mm	in.	mm	in.	mm	Plain-End (lbs./ft.)	Plain-End (kg/m)	Threads & Couplings (lbs./ft.)	Threads & Couplings (kg/m)
1/8	6	0.405	10.3	0.269	6.8	0.068	1.73	0.24	0.37	0.25	0.37
1/4	8	0.54	13.7	0.364	9.2	0.088	2.24	0.43	0.63	0.43	0.63
3/8	10	0.675	17.1	0.493	12.5	0.091	2.31	0.57	0.84	0.57	0.84
1/2	15	0.84	21.3	0.622	15.8	0.109	2.77	0.85	1.27	0.86	1.27
3/4	20	1.05	26.7	0.824	20.9	0.113	2.87	1.13	1.69	1.14	1.69
1	25	1.315	33.4	1.049	26.6	0.133	3.38	1.68	2.5	1.69	2.500
1 1/4	32	1.66	42.2	1.38	35.1	0.140	3.56	2.27	3.39	2.28	3.4
1 1/2	40	1.900	48.3	1.61	40.9	0.145	3.68	2.72	4.05	2.74	4.04
2	50	2.375	60.3	2.067	52.5	0.154	3.91	3.66	5.44	3.68	5.46
2 1/2	65	2.875	73	2.469	62.7	0.203	5.16	5.8	8.63	5.85	8.67
3	80	3.500	88.9	3.068	77.9	0.216	5.49	7.58	11.29	7.68	11.35
3 1/2	90	4.00	101.6	3.548	90.1	0.226	5.74	9.12	13.57	9.27	13.71
4	100	4.500	114.3	4.026	102.3	0.237	6.02	10.8	16.07	10.92	16.23
5	125	5.563	141.3	5.047	158.2	0.258	6.55	14.63	21.77	14.9	22.07
6	150	6.625	168.3	6.065	154.1	0.28	7.11	18.99	28.26	19.34	28.58
8	200	8.625	219.1	7.981	202.7	0.322	8.18	28.58	42.55	29.35	43.73
10	250	10.75	273	10.02	254.5	0.365	9.27	40.52	60.29	41.49	63.36
12	300	12.75	323	12.00	304.8	0.375	9.52	49.61	73.78	51.28	76.21

EXTRA-HEAVY PIPE SCHEDULE 80 — ASTM A53 TYPE F, GRADE A

TRADE SIZE	DN DESIGNATOR	OD		ID		WALL THICKNESS		NOMINAL WEIGHT (MASS) PER UNIT LENGTH			
		In.	mm	In.	mm	In.	mm	Plain-End (lbs./ft.)	Plain-End (kg/m)	Threads & Couplings (lbs./ft.)	Threads & Couplings (kg/m)
1/8	6	0.405	10.30	0.215	5.5	0.095	2.41	0.31	0.47	0.32	0.46
1/4	8	0.54	13.70	0.302	7.7	0.119	3.02	0.54	0.8	0.54	0.8
3/8	10	0.675	17.1	0.423	10.7	0.126	3.2	0.74	1.1	0.74	1.1
1/2	15	0.84	21.3	0.549	13.9	0.147	3.73	1.09	1.62	1.09	1.62
3/4	20	1.05	26.7	0.742	18.8	0.154	3.91	1.48	2.2	1.48	2.21
1	25	1.315	33.4	0.957	24.3	0.179	4.55	2.17	3.24	2.19	3.25
1 1/4	32	1.66	42.2	1.278	32.5	0.191	4.85	3	4.47	3.03	4.49
1 1/2	40	1.90	48.3	1.5	38.1	0.2	5.08	3.63	5.41	3.65	5.39
2	50	2.375	60.3	1.939	49.3	0.218	5.54	5.03	7.48	5.08	7.55
2 1/2	65	2.875	73	2.323	59	0.276	7.01	7.67	11.41	7.75	11.52
3	80	3.50	88.9	2.9	73.7	0.3	7.62	10.26	15.27	10.35	15.39
3 1/2	90	4.00	101.6	3.364	85.4	0.318	8.08	12.52	18.63	12.67	18.82
4	100	4.500	114.3	3.826	97.2	0.337	8.56	15	22.32	15.2	22.6

PERMISSIBLE VARIATIONS — ASTM A53 GRADES A AND B PIPE

	OD	OVER	UNDER
Outside Diameter	NPS 1/8 to 1 1/2; DN 6 to 40	1/64 (0.4mm)	1/64 (0.4mm)
	NPS 2 and up; DN 50 and up	1%	1%
Wall Thickness at Any Point	—	—	12.5%
Weight	—	10%	10%

Mechanical Properties
Grade A: Yield — 30,000 [205 MPa] psi minimum; Tensile — 48,000 psi [330 MPa] minimum
Grade B: Yield — 35,000 [240 MPa] psi minimum; Tensile — 60,000 psi [415 MPa] minimum

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JMC STEEL GROUP

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Wheatland *Tube*
JMC STEEL GROUP

700 South Dock Street
Sharon, PA 16146

800.257.8182
info@wheatland.com
wheatland.com

JMC *Steel Group*
Pipe and Tube Solutions

Corporate Office
227 West Monroe Street
26th Floor
Chicago, IL 60606

312.275.1600
info@jmcsteelgroup.com
jmcsteelgroup.com

About Wheatland Tube Standard Pipe

Wheatland Tube produces a full line of standard pipe—A53 CW and ERW pipe, lance pipe and seamless pressure pipe. We're the industry leader in hot-dip galvanized pipe, and we offer more than 350 different combinations of finish, end treatments and length on our standard pipe.

All Wheatland manufacturing locations' quality management systems are certified to ISO 9001:2008 requirements.

For more information, contact Wheatland Tube at:
800.257.8182 or **info@wheatland.com**
Or, visit our website at wheatland.com

The Strength to **Deliver**

SP-031113

OR EQUAL BY IMPORT MANUFACTURER

Wheatland *Tube*
JMC STEEL GROUP

SUBMITTAL DATA
Rev. 04/27/05

ASTM A 53 TYPE E GRADE B PIPE

SCOPE

Covers black and hot-dipped galvanized electric-resistance welded Grade B pipe. Pipe is intended for mechanical and pressure applications and is acceptable for ordinary uses in steam, water, gas and air lines. Wheatland ASTM A 53 is UL Listed and FM Approved, sizes 1" through 6" nominal, for use in Fire Sprinkler Pipe Applications. Pipe is suitable for welding, threading and grooving. Produced to the latest revision of ASTM A 53/ 53M, Federal Specification WW-P404 and ASME B36.10M.

MANUFACTURE

The weld seam shall be heat treated after welding to a minimum of 1400 °F or be otherwise processed in such a manner that no untempered martensite remains.

HOT-DIPPED GALVANIZED

The average weight of zinc coating shall be not less than 1.8 oz. per sq. ft. of surface (inside and outside).

When galvanized pipe is bent or otherwise fabricated to a degree which causes zinc coating to stretch or compress beyond the limit of elasticity, some flaking of the coating may occur.

HYDROSTATIC AND NONDESTRUCTIVE ELECTRIC TESTING

Hydrostatic inspection test pressures for plain-end pipe are listed in Table X 2.2 of the A53/A 53M specification. Test pressures shall be maintained for a minimum of five seconds.

Nondestructive electric testing of the weld seam is required on each length of ERW pipe NPS 2 and larger.

CHEMICAL REQUIREMENTS

Composition, max. %

Carbon	Manganese	Phosphorus	Sulfur
.30	1.20	.05	.045

*Copper	*Nickel	*Chromium	*Molybdenum	*Vanadium
.40	.40	.40	.15	.08

*The combination of these five elements shall not exceed 1.00%.

TENSILE REQUIREMENTS

Tensile Strength, min.	60 000 psi
Yield Strength, min.	35 000 psi
Elongation in 2"	Refer to A 53 Table x 4.1

BENDING TEST (COLD)

	For NPS 2 and under
Degree of Bend	90°
Diameter of Mandrel	12 x outside pipe diameter

FLATTENING TEST

As a test for ductility of the weld for pipe 2-1/2" NPS and larger, position the weld at 0° and alternately at 90° to the direction of force and flatten until the OD is 2/3 of the original outside diameter. No cracks shall occur along the inside or outside surface of the weld.

FREQUENCY OF TESTS

Tensile tests are required on one length of pipe from each lot of 500 lengths or fraction thereof for each size. Refer to A 53 specification for frequency of flattening tests.

END FINISH

Plain End: NPS 2 and larger, STD and XS weights: ends beveled to angle of 30°, +5°, -0° with a root face of 1/16" ± 1/32"

Threaded: To ANSI Standard B 1.20.1
Couplings: To ASTM Standard A 865

DIMENSIONS AND WEIGHTS

PERMISSIBLE VARIATIONS IN WALL THICKNESS
Minimum wall thickness at any point shall not be more than 12.5% under nominal wall thickness specified.

PERMISSIBLE VARIATIONS IN OUTSIDE DIAMETER
Pipe NPS 2 and larger shall not vary more than + 1% from the standard specified.

STANDARD (SCH. 40) BLACK PLAIN END			
Nominal Size	O.D. Inches	Nominal Wall	Weight/ Lb. Ft
2"	2.375	.154	3.66
2-1/2"	2.875	.203	5.80
3"	3.500	.216	7.58
4"	4.500	.237	10.88
5"	5.563	.258	14.63
6"	6.625	.280	18.99
8"	8.625	.322	28.58
EXTRA STRONG (SCH.80) BLACK PLAIN END			
Nominal Size	O.D. Inches	Nominal Wall	Weight/ Lb. Ft
2"	2.375	.218	5.03
2-1/2"	2.875	.276	7.67
3"	3.500	.300	10.26
4"	4.500	.337	15.00

PERMISSIBLE VARIATIONS IN WEIGHT PER FOOT.

Pipe shall not vary more than ± 10% from the standard specified.

PRODUCT MARKING

Each length of pipe is continuously stenciled to show the manufacturer, the grade of pipe (ASTM A 53), the kind of pipe E for Electric Resistance Welded, B for Grade B, the size, XS for extra strong, and length. Stencil markings indicate UL Listing and FM Approval for sizes 1" through 6" nominal for use in Fire Sprinkler Pipe Applications. Bar coding is acceptable as a supplementary identification method.

PIPE VALVES FITTINGS VALVE AUTOMATION PLUMBING SUPPLIES

EASTERN

Pipe Specification A53

Specification	A53 NPS 1/8 – 26 STD. XS and XXS, ANSI Schedules 10 through 160
Scope	Covers Seamless and Welded, Black and hot-dipped galvanized nominal (average) wall pipe for coiling, bending, flanging and other special purposes and is suitable for welding. Continuous-Welded pipe is not intended for flanging. Purpose for which pipe is intended should be stated on order.
Kinds of Steel Permitted For Pipe Material	Open-hearth Basic-oxygen Electric-furnace
Hot-Dipped Galvanizing	Sets standards for coating of pipe with zinc inside and outside by the hot-dipped process. Weight of coating must not average less than 1.8 oz. Per square foot and not less than 1.6 oz. Per square foot.
Permissible Variations in Wall Thickness	The minimum wall thickness at any point shall not be more than 12.5% under the nominal wall thickness specified.
Chemical Requirements	C max % / Mn max % / P max % / S max % Seamless or ERW Grade A 0.25 / 0.95 / 0.05 / 0.06 Grade B 0.30 / 1.20 / 0.05 / 0.06 Continuous-weld - / - / 0.08 / 0.06
Tensile Requirements	Continuous-Welded / Seamless and Electric-resistance-welded Grade A / Grade B Tensile Strength, min., psi.....45,000 / 48,000 / 60,000 Yield Strength, min., psi.....25,000 / 30,000 / 35,000
Hydrostatic Testing	Hydrostatic inspection test pressures for plain end and threaded and coupled pipe are specified. Hydrostatic pressure shall be maintained for not less than 5 seconds for all sizes of seamless and electric resistance-weld pipe.
Permissible Variations in Weights per Foot	Plus or Minus 10%
Permissible Variations in Outside Diameter	Outside Diameter at any point shall not vary from standard specified more than – For NPS 1 1/2 and Smaller Sizes: 1/64 " / 1/32" under For NPS 2 and Larger Sizes: 1% over / 1% under
Mechanical Tests Specified	Tensile Test – Transverse required on ERW for NPS 8 and large. Bending Test (Cold) – STD and XS-NPS 2 and under XXS-NPS 1 1/4 and under. Degree of Bend / Diameter of Mandrel For Normal A53 Uses: 90 / 12 x nom. dia. of pipe For Close Coiling: 180 / 8 x nom. dia. of pipe Flattening Test – NPS 2 and larger STD and XS. (Not required for XXS pipe).
Number of Tests Required	Seamless and Electric-Resistance-Welded – Bending, flattening, tensile on one length of pipe from each lot of 500 lengths or less of a size. Continuous-Weld – Bending, flattening, tensile NPS 1 1/2 & smaller: one/25 tons NPS 2 & larger: one/50 tons
Lengths	Standard Weight Single Random – 16' - 22'. 5% may be jointers. If Plain Ends – 5 % may be 12' - 16'. Double Random – Shortest Length 22', minimum average for order 35'. Extra Strong & Double Extra Strong Single Random – 12' - 22'. 5% may be 6' - 12'. Double Random (XS and lighter) – Shortest Length 22', minimum average for order 35'. Lengths longer than single random with wall thicknessess heavier than XS subject to negotiation.
Required Markings on Each Length (On Tags attached to each Bundle in case of Bundled Pipe)	Rolled, Stamped or Stenciled (Mfgrs. Option) Name or brand of manufacturer. Kind of pipe, that is, Continuous Welded, Electric-Resistance-Welded A, Electric-Resistance-Welded B, Seamless A; or Seamless B; XS for extra strong, XXS for double extra strong. ASTM A53 Length of pipe.
General Information	Couplings – Applied handling tight. Couplings, 2" and smaller straight tapped, other sizes taper tapped. Thread Protection – Applied to pipe 4" and large. End Finish (unless otherwise specified) – STD or XS, or wall thicknesses less than 0.500 in. (excluding XXS): Plain and beveled. All XXS and wall thicknesses over 0.500 in.: Plain end square cut.

574 New Market Depot Road
P. O. Box 218
New Market, VA 22844
540 740-4700

PRODUCT STANDARDS and CERTIFICATION

CMC Howell Metal copper tubing products are manufactured to current industry standards for chemical, mechanical, and cleanliness using the guidelines of American Society of Testing and Material (ASTM) standards, Federal Specifications WWT-775B and WWT-799B, National Fire Protection Association standard for Health Care Facilities NFPA99, Compressed Gas Association G-4.1, and NSF-61-G. All tubing is 100% eddy current tested for defects in accordance with ASTM testing requirements.

CMC Howell Metal copper tubing products are manufactured from UNS C12200 grade copper (Copper 99.9% minimum, Phosphorus 0.015 – 0.040% range), are seamless, and are free of mercury and asbestos and do not contact mercury or asbestos bearing equipment in any phase of manufacturing, storage, or shipping.

SEAMLESS COPPER WATER TUBE – Types K, L, & M **ASTM B-88, E-243, NSF-61-G**

Restriction Statement: "Seamless Copper tube (Alloy C12200) is certified by NSF to ANSI/NSF Standard 61 for public water supplies meeting, or in the process of meeting the U.S. EPA Lead and Copper Rule (56FR26460, June 7, 1991). Water supplies with pH less than 6.5 may require corrosion control to limit copper solubility in drinking water".

SEAMLESS COPPER WATER TUBE – Type DWV **ASTM B-306, E-243**

SEAMLESS COPPER TUBE FOR MEDICAL GAS SYSTEMS **ASTM B-819, E-243**

Manufactured tubes undergo a cleaning process and are then plugged and charged with dry nitrogen with the exception of "K/OXY" which is cleaned, purged with dry nitrogen and capped.

SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERATION FIELD SERVICE **ASTM B-280, E-243**

Manufactured straight length tubes undergo a cleaning process and are then plugged and charged with nitrogen.
Manufactured coiled length tubes undergo a cleaning process and are then purged with dry nitrogen and capped.

All tubing manufactured by CMC Howell Metal labeled as "ACR", "ACR/OYX", "L/OXY", or "K/OXY" is manufactured to meet the cleanliness requirements of 0.0035 g/ft^2 maximum as required by the guidelines of ASTM B-280 or B-819 as applicable. A certificate of cleanliness conformity is delivered with ACR and Medical Gas products.

All manufactured material printed or incised
"HOWELL", "HOWELL USA", "CMC HOWELL", or "CMC HOWELL USA"
is proudly made in the United States of America from No. 1 recycled scrap copper
and compliant with the "Buy American" Section (1605),
of the American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

Larry Roberts
Manager, Quality Control

OR EQUAL BY IMPORT MANUFACTURER

®WELDBEND

Flange Summary Data Sheet

Even with all the advances in technology today, the wholly welded piping system has for decades remained the best choice for use in high pressure and high temperature application. Many piping jobs in schools, industrial plants, refineries, and factories have benefited from the inherent advantages of a completely welded system. It becomes a closed container joining pipes, valves, fittings, and flanges. A welded joint actually becomes part of the pipe, minimizing leak potential. This provides greater margins of safety, especially under conditions of high internal pressures. Additionally, welding fittings form a continuous metal structure with the pipe, adding forged-in strength to any piping system. Furthermore, smooth forged flanges simplify insulation and take up less space.

Chemical requirements (in %):

Carbon	Manganese	Phosphorus (max)	Sulfur (max)
.35 max	.60-1.05	.035	.040

Silicon	Copper	Nickel	Chromium
.10-.35	.40 max	.40 max	.30 max

Molybdenum	Vanadium	Columbium
.12 max	.08 max	.02 max

Mechanical requirements:

Tensile Strength (min)	70,000 psi
Yield Strength (min)	36,000 psi
Basic minimum elongation for walls 5/16 in. and over in thickness, strip tests.	30%
Reduction of area (min)	30%
Hardness, HB (max)	187

ASTM A 105

Scope

This standard covers forged carbon steel piping components for ambient- and higher-temperature service in pressure systems. Flanges are ordered either to dimensions specified by the purchaser or to dimensional specifications such as ASME 16.5 and API 6A. Forgings made to ASTM A 105 are normally limited to a maximum weight of 10,000 lb.

Materials

Weldbend flanges are made by hammering, pressing, rolling and/or machining cast or forged bars, billets or slabs. These adhere to the extent described in the following sections.

Manufacture

ASTM A 105 covers the requirements for forged steel components as finished products only.
The requirements for raw materials are covered by the standards specified in Section 2: Referenced Documents of ASTM A 105.

Heat Treatment

Heat treatment is not a mandatory requirement of this specification except for the following piping components:
* Flanges above Class 300,
* Flanges of special design where the design pressure at the design temperature exceeds the pressure-temperature ratings of Class 300, Group 1.1,
* Flanges of special design where the design pressure or design temperature is not known.

Heat treatment, when required by the above, shall be annealing, normalizing, normalizing and tempering, or quenching and tempering in accordance with ASTM A 961.

Dimensions

Weldbend flanges are manufactured in accordance with ASME B 16.5 (24" NPS and smaller) and ASME B 16.47 (26" - 60" NPS).

Certification

For forgings made to specified dimensions agreed upon by the purchaser, and for forgings made to dimensional standards, the application of identification marks, as required by ASTM A 961, shall be the certification that the forgings have been furnished in accordance with the requirements of this standard. The specification designation included on test reports shall include the year of issue and revision letter, if any.
Test Reports: When test reports are required, Weldbend will also provide the following, if applicable:
*Type of heat treatment,
*Tensile property results, i.e., yield strength and ultimate strength in ksi, elongation and reduction in area, in percent,
*Chemical analysis results,
*Hardness results, and,
*Any supplementary testing required by the purchase order.

Product Marking

All flanges shall have the prescribed information stamped or otherwise suitable marked on each flange in accordance with the Standard/MSS SP-25. A Weldbend flange is marked as follows:
Weldbend's Name, Nominal Pipe Size, A105/SA105, Bore Designation, Heat Identification Number and manufacture date.

Note: All information contained in this document, and for a complete description of all requirements, refer to ASTM A 105. Sheets are subject to change without notice.

OR EQUAL BY IMPORT MANUFACTURER

®WELDBEND

Fitting Summary Data Sheet

Even with all the advances in technology today, the wholly welded piping system has for decades remained the best choice for use in high pressure and high temperature application. Many piping jobs in schools, industrial plants, refineries and factories have benefited from the inherent advantages of a completely welded system. It becomes a closed container joining pipes, valves, fittings, and flanges. A welded joint actually becomes part of the pipe, minimizing leak potential. This provides greater margins of safety, especially under conditions of high internal pressures. Additionally, welding fittings form a continuous metal structure with the pipe, adding forged-in strength to any piping system. Furthermore, smooth forged fittings simplify insulation and take up less space.

Chemical requirements (in %):

Carbon	Manganese	Phosphorus (max)	Sulfur (max)
.30 max	.29-1.06	.050	.058

Silicon	Chromium	Molybdenum	Nickel	Copper
.10 min	.40 max	.15 max	.40 max	.40 max

Vanadium	Columbium
.08 max	.02 max

Mechanical requirements:

Tensile Strength		60,000-85,000 psi
Yield Strength (min)		35,000 psi
Elongation	- Longitudinal:	22%
	- Transverse:	14%

ASTM A 234

Scope

This standard covers wrought carbon steel fittings of seamless and welded construction which are manufactured to the dimensional specifications of ASME B16.9 and B16.28. These fittings are primarily for use in pressure piping and in pressure vessel fabrication for service at moderate and elevated temperatures.

Materials

The starting material for fittings shall consist of killed steel, forgings, bars, plates, seamless or fusion-welded tubular products with filler metal added and shall conform to the the chemical requirements of ASTM A 234. Unless otherwise specified, carbon steel plates may be either coarse grain or fine grain practice.

Manufacture

Forging or shaping operations are performed by hammering, pressing, piercing, extruding, upsetting, rolling, bending, machining, or by a combination of two or more of these operations. The forming process shall be applied so that it will not produce injurious imperfections in the fittings.

Heat Treatment

Hot-formed WPB fittings, upon which the final forming operation is completed at a temperature above 1150°F and below 1800°F, need not be heat treated. Cold-Formed WPB fittings, upon which the final forming operation is completed at a temperature below 1150°F, shall be normalized, or shall be stress relieved at 1100°F to 1275°F.

Dimensions

Butt-welding fittings and butt-welding short radius elbows and returns purchased in accordance with this specification shall conform to the dimensions and tolerances given in the latest revision of ANSI B16.9 and B16.28, respectively.

Certification

When requested by the purchaser, the manufacturer shall provide a certificate of compliance to this specification. If requested to provide test reports, the manufacturer shall also provide the following where applicable:

* Chemical analysis results. When the amount of an element is less than .02%, the analysis for that element is reported as "<0.02%."
* Tensile property results, report the yield strength and ultimate strength in ksi [or MPa] and elongation in percent,
* Hardness acceptable in accordance with Section 10 of ASTM A-234,
* Seamless or Welded,
* Type of Heat Treatment, if any,
* Starting material, specifically pipe, plate, etc.,
* Statement regarding radiographic or ultrasonic examination.
* Any supplemental testing required by the purchase order.

Product Marking

All fittings shall have the prescribed information stamped or otherwise suitable marked on each fitting in accordance with ASTM A 234/MSS SP-25. A Weldbend fitting is marked as follows: Weldbend's Name, Nominal Pipe Size, Pipe Wall Thickness Designation, Material Grade (WPB/WPC) and Heat Identification Number.

Note: All information contained in this document, and for a complete description of all requirements, refer to ASTM A 105. Sheets are subject to change without notice.

STANDARD PACKING LISTS &
PRODUCT SPECIFICATIONS

STANDARD SPECIFICATIONS MALLEABLE IRON PIPE FITTINGS

CLASS	150 lbs.	300 lbs.
MATERIALS	ASTM A 197/ A 197 M, EQUIVALENT TO EN 1562	ASTM A 197/ A 197 M
DIMENSIONS	ASME B 16.3, ASME B 16.14, DIN EN 10242, EQUIVALENT TO BS 143 & 1256 : 2000	ASME B 16.3, ASME B 16.14
FLANGES DIMENSION	NA	NA
UNION DIMENSIONS	ASME B16.39, DIN EN 10242	ASME B16.39
THREADS	ANSI / ASME B 1.20.1, BS 21, DIN 2999, ISO 7-1	ANSI / ASME B 1.20.1
TENSILE STRENGTH	Min. 40,000 psi (28.4 kgf/mm.□)	Min. 40,000 psi (28.4 kgf/mm.□)
ELONGATION	Min. 5%	Min. 5%
ZINC COATING	ASTM A 153/A, 153M	ASTM A 153/A, 153M
WORKING PRESSURE	Class150 psi. at 350□F	Class 300 psi. at 550□F

QUALITY SYSTEM ISO 9001:2000

SA QUALITY POLICY

S = Satisfy Customers.
I = Improvement Continually.
A = At acceptable price and cost.
M = Management Leadership.

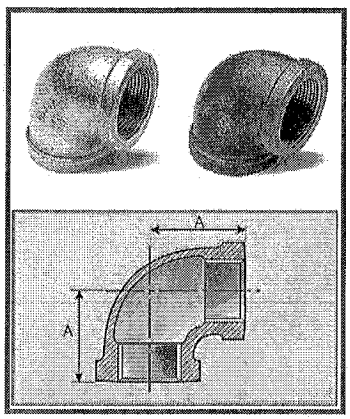
All product and services provided by Siam Fittings Co., Ltd. Shall conform to the standard requirements and by our customers. Each employee is responsible for his or her input to the procurement, production, support, delivery service, corporate with supplier of management provided.

We are committed to continually improving all products and services and to maintain Siam Fittings as Quality Leader in our field, by Involvement of people, Leadership, Process approach, System approach to management and making decision base on fact.

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

ELBOWS 90°

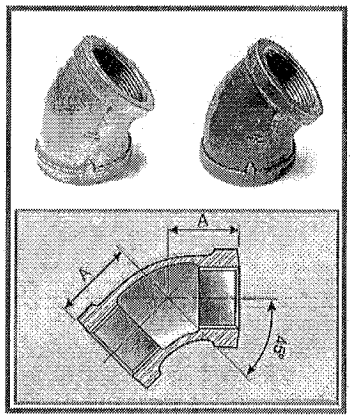
AL 90, BL 90



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	50	600	12	0.0260	16
1/4	20.6	35	420	12	0.0490	21
3/8	24.1	90	360	4	0.0730	26
1/2	28.4	50	200	4	0.1080	22
3/4	33.3	35	105	3	0.1670	18
1	38.1	20	60	3	0.2660	16
1 1/4	44.5	20	40	2	0.4290	17
1 1/2	49.3	15	30	2	0.5220	16
2	57.2	8	16	2	0.7980	13
2 1/2	68.6		12	1	1.3180	16
3	78.2		8	1	2.4605	20
3 1/2	86.9		4	1	3.1930	13
4	96.3		2	1	4.1205	8
5	114.3		2	1	6.8386	14
6	132.0		1	1	8.6000	9

ELBOWS 45°

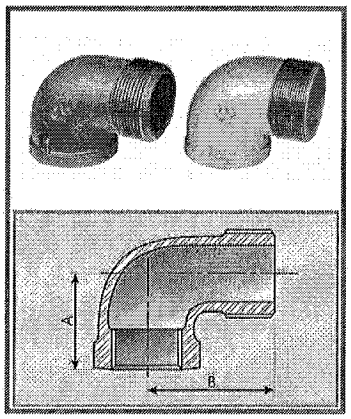
AL 45, BL 45



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	16.0	50	600	12	0.0330	20
1/4	18.5	30	360	12	0.0516	19
3/8	20.3	75	300	4	0.0710	21
1/2	22.3	50	200	4	0.1090	22
3/4	24.9	40	120	3	0.1608	19
1	28.4	20	60	3	0.2530	16
1 1/4	32.8	20	40	2	0.3850	15
1 1/2	36.3	10	30	3	0.5054	15
2	42.7	12	24	2	0.8180	20
2 1/2	49.5		12	1	1.2170	15
3	55.1		10	1	1.9690	20
4	66.3		4	1	3.4248	14
5	77.5		2	1	4.8500	10
6	87.9		1	1	5.8016	6

STREET ELBOWS 90°

ASL 90, BSL 90



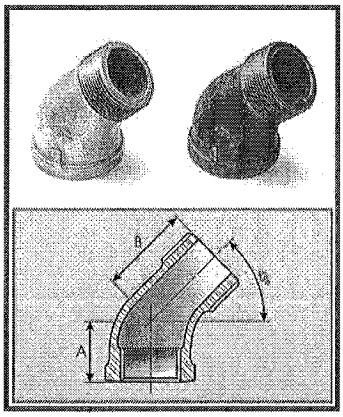
Size (inch)	Dimensions A	Dimensions B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	25.4	60	720	12	0.0290	21
1/4	20.6	30.2	35	420	12	0.0440	18
3/8	24.1	36.6	60	240	4	0.0770	18
1/2	28.4	41.4	60	180	3	0.1150	21
3/4	33.3	48.0	35	105	3	0.1890	20
1	38.1	54.3	45	90	2	0.2590	23
1 1/4	44.5	62.2	25	80	2	0.4566	23
1 1/2	49.3	68.3	9	27	3	0.6000	16
2	57.2	82.8	8	16	2	1.0026	16
2 1/2	68.6	98.0	5	10	2	1.2870	13
3	78.2	114.5		8	1	2.5950	21
4	96.3	144.5		4	1	4.7604	19
5	114.3	174.2		1	1	5.5000	6
6	130.3	204.0		1	1	9.2500	9

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

STREET ELBOWS 45°

ASL 45, BSL 45

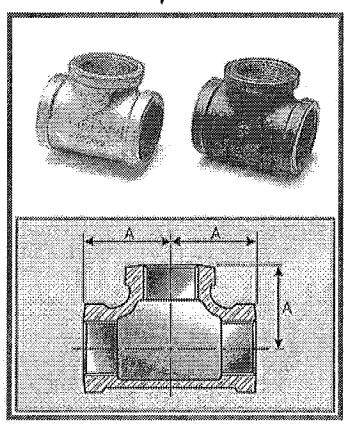
Size (inch)	Dimensions A	Dimensions B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	16.0	21.0	70	840	12	0.0225	19
1/4	18.5	23.9	40	480	12	0.0590	28
3/8	20.3	26.2	100	400	4	0.0600	24
1/2	22.3	33.0	75	225	3	0.1030	23
3/4	24.9	37.5	40	120	3	0.1502	18
1	28.4	43.0	25	75	3	0.2508	19
1 1/4	32.8	47.4	10	40	4	0.3450	14
1 1/2	36.3	51.7	10	30	3	0.5130	15
2	42.7	60.4	12	24	2	0.8014	19
2 1/2	49.5	69.0	6	12	2	1.1660	14
3	55.1	80.2	3	6	2	1.6000	10
4	66.3	99.0		4	1	3.7700	15



TEES

AT, BT

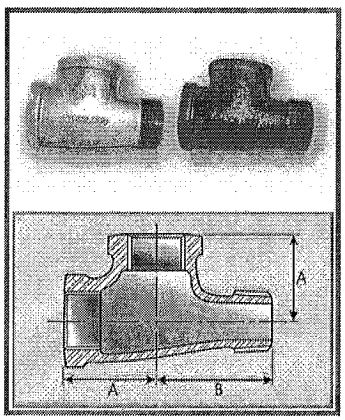
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	120	480	4	0.0405	19
1/4	20.6	75	300	4	0.0730	22
3/8	24.1	45	180	4	0.1105	20
1/2	28.4	40	120	3	0.1580	19
3/4	33.3	35	70	2	0.2498	17
1	38.1	20	40	2	0.3840	15
1 1/4	44.5	14	28	2	0.6230	17
1 1/2	49.3	12	24	2	0.7910	19
2	57.2	8	16	2	1.1540	18
2 1/2	68.6	4	8	2	1.7080	14
3	78.2		6	1	2.8910	17
4	96.3	1	2	2	5.3120	11
5	114.3		1	1	7.4630	7
6	132.0		1	1	11.1600	11



SERVICE TEES

AST, BST

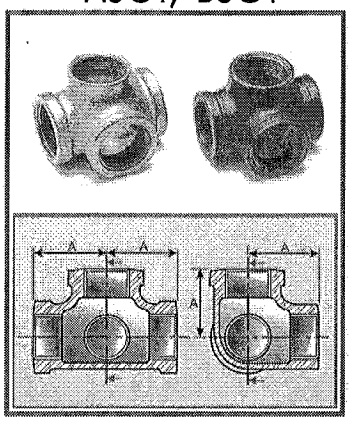
Size (inch)	Dimensions A	Dimensions B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	28.4	41.4	40	120	3	0.1400	17
3/4	33.3	48.0	25	75	3	0.2500	19
1	38.1	54.3	20	40	2	0.4040	16
1 1/4	44.5	62.2	15	30	2	0.6460	19
1 1/2	49.3	68.3	12	24	2	0.8120	19
2	57.2	82.8	8	16	2	1.2900	21



MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

SIDE OUTLET TEES

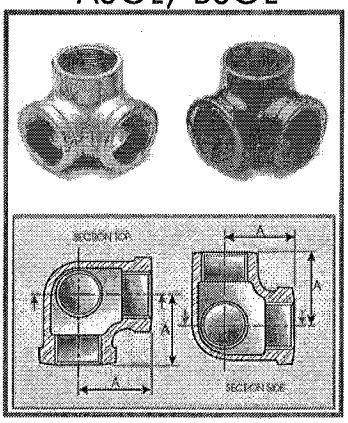
ASOT, BSOT



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/8	24.1	40	160	4	0.1140	18
1/2	28.4	25	100	4	0.1720	17
3/4	33.3	15	60	4	0.2622	16
1	38.1	20	40	2	0.4042	16
1 1/4	44.5	12	24	2	0.6300	15
1 1/2	49.3	8	16	2	0.7500	12
2	57.2	4	8	2	1.1710	9

SIDE OUTLET ELBOWS

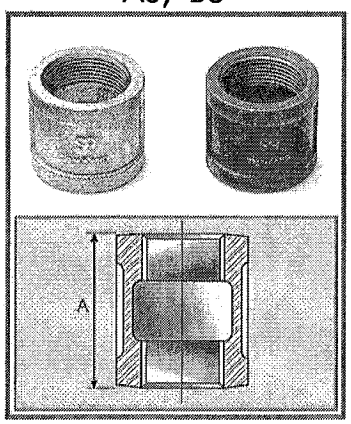
ASOL, BSOL



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	45	540	12	0.0390	21
1/4	20.6	75	300	4	0.0680	20
3/8	24.1	50	200	4	0.1050	21
1/2	28.4	45	135	3	0.1358	18
3/4	33.3	20	80	4	0.2130	17
1	38.1	20	40	2	0.3560	14
1 1/4	44.5	15	30	2	0.5914	18
1 1/2	49.3	12	24	2	0.7060	17
2	57.2	5	10	2	1.1260	11

COUPLINGS

AS, BS



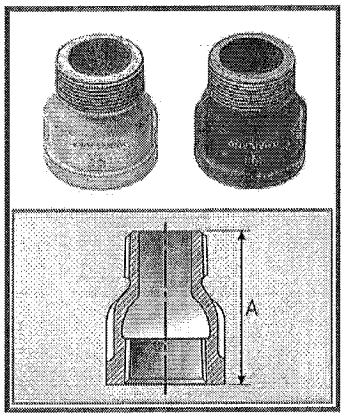
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	24.4	70	840	12	0.0260	22
1/4	26.9	40	480	12	0.0400	19
3/8	29.5	40	480	12	0.0600	29
1/2	34.0	60	240	4	0.0884	21
3/4	38.6	50	150	3	0.1384	21
1	42.4	25	100	4	0.2056	21
1 1/4	49.0	16	64	4	0.2940	19
1 1/2	54.6	18	36	2	0.4104	15
2	64.3	12	24	2	0.6826	15
2 1/2	73.2	8	16	2	1.0988	18
3	80.8		12	1	1.5472	19
4	93.7	3	6	2	2.8326	17
5		1	2	2	3.3000	7
6			2	1	5.0993	10

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

EXTENSION PIECES

AX, BX

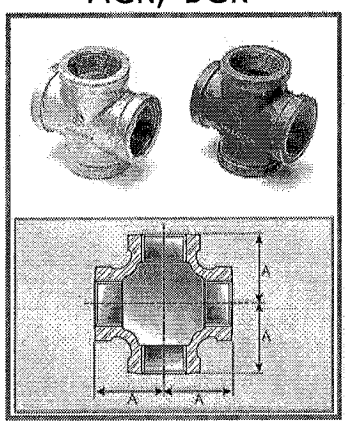
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/8	32	40	480	12	0.0480	23
1/2	40	75	300	4	0.0720	22
3/4	48	40	160	4	0.1272	20
1	65	30	90	3	0.2000	18
1 1/4	60	30	60	2	0.3000	18
1 1/2	65	20	40	2	0.3970	16
2	70	15	30	2	0.6000	18



CROSSES

ACR, BCR

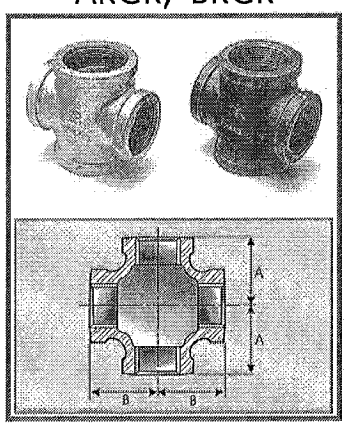
Size (inch)	Dimensions A	Inner Box B	Master Ctn. Pcs./Box	NO. of Pcs./Ctn.	Weight/Pcs. Inner Box	N.W./Ctn. (Kgs.)
1/8	17.5	30	360	12	0.0510	18
1/4	20.6	60	240	4	0.0800	19
3/8	24.1	50	150	3	0.1228	18
1/2	28.4	30	90	3	0.2050	18
3/4	33.3	20	60	3	0.3130	19
1	38.1	15	30	2	0.4838	15
1 1/4	44.5	10	20	2	0.7110	14
1 1/2	49.3	8	16	2	0.8660	14
2	57.2	5	10	2	1.4740	15
2 1/2	68.6	3	6	2	2.0520	12
3	78.2	2	4	2	3.4970	14
4	96.3	1	2	2	6.7000	13
5	114.3		1	1	8.0000	8
6	132.0		1	1	13.0000	13



REDUCING CROSSES

ARCR, BRCR

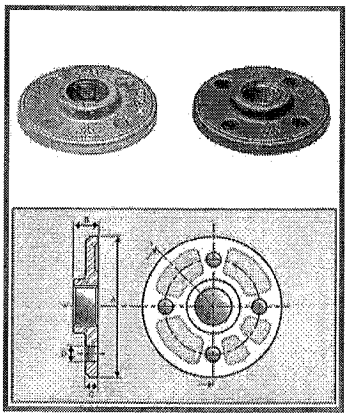
Size (inch)	Dimensions A	Dimensions B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1 1/2 X 1 1/4	46.2	47.8	9	18	2	0.9060	16
2 X 1 1/4	48.3	53.3	5	10	2	1.1880	11
2 1/2 X 1 1/4	52.0	62.0	4	8	2	1.4510	12
2 1/2 X 1 1/2	56.0	63.0	4	8	2	1.5430	12



MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

FLOOR FLANGES, FLANGES "D"

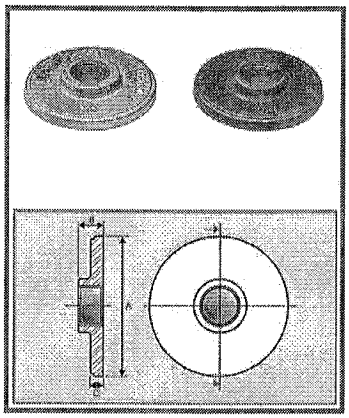
AFF, FD



Size (inch)	Dimensions A	B	C	D	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/8	88.9	14.3	7.2	6.4	25	75	3	0.2760	21
1/2	88.9	14.3	7.2	6.4	25	50	2	0.2860	14
3/4	88.9	15.9	7.9	6.4	15	45	3	0.3400	15
1	101.6	17.5	8.7	6.4	15	30	2	0.4830	14
1 1/4	101.6	19.1	8.7	6.4	10	30	3	0.4900	15
1 1/2	114.3	22.2	9.5	8.0	8	24	3	0.6480	16
2	139.7	25.4	10.3	8.0	8	16	2	1.0150	16
2 1/2					4	12	3	1.2400	15
3					4	8	2	1.7100	14
4					3	6	2	2.5890	16
5	255.0	32.5	13.5	19.0		4	1	4.3620	17
6						4	1	5.5786	22

ROUND FLANGES

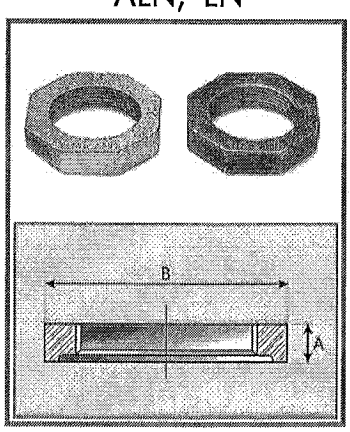
F



Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	95.0	15	5.0	25	50	2	0.2860	14
3/4	102.0	14	5.0	15	45	3	0.3400	15
1	114.0	16	5.0	15	30	2	0.4830	14
1 1/4	120.0	18	6.8	10	30	3	0.4900	15
1 1/2	138.0	19	6.8	8	24	3	0.6480	16
2	152.0	21	8.0	8	16	2	1.0150	16
2 1/2	165.0	24	8.0	4	12	3	1.2400	15
3	-	-	-	4	8	2	1.7100	14
4	-	-	-	3	6	2	2.5890	16
5	254.6	45	15.0		4	1	4.0000	16
6	284.0	50	15.0		4	1	5.5786	22

LOCKNUTS

ALN, LN



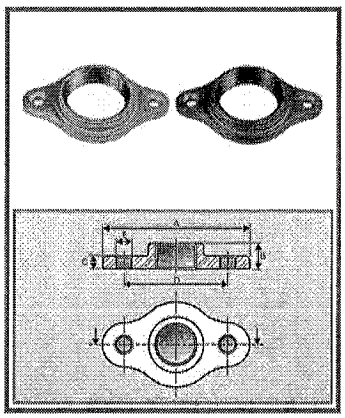
Size (inch)	Dimensions A	B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	5.0	17.5	250	3000	12	0.0080	24
1/4	6.6	21.3	125	1500	12	0.0117	18
3/8	7.3	25.4	125	1500	12	0.0150	23
1/2	8.1	30.0	150	600	4	0.0380	23
3/4	8.8	36.3	90	360	4	0.0590	21
1	9.9	44.6	60	240	4	0.0880	21
1 1/4	10.9	53.3	45	180	4	0.1220	22
1 1/2	12.1	59.7	45	165	3	0.2150	29
2	13.7	73.2	25	75	3	0.2550	19
2 1/2	15.2	98.0	20	40	2	0.5150	21
3	17.2	117.3	20	40	2	0.6090	24
4	20.5	147.1	7	14	2	1.1660	16
5	-	-	5	10	2	2.1980	22
6	-	-	4	8	2	3.2300	26

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

WASTENUTS

AWN

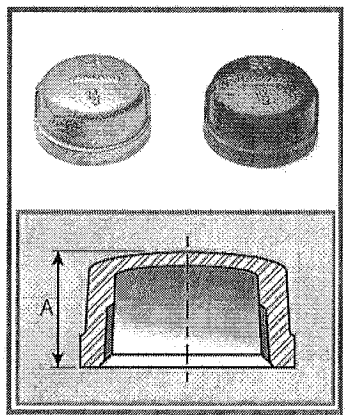
Size (inch)	Dimensions A	B	C	D	E	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight /Pcs	N.W./Ctn. (Kgs.)
1/2	62.0	6.0	4.4	46.0	6.0	90	360	4	0.0540	19
3/4	73.0	10.5	5.0	54.0	7.3	80	240	3	0.0800	19
1	84.1	11.2	4.8	65.1	7.2	50	200	4	0.0960	19
1 1/4	100.0	12.7	5.6	77.8	8.7	30	120	4	0.1450	17
1 1/2	109.5	14.3	6.4	87.3	8.7	50	100	2	0.1890	19
2	130.2	16.0	7.2	104.8	8.7	30	60	2	0.2850	17



CAPS

ACA, BCA

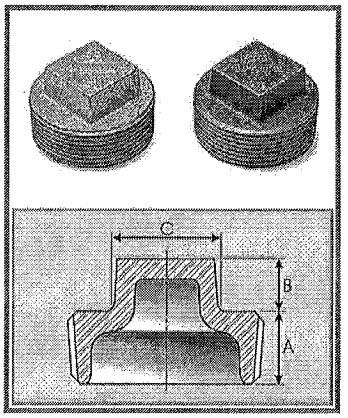
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	13.5	120	1440	12	0.0170	24
1/4	16.0	80	960	12	0.0260	25
3/8	18.8	60	720	12	0.0380	27
1/2	22.1	75	300	4	0.0570	17
3/4	24.6	40	160	4	0.0978	16
1	29.6	25	100	4	0.1696	17
1 1/4	32.5	20	80	4	0.2220	18
1 1/2	33.8	18	54	3	0.2934	16
2	36.8	12	36	3	0.4550	16
2 1/2	43.2	20	40	2	0.6580	26
3	45.7		24	1	1.0000	24
3 1/2	48.3	6	12	2	1.5140	18
4	52.8	6	12	2	1.7048	20
5	58.9	5	10	2	2.3782	24
6	64.8	2	4	2	4.0248	16



PLUGS

AP, P

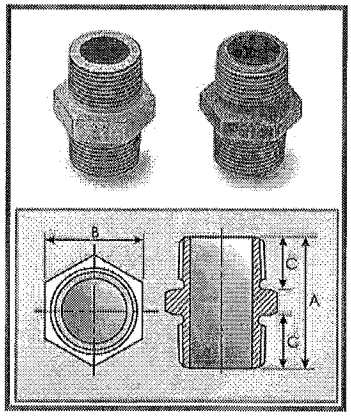
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	9.8	6.1	7.1	300	3,600	12	0.0070	25
1/4	11.6	7.1	9.5	150	1,800	12	0.0132	24
3/8	12.6	8.0	11.0	100	1,200	12	0.0230	28
1/2	14.7	9.7	14.3	50	600	12	0.0390	23
3/4	16.5	11.2	15.9	30	360	12	0.0600	22
1	19.1	12.7	20.9	20	240	12	0.1000	24
1 1/4	20.9	14.2	23.8	40	120	3	0.1810	22
1 1/2	21.7	15.8	28.6	30	90	3	0.2096	19
2	23.2	17.3	33.3	20	60	3	0.3360	20
2 1/2	32.0	18.8	38.1	16	32	2	0.5650	18
3	29.4	20.3	42.9	16	32	2	0.7680	25
4	31.0	25.4	58.0	6	12	2	1.2274	15
5	33.3	25.4	-	5	10	2	2.0900	21
6	35.6	31.8	77.0	5	10	2	3.1356	31



MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

NIPPLES

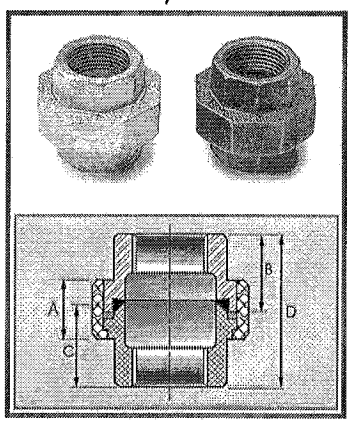
NI



Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	32	14	11.0	240	960	4	0.0220	21
1/4	34	17	12.0	200	800	4	0.0260	21
3/8	36	21	13.0	150	600	4	0.0410	25
1/2	45	27	18.5	80	320	4	0.0700	22
3/4	48	32	19.5	60	180	3	0.1130	20
1	53	38	21.5	40	120	3	0.1868	22
1 1/4	56	48	23.0	35	70	2	0.2776	19
1 1/2	60	55	24.0	25	50	2	0.3436	17
2	70	70	28.0	18	36	2	0.5434	20
2 1/2	76	85	31.0	10	20	2	0.8890	18
3	84	100	34.0	6	12	2	1.3070	16
4	95	130	38.5	3	6	2	1.8512	11
5	104	145	44.0	2	4	2	2.6390	11
6	116	170	46.0		3	1	3.9510	12

UNIONS CONICAL BRASS SEAT

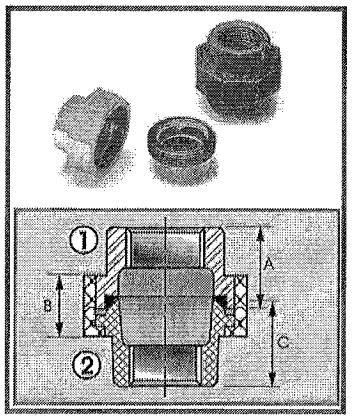
ACU, BCU



Size (inch)	Dimensions A	B	C	D	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	14.0	16.5	17.50	32.0	60	240	4	0.0880	21
1/4	15.5	18.5	20.25	36.6	20	240	12	0.0930	22
3/8	16.0	21.0	22.75	40.9	40	160	4	0.1598	26
1/2	17.0	23.0	25.25	43.7	50	100	2	0.1960	20
3/4	18.5	25.5	27.75	49.3	35	70	2	0.2850	20
1	20.0	27.0	30.00	52.3	20	40	2	0.4130	17
1 1/4	24.0	30.0	35.00	57.4	15	30	2	0.6144	18
1 1/2	25.5	33.0	38.00	61.2	10	20	2	0.7940	16
2	27.0	37.0	41.00	69.8	6	12	2	1.1900	14
2 1/2	29.5	42.0	45.50	81.8	4	8	2	2.0000	16
3	32.5	47.0	50.00	88.9	4	8	2	2.5590	20
4	39.0	58.0	60.50	97.8	2	4	2	4.6874	19

REDUCING UNIONS

ARCU



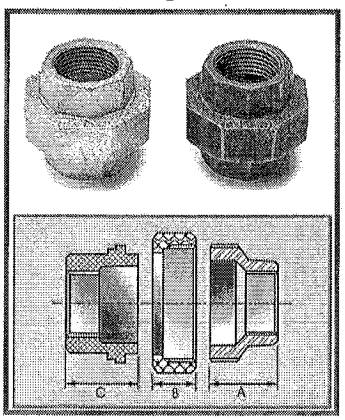
Size (inch) 1x2	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/4 X 1/2	22.5	18.5	27.75	30	90	3	0.3050	27

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

UNIONS FLAT SEAT WITHOUT GASKET

U

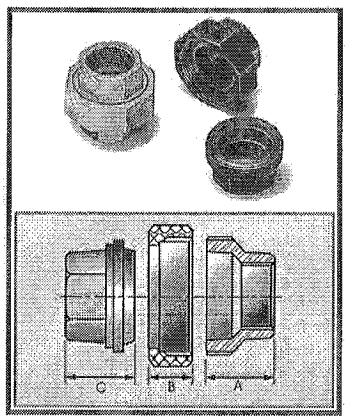
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4	18.3	15.5	19.0	20	240	12	0.0930	22
3/8	19.0	16.0	20.5	40	160	4	0.1598	26
1/2	21.0	17.0	24.5	50	100	2	0.1960	20
3/4	24.5	18.5	26.5	35	70	2	0.2850	20
1	27.0	20.0	29.0	20	40	2	0.4130	17
1 1/4	30.0	24.0	34.0	15	30	2	0.6144	18
1 1/2	33.0	25.5	37.5	10	20	2	0.7940	16
2	37.0	37.0	40.0	6	12	2	1.1900	14
2 1/2	42.0	29.5	49.5	4	8	2	2.0000	16
3	47.0	32.5	49.5	4	8	2	2.5590	20
4	58.0	39.0	60.5	2	4	2	4.6874	19
6	73.0	49.0	73.0		2	1	11.1200	22



UNIONS CONICAL IRON TO IRON SEAT

U340

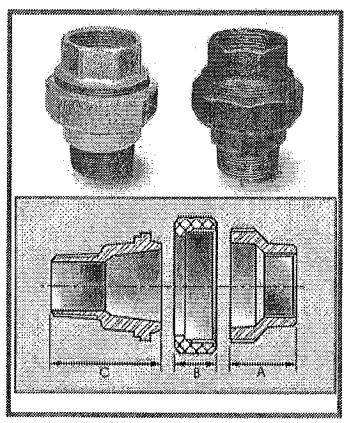
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	26.0	19.0	30.0	50	100	2	0.1990	20
3/4	28.0	20.0	30.5	35	70	2	0.2860	20
1	31.0	22.0	34.0	20	40	2	0.3480	14
1 1/4	33.0	24.0	40.0	15	30	2	0.6040	18
1 1/2	36.0	25.0	42.5	10	20	2	0.7180	14
2	42.0	27.0	46.0	6	12	2	1.0740	13
2 1/2				4	8	2	2.0000	16



UNIONS CONICAL IRON TO IRON SEAT, M & F

U341

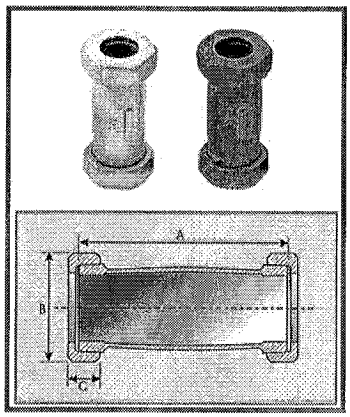
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	26.0	19.0	30.0	50	100	2	0.2520	25
3/4	28.0	20.0	30.5	35	70	2	0.3260	23
1	31.0	22.0	34.0	20	40	2	0.4080	16
1 1/4	33.0	24.0	40.0	15	30	2	0.7150	21
1 1/2	36.0	27.0	42.5	10	20	2	0.8720	17
2	42.0	27.0	46.0	6	12	2	1.0130	12



MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

LONG COMPRESSION, COUPLINGS

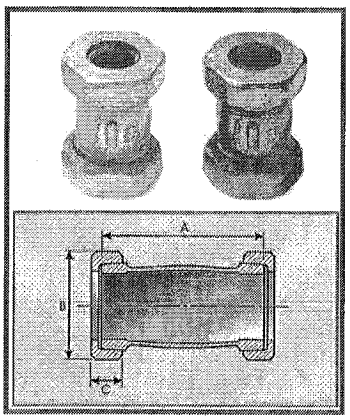
ALCC



Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	78.0	48.0	15.0	20	40	2	0.4000	16
3/4	86.5	54.0	16.0	15	30	2	0.5200	16
1	97.0	57.0	17.0	10	20	2	0.6720	13
1 1/4	107.0	67.0	18.0	10	20	2	0.9300	19
1 1/2	115.0	76.0	18.0	6	12	2	1.1500	14
2	127.0	89.0	19.0	5	10	2	1.6600	17

SHORT COMPRESSION COUPLINGS

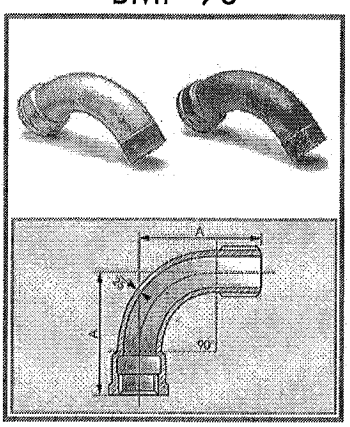
ASLCC



Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	59.0	48.0	15.0	25	75	3	0.3020	23
3/4	64.5	54.0	16.0	20	60	3	0.4060	24
1	69.0	57.0	17.0	18	36	2	0.5130	18
1 1/4	74.0	67.0	18.0	10	20	2	0.6970	14
1 1/2	79.0	76.0	18.0	12	24	2	0.8650	21
2	84.0	89.0	19.0	6	12	2	1.2000	14
2 1/2	94.0	109.0	26.0	4	8	2	2.0800	17
3	104.0	135.7	26.0	2	4	2	2.7900	11

BENDS M & F 90°

BMF 90



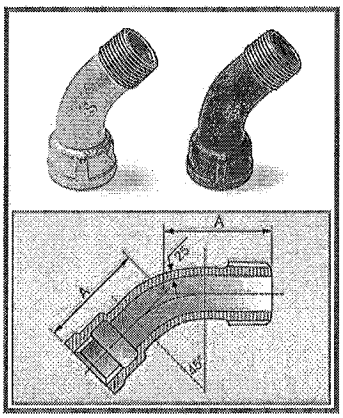
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4		100	400	4	0.0570	23
3/8		60	240	4	0.0810	19
1/2	52	40	160	4	0.1190	19
3/4	65	40	80	2	0.2160	17
1	82	20	40	2	0.3678	15
1 1/4	100	14	28	2	0.6020	17
1 1/2	115	9	18	2	0.7960	14
2	140	5	10	2	1.3528	14
2 1/2	175		6	1	2.6860	16
3	205		3	1	3.4190	10
4	260		1	1	7.4200	7
5	318		1	1	17.2000	17
6	375		1	1	23.0000	23

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

BENDS M & F 45°

BMF 45

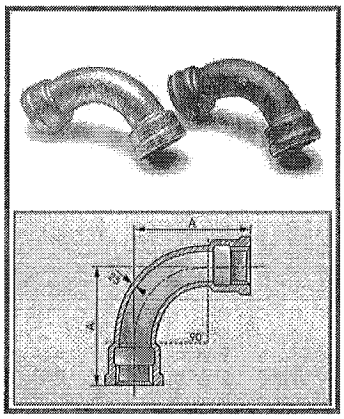
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	38	60	180	4	0.1180	21
3/4	45	30	90	3	0.1950	18
1	55	25	50	2	0.3150	16
1 1/4	63	15	30	2	0.4850	15
1 1/2	70	12	24	2	0.6400	15
2	85	6	12	2	1.1000	13
2 1/2	100	3	6	2	1.7000	10
3	115	2	4	2	2.6500	11
4	145		2	1	6.4000	13
5	170		1	1	8.6000	9
6	195		1	1	13.3300	13



BENDS FEMALE 90°

BF 90

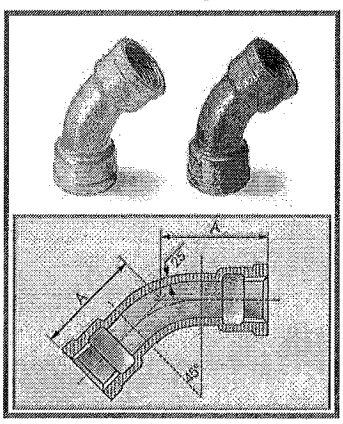
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	52	40	160	4	0.1510	24
3/4	65	40	80	2	0.2700	22
1	82	24	48	2	0.4256	20
1 1/4	100	12	24	2	0.7740	19
1 1/2	115	9	18	2	0.8920	16
2	140		10	1	1.5036	16
2 1/2	175		4	1	2.9200	12
3	205		3	1	4.1662	12
4	260		1	1	9.5000	10
6			1	1	22.0000	22



BENDS FEMALE 45°

BF 45

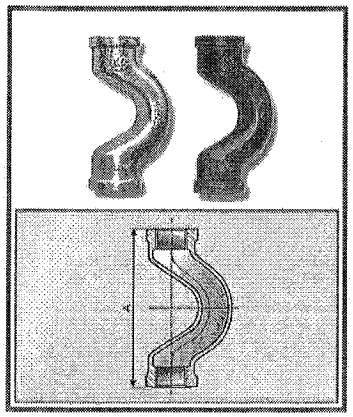
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	38	60	180	3	0.1520	27
3/4	45	30	90	3	0.2100	19
1	55	25	50	2	0.3650	18
1 1/4	63	15	30	2	0.5800	17
1 1/2	70	12	24	2	0.7200	17
2	81.5	6	12	2	1.1660	14
2 1/2	100	3	6	2	2.3250	14
3	115	2	4	2	2.9500	12
4	145		2	1	6.4000	13



MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

CROSS OVER

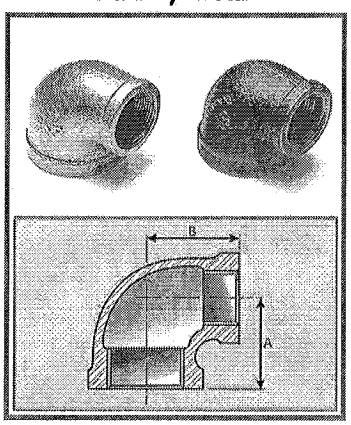
NOS



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	92	20	80	4	0.2090	17
3/4	112	25	50	2	0.3450	17

REDUCING ELBOWS

ARL , BRL

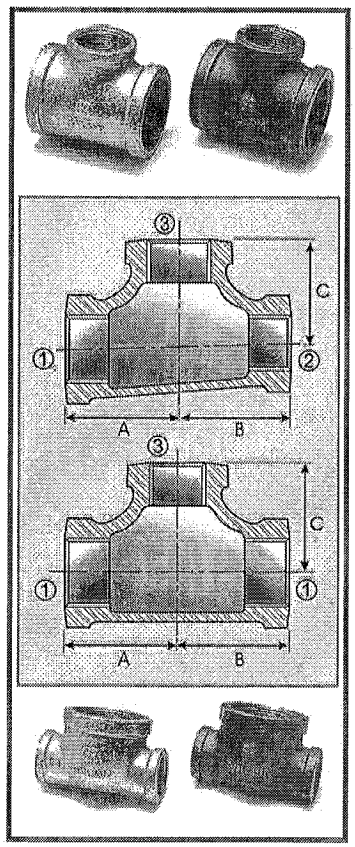


Size (inch)	Dimensions A	B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4 X 1/8	18.8	19.3	40	480	12	0.0440	21
3/8 X 1/8	20.5	21.6	105	420	4	0.0580	24
3/8 X 1/4	22.4	22.9	90	360	4	0.0640	23
1/2 X 1/8	26.4	26.2	60	240	4	0.0700	17
1/2 X 1/4	24.6	24.9	60	240	4	0.0800	19
1/2 X 3/8	26.4	26.2	60	240	4	0.0970	23
3/4 X 1/8	26.2	25.7	40	160	4	0.1050	17
3/4 X 1/4	26.7	27.4	40	160	4	0.1110	18
3/4 X 3/8	28.5	28.7	40	160	4	0.1250	20
3/4 X 1/2	30.5	31.0	40	160	4	0.1440	23
1 X 1/4	30.0	32.0	25	100	4	0.1580	16
1 X 3/8	30.0	32.3	25	100	4	0.1770	18
1 X 1/2	32.0	35.5	25	100	4	0.2020	20
1 X 3/4	34.8	36.8	60	100	2	0.2360	24
1 1/4 X 1/2	34.0	38.9	20	80	4	0.2890	23
1 1/4 X 3/4	36.8	41.2	15	60	4	0.3190	19
1 1/4 X 1	40.1	42.4	10	40	4	0.3674	15
1 1/2 X 1/2	35.0	42.0	15	60	4	0.4200	25
1 1/2 X 3/4	38.6	44.5	10	40	4	0.3350	13
1 1/2 X 1	41.9	45.7	10	40	4	0.3000	12
1 1/2 X 1 1/4	46.2	47.8	15	30	2	0.5756	17
2 X 1/2	37.6	47.5	10	40	4	0.4520	18
2 X 3/4	40.6	50.0	9	36	4	0.5500	20
2 X 1	43.9	51.3	14	28	2	0.5560	16
2 X 1 1/4	48.3	53.3	10	20	2	0.6490	13
2 X 1 1/2	51.3	54.9	10	20	2	0.6200	12
2 1/2 X 1/2			10	20	2	0.7900	16
2 1/2 X 3/4			10	20	2	0.7900	16
2 1/2 X 1			8	16	2	0.9900	16
2 1/2 X 1 1/4			8	16	2	0.9630	15
2 1/2 X 1 1/2	54.9	63.8	6	12	2	1.0000	12
2 1/2 X 2	60.7	66.0	6	12	2	1.2250	15
3 x 1			4	8	2	1.2360	10
3 X 1 1/2			4	8	2	1.3750	11
3 X 2	64.0	73.4	4	8	2	1.4000	11
3 X 2 1/2	71.9	75.9	4	8	2	1.7600	14
4 X 2	69.1	87.5	2	4	2	2.5300	10
4 X 2 1/2	77.2	89.1	1	2	2	2.5800	5
4 X 3	83.8	91.4	1	2	2	2.7500	6
6 x 4				1	1	7.7800	8

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

REDUCING TEES

ART, BRT



Size 1 x 2 x 3 (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn Pcs./Ctn	NO. of Inner Box	Weight/Pcs.	N.W./Ctn (Kgs.)
1/4 X 1/8	18.8	18.8	19.3	25	300	12	0.0600	18
3/8 X 1/8	22.4	20.6	21.6	90	360	4	0.0730	26
3/8 X 1/4	22.4	22.4	22.9	60	240	4	0.0820	20
1/2 X 1/8	21.9	21.9	23.5	40	160	4	0.1120	18
1/2 X 1/4	24.6	24.6	24.9	40	160	4	0.1160	19
1/2 X 3/8	25.9	25.9	25.7	40	160	4	0.1300	21
3/4 X 1/8	24.0	24.0	25.7	32	128	4	0.1520	19
3/4 X 1/4	26.7	26.7	27.4	25	100	4	0.1600	16
3/4 X 3/8	27.9	27.9	28.1	25	100	4	0.1830	18
3/4 X 1/2	29.9	29.9	30.4	20	80	4	0.2150	17
1 X 1/4	27.6	27.6	30.4	20	80	4	0.2380	19
1 X 3/8	30.0	30.0	32.3	15	60	4	0.2730	16
1 X 1/2	31.4	31.4	34.8	16	60	4	0.3190	19
1 X 3/4	34.8	34.8	36.8	12	48	4	0.3610	17
1 1/4 X 1/4	30.0	30.0	36.6	20	40	2	0.3450	14
1 1/4 X 3/8	32.0	32.0	36.6	20	40	2	0.3850	15
1 1/4 X 1/2	34.0	34.0	38.9	20	40	2	0.4400	18
1 1/4 X 3/4	36.8	36.8	41.2	20	40	2	0.4560	18
1 1/4 X 1	40.1	40.1	42.2	20	40	2	0.4990	20
1 1/2 X 3/8	40.1	40.1	40.2	18	36	2	0.4450	16
1 1/2 X 1/2	35.8	35.8	42.2	18	36	2	0.4670	17
1 1/2 X 3/4	35.8	35.8	44.6	15	30	2	0.5670	17
1 1/2 X 1	41.9	41.9	45.7	10	30	3	0.6390	19
1 1/2 X 1 1/4	41.9	41.9	47.8	12	24	2	0.7160	17
2 X 3/8	46.2	46.2	-	10	20	2	0.6600	13
2 X 1/2	37.9	37.9	47.8	10	20	2	0.7320	15
2 X 3/4	40.6	40.6	50.0	10	20	2	0.8060	16
2 X 1	43.9	43.9	51.3	10	20	2	0.8960	18
2 X 1 1/4	47.3	47.3	52.2	8	16	2	0.8730	14
2 X 1 1/2	50.3	50.3	53.8	8	16	2	0.9440	15
2 1/2 X 1/2	40.2	40.2	55.9	6	12	2	1.1830	14
2 1/2 X 3/4	44.2	44.2	58.9	6	12	2	1.2940	16
2 1/2 X 1	46.5	46.5	59.0	5	10	2	1.3340	13
2 1/2 X 1 1/4	47.5	47.5	62.2	5	10	2	1.3420	13
2 1/2 X 1 1/2	54.9	54.9	63.8	5	10	2	1.5370	15
2 1/2 X2	60.7	60.7	66.0	4	8	2	1.7680	14
3 X 1/2	46.5	46.5	65.0	4	8	2	1.2800	10
3 X 3/4	45.5	45.5	65.3	3	6	2	1.4400	9
3 X 1	50.8	50.8	67.6	3	6	2	1.5860	10
3 X 1 1/4	55.1	55.1	69.6	3	6	2	1.7400	10
3 X 1 1/2	58.2	58.2	71.1	3	6	2	2.1800	13
3 X 2	64.0	64.0	73.4	3	6	2	2.0650	12
3 X 2 1/2	71.9	71.9	76.0	3	6	2	2.3300	14
4 X 1/2	53.5	53.5	79.2	2	4	2	2.5000	10
4 X 3/4	53.5	53.5	79.2	2	4	2	2.7500	11
4 X 1	-	-	-	2	4	2	2.6310	11
4 X 1 1/4	61.0	61.0	86.5	2	4	2	2.9850	12
4 X 1 1/2	62.5	62.5	82.6	2	4	2	3.0100	12
4 X 2	68.2	68.2	84.9		3	1	3.1650	9
4 X 2 1/2	77.5	77.5	89.2		3	1	4.1200	12
4 X 3	82.1	82.1	89.6	1	2	2	3.7080	7
5 X 3	89.2	89.2	107.2	1	2	2	5.1000	10
5 X 4	100.0	100.0	111.0		1	1	6.1000	6
6 X 1/2	-	86.1	-		1	1	5.8000	6
6 X 2	78.2	78.2	115.8		1	1	7.0000	7
6 X 2 1/2	86.1	86.1	118.4		1	1	7.3500	7
6 X 3	92.5	92.5	120.7		1	1	8.5880	9
6 X 4	104.9	104.9	125.5		1	1	8.8852	9
6 X 5	116.0	116.0	128.0		1	1	10.5000	11
1/2 X 1/4 X 1/2	28.4	24.9	28.4	30	120	4	0.1430	17
1/2 X 1/2 X 3/4	31.0	31.0	30.5	30	120	4	0.1950	23
1/2 X 1/2 X 1	34.6	34.6	32.0	25	100	4	0.2200	22
3/4 X 1/2 X 1/2	29.9	27.9	30.4	25	100	4	0.1940	19
3/4 X 1/2 X 3/4	32.6	30.4	32.6	20	80	4	0.2300	18
3/4 X 1/2 X 1	36.1	34.8	34.1	18	72	4	0.2900	21
3/4 X 3/4 X 1	36.8	36.8	34.8	40	80	2	0.3080	24
3/4 X 3/4 X 1 1/4				20	60	3	0.3500	21
3/4 X 3/4 X 1 1/2				12	36	3	0.4050	15
1 X 1/2 X 1/2	31.4	27.9	34.8	20	80	4	0.2200	18
1 X 1/2 X 3/4	34.1	30.4	36.1	20	80	4	0.2700	22
1 X 1/2 X 1	37.3	34.8	37.3	15	60	4	0.3362	20
1 X 3/4 X 1/2	31.4	29.9	34.8	20	80	4	0.2790	22
1 X 3/4 X 3/4	34.1	32.6	36.1	15	60	4	0.3014	18
1 X 3/4 X 1	38.1	36.8	38.1	30	60	2	0.3590	22
1 X 1 X 1 1/4	42.4	42.4	40.1	11	44	4	0.4150	18
1 X 1 X 1 1/2	45.7	45.7	41.9	9	36	4	0.5250	19
1 X 1 X 2	50.3	50.3	47.9	12	24	2	0.6600	16
1 1/4 X 1/2 X 1/2	34.0	32.0	38.9	25	50	2	0.3000	15
1 1/4 X 1/2 X 3/4	37.0	32.0	39.5	25	50	2	0.3600	18
1 1/4 X 1/2 X 1	40.1	34.5	42.4	20	40	2	0.4240	17
1 1/4 X 1/2 X 1 1/4	43.6	38.1	43.6	20	40	2	0.4900	20
1 1/4 X 3/4 X 1/2	36.1	32.6	40.3	10	40	4	0.3460	14
1 1/4 X 3/4 X 3/4	36.1	32.6	40.4	10	40	4	0.3200	13
1 1/4 X 3/4 X 1	39.3	36.1	41.5	10	40	4	0.4390	18
1 1/4 X 3/4 X 1 1/4	44.5	41.2	44.5	20	40	2	0.5260	21
1 1/4 X 1 X 1/2	33.3	31.4	38.1	20	40	2	0.3400	14

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

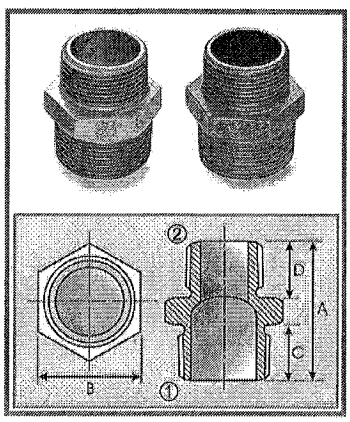
REDUCING TEES

ART, BRT

Siz 1X2X3 (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1 1/4 X 1X 3/4	36.1	34.1	40.4	20	40	2	0.4110	16
1 1/4 X 1 X 1	39.3	37.3	41.5	20	40	2	0.4400	18
1 1/4 X 1 X 1 1/4	44.5	42.4	44.5	15	30	2	0.5200	16
1 1/4 X 1 X 1 1/2	49.3	42.4	49.3	18	36	2	0.5300	19
1 1/4 X1 1/4 X 1 1/2	47.8	47.8	46.2	12	24	2	0.6590	16
1 1/4 X1 1/4 X 2	53.3	53.3	48.3	12	24	2	0.7900	19
1 1/2 X 1/2 X 3/4				12	48	4	0.3250	16
1 1/2 X 1/2 X 1	41.9	38.6	49.3	18	36	2	0.5400	19
1 1/2 X 1/2 X 1 1/4				15	30	2	0.6540	20
1 1/2 X 1/2 X 1 1/2	49.3	42.2	49.3	12	24	2	0.6510	16
1 1/2 X 3/4 X 1/2				15	30	2	0.3470	10
1 1/2 X 3/4 X 3/4				15	30	2	0.3850	12
1 1/2 X 3/4 X 1 1/4	45.5	40.0	49.0	12	24	2	0.5000	12
1 1/2 X 3/4 X 1 1/2	48.3	43.6	48.3	12	24	2	0.6090	15
1 1/2 X 1 X 1/2				15	30	2	0.4100	12
1 1/2 X 1 X 3/4	37.8	34.2	44.0	15	30	2	0.4540	14
1 1/2 X 1 X 1	41.9	38.1	45.7	15	30	2	0.5240	16
1 1/2 X 1 X 1 1/4	46.2	42.4	47.8	12	24	2	0.5740	14
1 1/2 X 1 X 1 1/2	49.3	45.7	49.3	12	24	2	0.6200	15
1 1/2 X 1 1/4 X 1/2	35.8	34.0	42.2	12	24	2	0.4710	11
1 1/2 X 1 1/4 X 3/4	38.6	36.3	44.5	12	24	2	0.4700	11
1 1/2 X 1 1/4 X 1	41.1	39.3	44.8	12	24	2	0.5460	13
1 1/2 X 1 1/4 X 1 1/4	46.2	44.5	47.8	12	24	2	0.6300	15
1 1/2 X 1 1/4 X 1 1/2	48.3	46.8	48.3	12	24	2	0.6530	16
1 1/2 X 1 1/4 X 2	56.5	51.6	53.4	8	16	2	0.8500	14
1 1/2 X 1 1/2 X 2	53.6	53.6	50.3	8	16	2	0.9000	14
2 X 1/2 X 2	56.1	46.8	56.1	8	16	2	0.9240	15
2 X 3/4 X 3/4	41.5	33.0	49.0	12	24	2	0.5000	12
2 X 3/4 X 2	57.2	50.0	57.2	8	16	2	0.9000	14
2 X 1 X 1	44.0	40.0	53.0	12	24	2	0.6440	15
2 X 1 X 1 1/2	50.3	44.8	53.8	10	20	2	0.8020	16
2 X 1 X 2	56.1	50.3	56.1	8	16	2	0.8860	14
2 X 1 1/4 X 1	46.0	40.0	51.5	8	16	2	0.6800	11
2 X 1 1/4 X 1 1/4	47.3	43.6	52.2	8	16	2	0.7000	11
2 X 1 1/4 X 1 1/2	53.1	47.8	54.9	8	16	2	0.7700	12
2 X 1 1/4 X 2	57.2	53.3	57.2	8	16	2	1.0000	16
2 X 1 1/2 X 1/2	48.3	38.9	-	10	20	2	0.7400	15
2 X 1 1/2 X 3/4	41.5	37.1	50.3	10	20	2	0.6240	12
2 X 1 1/2 X 1	43.9	41.9	51.3	10	20	2	0.7130	14
2 X 1 1/2 X 1 1/4	47.3	45.3	52.2	8	16	2	0.7700	12
2 X 1 1/2 X 1 1/2	50.3	48.3	53.8	8	16	2	0.8220	13
2 X 1 1/2 X 2	56.1	53.7	56.1	8	16	2	1.0330	17
2 X 2 X 2 1/2	64.7	64.7	59.5	6	12	2	1.4830	18
2 1/2 X 2 X 2	59.5	56.0	64.7	5	10	2	1.4480	14
2 1/2 X 2 X 2 1/2	68.6	66.0	68.6	4	8	2	1.8502	15

REDUCING NIPPLES

RNI



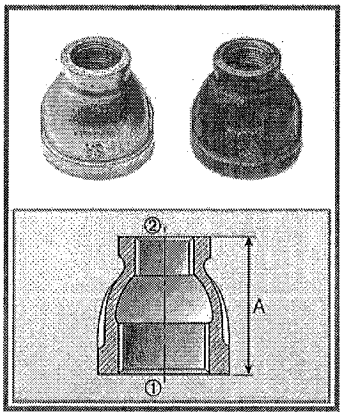
Size (inch)	Dimensions A	B	C	D	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/8 X 1/4	38.0	19.0	15.0	14.0	105	210	2	0.0450	9
1/2 X 1/4	44.0	22.0	19.0	16.0	90	180	2	0.0650	12
1/2 X 3/8	44.0	22.0	19.0	16.0	170	340	2	0.0710	24
3/4 X 1/2	47.0	30.0	20.5	17.5	50	200	4	0.0860	17
1 X 1/2	53.0	36.0	24.5	18.5	50	150	3	0.1530	23
1 X 3/4	53.0	36.0	22.5	20.5	45	135	3	0.1320	18
1 1/4 X 1/2					40	80	2	0.2170	17
1 1/4 X 3/4	57.0	46.0	26.0	21.0	40	80	2	0.2000	16
1 1/4 X 1	57.0	46.0	25.0	22.0	40	80	2	0.2220	18
1 1/2 X 1/2					30	60	2	0.2960	18
1 1/2 X 3/4	59.0	50.0	26.0	21.0	30	60	2	0.3230	19
1 1/2 X 1	59.0	50.0	25.0	22.0	25	50	2	0.3028	15
1 1/2 X 1 1/4	59.0	50.0	25.0	22.0	25	50	2	0.3138	16
2 X 1/2	68.0	65.0	33.0	21.0	25	50	2	0.4100	21
2 X 3/4	68.0	65.0	32.0	22.0	25	50	2	0.4100	21
2 X 1	68.0	65.0	30.0	24.0	25	50	2	0.4250	21
2 X 1 1/4	68.0	65.0	30.0	24.0	20	40	2	0.4216	17
2 X1 1/2	68.0	65.0	30.0	24.0	18	36	2	0.4490	16
2 1/2 X 1	75.0	80.0	35.0	24.0	10	20	2	0.8000	16
2 1/2 X 1 1/4	75.0	80.0	33.0	26.0	10	20	2	0.5600	11
2 1/2 X 1 1/2	75.0	80.0	33.0	26.0	10	20	2	0.9000	18
2 1/2 X 2	75.0	80.0	31.0	28.0	16	32	2	0.7200	23
3 X 1 1/2	83.0	95.0	39.0	28.0	6	12	2	1.2000	14
3 X 2	83.0	95.0	37.0	30.0	6	12	2	1.0682	13
3 X 2 1/2	83.0	95.0	35.0	32.0	6	12	2	1.0200	12
4 X 2	95.0	130.0	47.0	31.0	4	8	2	2.1400	17
4 X 2 1/2					4	8	2	2.0200	16
4 X 3	95.0	130.0	42.0	36.0	4	8	2	1.8848	15

MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

Size (inch) 1 X 2	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4 X 1/8	25.4	50	600	12	0.0350	21
3/8 X 1/8	28.7	35	420	12	0.0460	19
3/8 X 1/4	28.7	30	360	12	0.0530	19
1/2 X 1/8	31.8	75	300	4	0.0754	23
1/2 X 1/4	31.2	75	300	4	0.0700	21
1/2 X 3/8	31.2	60	240	4	0.0740	18
3/4 X 1/8	36.6	70	210	3	0.0900	19
3/4 X 1/4	36.6	45	180	4	0.0960	17
3/4 X 3/8	35.9	45	180	4	0.1010	18
3/4 X 1/2	35.9	60	180	3	0.1300	23
1 X 1/4	42.0	45	135	3	0.1680	23
1 X 3/8	42.0	30	120	4	0.1580	19
1 X 1/2	42.0	30	120	4	0.1678	20
1 X 3/4	42.0	25	100	4	0.1840	18
1 1/4 X 3/8	52.3	25	75	3	0.2260	17
1 1/4 X 1/2	52.3	25	75	3	0.2520	19
1 1/4 X 3/4	52.3	25	75	3	0.2740	21
1 1/4 X 1	52.3	15	60	4	0.2996	18
1 1/2 X 3/8	58.7	30	60	2	0.2670	16
1 1/2 X 1/2	57.5	20	60	3	0.3500	21
1 1/2 X 3/4	57.5	15	60	4	0.3580	21
1 1/2 X 1	57.5	25	50	2	0.3836	19
1 1/2 X 1 1/4	57.5	12	48	4	0.3920	19
2 X 3/8	71.4	12	36	3	0.4400	16
2 X 1/2	70.0	12	36	3	0.5090	18
2 X 3/4	70.0	12	36	3	0.5050	18
2 X 1	70.0	12	36	3	0.5808	21
2 X 1 1/4	70.0	9	27	3	0.5926	16
2 X 1 1/2	70.0	9	27	3	0.6388	17
2 1/2 X 1/2	82.6	10	20	2	0.7780	16
2 1/2 X 3/4	80.9	10	20	2	0.7260	15
2 1/2 X 1	80.9	10	20	2	0.8340	17
2 1/2 X 1 1/4	82.6	10	20	2	0.8280	17
2 1/2 X 1 1/2	82.6	7	14	2	0.7900	11
2 1/2 X 2	82.6	7	14	2	0.8132	11
3 X 1/2	91.8	7	14	2	1.0100	14
3 X 3/4	91.8	7	14	2	1.0000	14
3 X 1	91.8	6	12	2	0.9344	11
3 X 1 1/4	91.8	6	12	2	0.9100	11
3 X 1 1/2	91.8	6	12	2	0.9900	12
3 X 2	98.7	6	12	2	1.0282	12
3 X 2 1/2	93.7	5	10	2	1.5948	16
4 X 1/2	109.1	3	6	2	1.7000	10
4 X 3/4	109.1	3	6	2	1.7000	10
4 X 1	111.3	3	6	2	1.8000	11
4 X 1 1/4	111.3	3	6	2	1.6600	10
4 X 1 1/2	111.3	3	6	2	1.7400	10
4 X 2	111.3	3	6	2	2.2540	14
4 X 2 1/2	111.3	3	6	2	1.8200	11
4 X 3	111.3	3	6	2	1.8490	11
5 X 2	129.0		4	1	2.9000	12
5 X 3	129.0		2	1	3.1000	6
5 X 4	129.0		2	1	3.5000	7
6 X 2	147.5		2	1	4.0000	8
6 X 2 1/2	147.5		2	1	4.4500	9
6 X 3	147.5		2	1	3.2000	6
6 X 4	147.5	1	2	2	4.9270	10
6 X 5	147.5	1	2	2	4.5000	9

REDUCING COUPLINGS

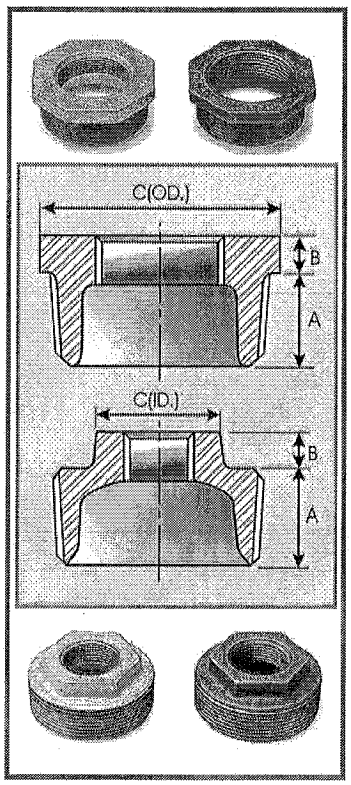
ARS, BRS



MALLEABLE IRON PIPE FITTINGS CLASS 150 lbs.

BUSHINGS

ABU, BU



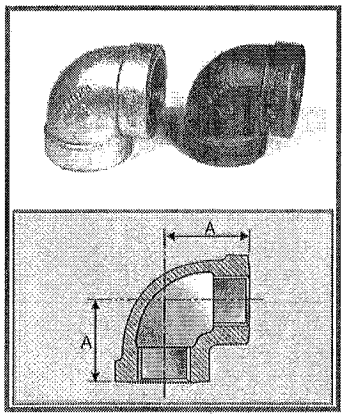
Size (inch)	Dimensions A	B	C(id)	C(od)	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4 X 1/8	13.2	3.8	-	16.3	120	1440	12	0.0110	16
3/8 X 1/8	12.2	4.1	-	21.6	75	900	12	0.0170	15
3/8 X 1/4	12.2	4.1	-	21.1	75	900	12	0.0190	17
1/2 X 1/8	16.4	4.8	-	26.2	150	600	4	0.0435	26
1/2 X 1/4	14.2	4.8	-	26.2	150	600	4	0.0340	20
1/2 X 3/8	14.2	4.8	-	26.2	150	600	4	0.0300	18
3/4 X 1/8	16.0	5.6	-	29.2	75	300	4	0.0750	23
3/4 X 1/4	16.0	5.6	-	29.2	75	300	4	0.0730	22
3/4 X 3/8	16.0	5.6	-	29.2	75	300	4	0.0650	20
3/4 X 1/2	18.0	5.6	-	29.2	75	300	4	0.0450	14
1 X 1/8	19.1	9.6	28.5	-	50	200	4	0.0960	19
1 X 1/4	19.1	9.6	28.5	-	50	200	4	0.0860	17
1 X 3/8	19.1	9.6	28.5	-	50	200	4	0.1080	22
1 X 1/2	21.6	6.4	-	36.1	50	200	4	0.0944	19
1 X 3/4	21.6	6.4	-	36.1	50	200	4	0.0780	16
1 1/4 X 1/4	22.8	8.6	28.5	-	30	120	4	0.1390	17
1 1/4 X 3/8	22.8	8.6	28.5	-	30	120	4	0.1960	24
1 1/4 X 1/2	22.8	8.6	31.5	-	30	120	4	0.1320	16
1 1/4 X 3/4	20.3	7.1	-	44.7	30	120	4	0.1610	19
1 1/4 X 1	20.3	7.1	-	44.7	30	120	4	0.1330	16
1 1/2 X 1/8	-	-	-	-	25	75	3	0.2950	22
1 1/2 X 1/4	23.6	9.4	28.5	-	25	75	3	0.2930	22
1 1/2 X 3/8	23.6	9.4	28.5	-	25	75	3	0.2900	22
1 1/2 X 1/2	23.6	9.4	34.0	-	25	75	3	0.1800	14
1 1/2 X 3/4	23.6	9.4	36.5	-	25	75	3	0.1750	13
1 1/2 X 1	23.3	7.9	-	50.8	25	75	3	0.2100	16
1 1/2 X 1 1/4	23.3	7.9	-	50.8	25	75	8	0.1460	11
2 X 1/4	21.8	10.6	28.5	-	20	60	3	0.2770	17
2 X 3/8	22.4	10.0	28.5	-	20	60	3	0.4300	26
2 X 1/2	24.9	10.4	34.0	-	20	60	3	0.3800	23
2 X 3/4	24.9	10.4	41.4	-	20	60	3	0.2860	17
2 X 1	24.9	10.4	45.0	-	20	60	3	0.3040	18
2 X 1 1/4	27.0	11.0	-	63.0	20	60	3	0.3320	20
2 X 1 1/2	27.0	11.0	-	63.0	20	60	3	0.3198	19
2 1/2 X 1/2	27.2	11.2	34.0	-	15	30	2	0.7130	21
2 1/2 X 3/4	27.2	11.2	41.4	-	15	30	2	0.7000	21
2 1/2 X 1	27.2	11.2	49.5	-	15	30	2	0.6870	21
2 1/2 X 1 1/4	27.2	11.2	60.7	-	15	30	2	0.6420	19
2 1/2 X 1 1/2	27.2	11.2	-	75.7	15	30	2	0.6240	19
2 1/2 X 2	29.7	9.4	-	75.7	15	30	2	0.5034	15
3 X 1/2	28.7	12.2	34.0	-	12	24	2	1.0100	24
3 X 3/4	28.7	12.2	41.4	-	12	24	2	1.0360	25
3 X 1	28.7	12.2	49.5	-	12	24	2	0.6650	16
3 X 1 1/4	28.7	12.2	60.7	-	12	24	2	1.0100	24
3 X 1 1/2	28.7	12.2	68.1	-	12	24	2	0.8900	21
3 X 2	28.7	12.2	-	98.0	12	24	2	0.8700	21
3 X 2 1/2	28.7	12.2	-	98.0	12	24	2	0.6820	16
3 1/2 X 1 1/2	30.0	13.2	70.0	-	8	16	2	1.0000	16
3 1/2 X 2	33.0	13.2	83.3	-	8	16	2	1.2000	19
3 1/2 X 3	30.0	10.9	-	117.3	8	16	2	0.8250	13
4 X 1/2	39.8	14.2	-	121.0	5	10	2	1.6600	17
4 X 3/4	38.0	13.0	-	121.0	5	10	2	1.5000	15
4 X 1	31.0	15.2	-	-	5	10	2	1.1740	12
4 X 1 1/4	31.0	15.2	-	-	5	10	2	1.6440	16
4 X 1 1/2	31.0	15.2	-	-	5	10	2	1.7760	18
4 X 2	36.0	15.2	-	-	5	10	2	1.3140	13
4 X 2 1/2	31.0	15.2	-	-	5	10	2	1.2582	13
4 X 3	37.0	14.0	-	126.0	5	10	2	1.3760	14
5 X 2	38.3	15.2	-	-	2	4	2	2.8300	11
5 X 3	42.5	15.5	-	-	2	4	2	2.5000	10
5 X 4	41.7	15.5	-	146.8	2	4	2	2.1000	8
6 X 2	35.6	19.1	-	-	2	4	2	4.4710	18
6 X 2 1/2	35.6	19.1	-	-	2	4	2	3.8770	16
6 X 3	35.6	19.1	-	-	2	4	2	2.5610	10
6 X 4	40.0	19.1	-	-	2	4	2	2.5880	10
6 X 5	35.6	19.1	-	179.1	2	4	2	3.0700	12

MALLEABLE IRON PIPE FITTINGS CLASS 300 lbs.

ELBOWS 90°

AXHL 90, BXHL 90

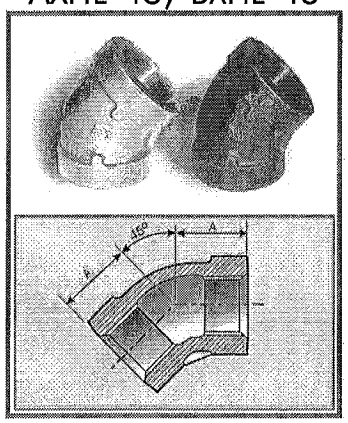
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4	23.9	180	360	2	0.0930	33
3/8	26.9	120	240	2	0.1350	32
1/2	31.7	40	80	2	0.2030	16
3/4	36.6	30	60	2	0.3280	20
1	41.4	20	40	2	0.5260	21
1 1/4	49.3	12	24	2	0.7700	18
1 1/2	54.1	8	16	2	1.1120	18
2	63.5	6	12	2	1.7060	20
2 1/2	74.7	4	8	2	2.8260	23
3	85.8	2	4	2	4.2660	17
4	105.0	1	2	2	6.3880	13



ELBOWS 45°

AXHL 45, BXHL 45

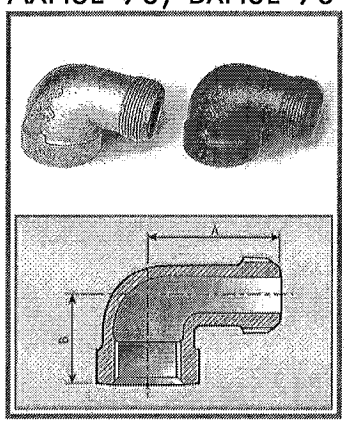
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4	20.6	180	360	2	0.0870	31
3/8	22.3	120	240	2	0.1290	31
1/2	25.4	40	80	2	0.1920	15
3/4	28.7	30	60	2	0.3100	19
1	33.3	20	40	2	0.4720	19
1 1/4	38.1	12	24	2	0.7670	18
1 1/2	42.9	8	16	2	1.0200	16
2	50.8	6	12	2	1.6420	20
2 1/2	57.1	4	8	2	2.5140	20
3	63.5	2	4	2	3.9390	16
4	71.0	1	2	2	5.3170	11



STREET ELBOWS 90°

AXHSL 90, BXHSL 90

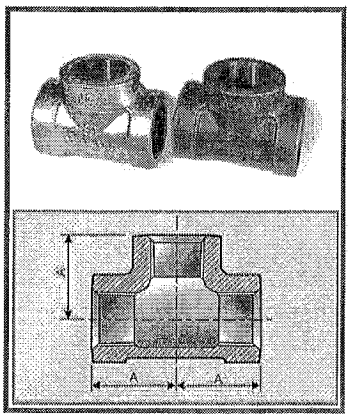
Size (inch)	Dimensions A	B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4	36.6	23.9	180	360	2	0.0780	28
3/8	41.4	26.9	120	240	2	0.1170	28
1/2	50.8	31.7	40	80	2	0.1770	14
3/4	55.6	36.6	30	60	2	0.2850	17
1	66.0	41.4	20	40	2	0.4630	19
1 1/4	73.1	49.3	12	24	2	0.7610	18
1 1/2	79.5	54.1	8	16	2	0.7830	13
2	93.7	63.5	6	12	2	1.6480	20
4	148.0	105.0	1	2	2	6.1730	12



MALLEABLE IRON PIPE FITTINGS CLASS 300 lbs.

TEES

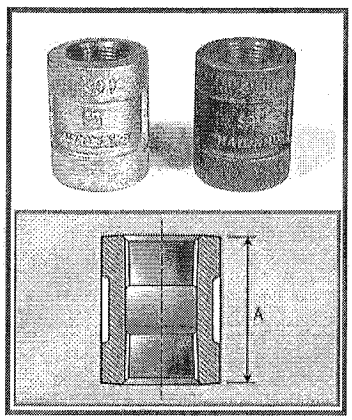
AXHT, BXHT



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4	23.9	120	240	2	0.1310	31
3/8	26.9	90	180	2	0.1930	35
1/2	31.7	30	60	2	0.2970	18
3/4	36.6	20	40	2	0.4760	19
1	41.4	12	24	2	0.7120	17
1 1/4	49.3	10	20	2	1.1540	23
1 1/2	54.1	6	12	2	1.5040	18
2	63.5	4	8	2	2.4050	19
2 1/2	74.7	2	4	2	3.7700	15
3	85.8	1	2	2	5.7660	12
4	105.0	1	2	2	8.6020	17

COUPLINGS

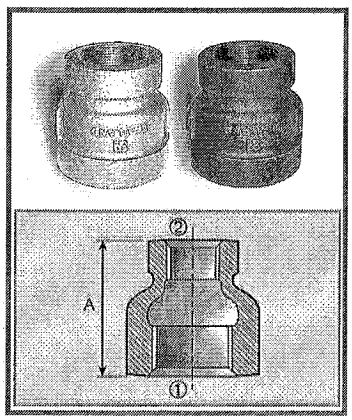
AXHS, BXHS



Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4	34.8	200	400	2	0.0740	30
3/8	41.1	150	300	2	0.1200	36
1/2	47.5	40	80	2	0.1870	15
3/4	53.8	30	60	2	0.2960	18
1	60.2	20	40	2	0.4600	18
1 1/4	72.9	12	24	2	0.7510	18
1 1/2	72.9	12	24	2	0.9140	22
2	91.9	6	12	2	1.5800	19
2 1/2	104.6	4	8	2	2.4230	19
3	104.6	2	4	2	3.3070	13
4	108.0	2	4	2	4.7390	19

REDUCING COUPLING

AXHRS, BXHRS



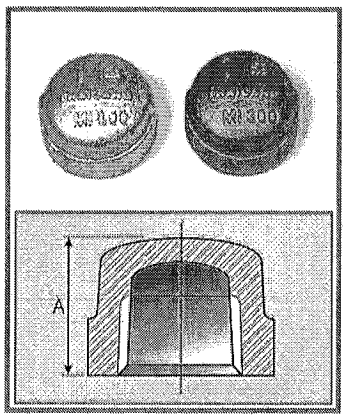
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2 x 1/4	42.9	100	200	2	0.1410	28
1/2 x 3/8	42.9	100	200	2	0.1540	31
3/4 x 3/8	44.5	60	120	2	0.2080	25
3/4 x 1/2	44.5	60	120	2	0.2250	27
1 x 1/2	50.8	50	100	2	0.3500	35
1 x 3/4	50.8	40	80	2	0.3870	31
1 1/4 x 1/2	60.5	24	48	2	0.5080	24
1 1/4 x 3/4	60.5	20	40	2	0.5460	22
1 1/4 x 1	60.5	20	40	2	0.5650	23
1 1/2 x 1/2	68.3	24	48	2	0.6690	32
1 1/2 x 3/4	68.3	20	40	2	0.6980	28
1 1/2 x 1	68.3	18	36	2	0.7390	27
1 1/2 x 1 1/4	68.3	18	36	2	0.8230	30
2 x 1/2	81.0	12	24	2	1.1160	27
2 x 3/4	81.0	12	24	2	1.0920	26
2 x 1	81.0	12	24	2	1.1170	27
2 X 1 1/4	81.0	8	16	2	1.2290	20
2 X 1 1/2	81.0	8	16	2	1.2610	20
2 1/2 x 1 1/2	93.7	4	8	2	1.7040	14
2 1/2 x 2	93.7	6	12	2	1.9850	24
3 x 2	103.1	4	8	2	2.6520	21
3 x 2 1/2	103.1	4	8	2	2.8520	23
4 x 3	112.0	2	4	2	4.0820	16

MALLEABLE IRON PIPE FITTINGS CLASS 300 lbs.

CAPS

AXHCA, BXHCA

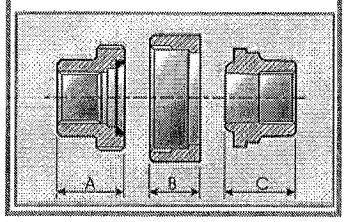
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/8	21.1	120	240	2	0.0620	15
1/2	24.9	80	160	2	0.1010	16
3/4	27.4	50	100	2	0.1550	16
1	32.0	30	60	2	0.2420	15
1 1/4	35.0	20	40	2	0.3690	15
1 1/2	36.3	15	30	2	0.4900	15
2	42.7	10	20	2	0.8370	17
2 1/2	56.0	8	16	2	1.3260	21
3	60.0	5	10	2	1.9820	20
4	70.0	3	6	2	3.1370	19



UNION CONICAL BRASS SEAT

AXHCU, BXHCU

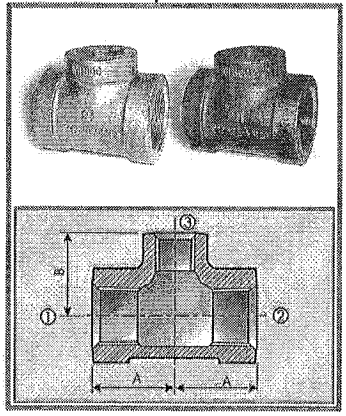
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8				200	400	2	0.1310	52
1/4				120	240	2	0.1500	36
3/8				90	180	2	0.2100	38
1/2	24.5	20.0	27.0	40	80	2	0.2720	22
3/4	27.5	21.0	29.0	30	60	2	0.3830	23
1	29.0	23.0	32.5	18	36	2	0.6500	23
1 1/4	33.0	26.0	38.0	12	24	2	0.9500	23
1 1/2	35.5	29.0	41.5	10	20	2	1.1290	23
2	42.0	32.0	45.0	6	12	2	1.8580	22
2 1/2	43.5	37.0	51.0	4	8	2	2.9730	24
3	55.5	43.0	58.0	3	6	2	4.8020	29
4	61.5	54.0	64.5	1	2	2	8.4740	17



REDUCING TEES

AXHRT, BXHRT

Size 1 x 2 x 3 (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO. of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/4 x 3/4 x 1/2	33.3	33.3	35.0	30	60	2	0.5660	34
1 x 1 x 1/2	36.6	36.6	38.1	16	32	2	0.5760	18
1 x 1 x 3/4	38.1	38.1	39.6	15	30	2	0.6200	19
1 1/4 x 1 1/4 x 1/2	38.1	38.1	42.9	12	24	2	0.9170	22
1 1/4 x 1 1/4 x 3/4	41.4	41.4	44.4	12	24	2	0.9040	22
1 1/4 x 1 1/4 x 1	44.4	44.4	46.0	12	24	2	1.0060	24
1 1/2 x 1 1/2 x 1/2	41.4	41.4	46.0	10	20	2	1.1900	24
1 1/2 x 1 1/2 x 3/4	42.9	42.9	47.7	10	20	2	1.2300	25
1 1/2 x 1 1/2 x 1	46.0	46.0	50.8	10	20	2	1.2090	24
1 1/2 x 1 1/2 x 1 1/4	50.8	50.8	52.3	8	16	2	1.3810	22
2 x 2 x 1/2	44.4	44.4	52.3	6	12	2	1.7720	21
2 x 2 x 3/4	46.0	46.0	54.1	6	12	2	1.7820	21
2 x 2 x 1	50.8	50.8	57.1	5	10	2	2.0170	20
2 x 2 x 1 1/4	54.1	54.1	60.4	5	10	2	1.9790	20
2 x 2 x 1 1/2	57.1	57.1	58.7	5	10	2	2.0930	21
2 1/2 x 2 1/2 x 2	68.3	68.3	69.8	4	8	2	1.5060	12
3 x 3 x 2	71.4	71.4	79.5	2	4	2	4.3860	18



Appendix A. Basic Dimension, for American Standard Pipe Threads

This information is selected from the International Standard for Pipe Threads, ANSI B1.20.1-1983 Table 2.

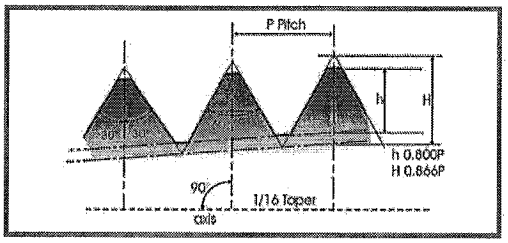


Fig. 4 (Taper)
H = 0.866025 P
h = 0.800000 P

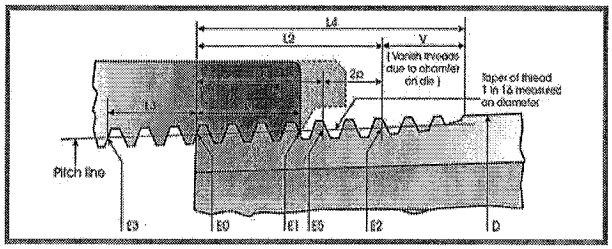


Fig. 5 (Taper)

Nominal Pipe Size (inches)	O.D. of Pipe (D)	Threads /in. (N)	Pitch of Thread (P)	Pitch Dia. at Beginning of External Thread (E_0)	Handtight Engagement			Effective Thread, External			Depth of Thread h
					Length[2] (L_1)		Diam.[3] (E_1)	Length[4] (L_2)		Diam. (E_2)	
					Inch	Thread		Inch	Thread		
1/8	0.405	27.0	0.03704	0.36351	0.1615	4.36	0.37360	0.2639	7.12	0.38000	0.029
1/4	0.540	18.0	0.05556	0.47739	0.2278	4.10	0.49163	0.4018	7.23	0.50250	0.044
3/8	0.675	18.0	0.05556	0.61201	0.2400	4.32	0.62701	0.4078	7.34	0.63750	0.044
1/2	0.840	14.0	0.07143	0.75843	0.3200	4.48	0.77843	0.5337	7.47	0.79179	0.057
3/4	1.050	14.0	0.07143	0.96768	0.3390	4.75	0.98887	0.5457	7.64	1.00179	0.057
1	1.315	11.5	0.08696	1.21363	0.4000	4.60	1.23863	0.6828	7.85	1.25630	0.069
1 1/4	1.660	11.5	0.08696	1.55713	0.4200	4.83	1.58338	0.7068	8.13	1.60130	0.069
1 1/2	1.900	11.5	0.08696	1.79609	0.4200	4.83	1.82234	0.7235	8.32	1.84130	0.069
2	2.375	11.5	0.86996	2.26902	0.4360	5.01	2.29627	0.7565	8.70	2.31630	0.069
2 1/2	2.875	8.0	0.12500	2.71953	0.6820	5.46	2.76216	1.1375	9.10	2.79062	0.100
3	3.500	8.0	0.12500	3.34062	0.7660	6.13	3.38850	1.2000	9.60	3.41562	0.100
3 1/2	4.000	8.0	0.12500	3.83750	0.8210	6.57	3.88881	1.2500	10.00	3.91562	0.100
4	4.500	8.0	0.12500	4.33438	0.8440	6.75	4.38712	1.3000	10.40	4.41562	0.100
5	5.563	8.0	0.12500	5.39073	0.9370	7.50	5.44929	1.4063	11.25	5.47862	0.100
6	6.625	8.0	0.12500	6.44609	0.9580	7.66	6.50597	1.5125	12.10	6.54062	0.100

Nominal Pipe Size (inches)	Length, L_1 Plane to L_2 Plane External Thread (L_2-L_1)		Wrench Makeup Length for Internal Thread[2]			Vanish Thread (V)		Overall[3] Length External Thread (L_4)	Nominal Complete External Threads[5]		Height of Thread (h)	Increase in Diam./ Thread (0.0625 x h)	Basic[6] Minor Diam. At Small End of Pipe (K_0)
			Length (L_3)		Diam. (E_3)				Length (L_5)	Diam. (E_4)			
	Inch	Thread	Inch	Thread		Inch	Thread						
1/8	0.1024	2.76	0.1111	3	0.35656	0.1285	3.47	0.3924	0.1898	0.37537	0.02963	0.00231	0.3339
1/4	0.1740	3.13	0.1667	3	0.46697	0.1928	3.47	0.5946	0.2907	0.49556	0.04444	0.00347	0.4329
3/8	0.1678	3.02	0.1667	3	0.60160	0.1928	3.47	0.6006	0.2967	0.63056	0.04444	0.00347	0.5676
1/2	0.2137	2.99	0.2143	3	0.74504	0.2478	3.47	0.7815	0.3909	0.78286	0.05714	0.00446	0.7013
3/4	0.2067	2.89	0.2143	3	0.95429	0.2478	3.47	0.7935	0.4029	0.99286	0.05714	0.00446	0.9105
1	0.2828	3.25	0.2609	3	1.19733	0.3017	3.47	0.9845	0.5089	1.24543	0.06957	0.00543	1.1441
1 1/4	0.2868	3.30	0.2609	3	1.54083	0.3017	3.47	1.0086	0.5329	1.59043	0.06957	0.00543	1.4876
1 1/2	0.3035	3.49	0.2609	3	1.77978	0.3017	3.47	1.0252	0.5496	1.83043	0.06957	0.00543	1.7265
2	0.3205	3.69	0.2609	3	2.25272	0.3017	3.47	1.0582	0.5826	2.30543	0.06957	0.00543	2.1995
2 1/2	0.4555	3.64	0.2500	2	2.70391	0.4337	3.47	1.5712	0.8875	2.77500	0.10000	0.00781	2.6195
3	0.4340	3.47	0.2500	2	3.32500	0.4337	3.47	1.6337	0.9500	3.40000	0.10000	0.00781	3.2406
3 1/2	0.4290	3.43	0.2500	2	3.82188	0.4337	3.47	1.6837	1.0000	3.90000	0.10000	0.00781	3.7375
4	0.4560	3.65	0.2500	2	4.31875	0.4337	3.47	1.7337	1.0500	4.40000	0.10000	0.00781	4.2344
5	0.4693	3.75	0.2500	2	5.37511	0.4337	3.47	1.8400	1.1563	5.46300	0.10000	0.00781	5.2907
6	0.5545	4.44	0.2500	2	6.43047	0.4337	3.47	1.9462	1.2625	6.52500	0.10000	0.00781	6.3461

Appendix B. Basic Dimensions for Pipe Threads

This information is selected from the International Standard Pipe Threads ISO 7-1 1994

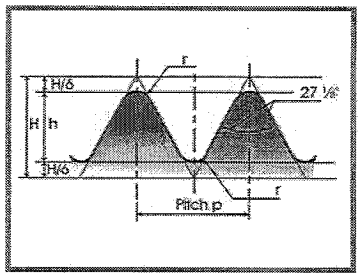


Fig 1 parallel Thread Fig 2 (Taper)
H = 0.960491 x p H
h = 0.640327 x p h
r = 0.137329 x p r

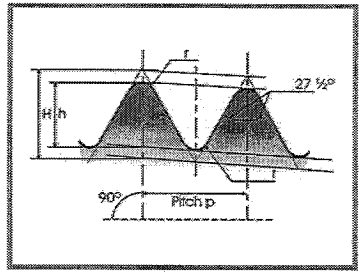
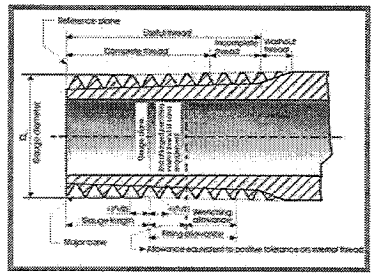


Fig. 3 Taper Thread (Taper 1 in 16 on dia.)
= 0.960237 x p (Shown exaggerated
= 0.640327 x p in diagram)
= 0.137278 x p Axis of screw

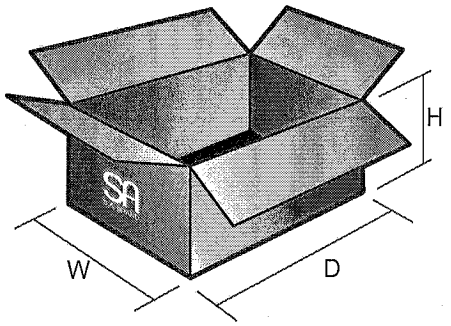


Designation of thread size	Number of threads in 25.4 mm	Pitch	Height (gauge diameter)	Diameters at gauge plane			Gauge length (external thread)					Tolerance on position of gauge plane on internal thread		Length of useful external thread not less than			Fitting allowance		Diametral tolerance1 on parallel internal threads
				Major (gauge diameter)	Pitch	Minor	Nominal	Tolerance ±T1/2		max.	min.	Tolerance ±T2/2		For nominal gauge length	For maximum gauge length	For minimum gauge length			
		P	h	d	d_2	d_1		2)	Turns of thread			2)	Turns of thread				2)	Turns of thread	
1/8	28	0.907	0.581	9.728	9.147	8.566	4.0	0.9	1	4.9	3.1	1.1	1	6.5	7.4	5.6	2.5	2 3/4	±0.071
1/4	19	1.337	0.856	13.157	12.301	11.445	6.0	1.3	1	7.3	4.7	1.7	1	9.7	11.0	8.4	3.7	2 3/4	±0.104
3/8	19	1.337	0.856	16.662	15.806	14.950	6.4	1.3	1	7.7	5.1	1.7	1	10.1	11.4	8.8	3.7	2 3/4	±0.104
1/2	14	1.814	1.162	20.955	19.793	18.631	8.2	1.8	1	10.0	6.4	2.3	1	13.2	15.0	11.4	5.0	2 3/4	±0.142
3/4	14	1.814	1.162	26.441	25.279	24.117	9.5	1.8	1	11.3	7.7	2.3	1	14.5	16.3	12.7	5.0	2 3/4	±0.142
1	11	2.309	1.479	33.249	31.770	30.291	10.4	2.3	1	12.7	8.1	2.9	1	16.8	19.1	14.5	6.4	2 3/4	±0.180
1 1/4	11	2.309	1.479	41.910	40.431	38.952	12.7	2.3	1	15.0	10.4	2.9	1	19.1	21.4	16.8	6.4	2 3/4	±0.180
1 1/2	11	2.309	1.479	47.803	46.324	44.845	12.7	2.3	1	15.0	10.4	2.9	1	19.1	21.4	16.8	6.4	2 3/4	±0.180
2	11	2.309	1.479	59.614	58.135	56.656	15.9	2.3	1	18.2	13.6	2.9	1	23.4	25.7	21.1	7.5	3 3/4	±0.180
2 1/2	11	2.309	1.479	75.184	73.705	72.226	17.5	3.5	1	21.0	14.0	3.5	1	26.7	30.2	23.2	9.2	4	±0.216
3	11	2.309	1.479	87.884	86.405	84.926	20.6	3.5	1	24.1	17.1	3.5	1	29.8	33.3	26.3	9.2	4	±0.216
4	11	2.309	1.479	113.030	111.551	110.072	25.4	3.5	1	28.9	21.9	3.5	1	35.8	39.3	32.3	10.4	4 1/2	±0.216
5	11	2.309	1.479	138.430	136.951	135.472	28.6	3.5	1	32.1	25.1	3.5	1	40.1	43.6	36.6	11.5	5	±0.216
6	11	2.309	1.479	163.830	162.351	160.872	28.6	3.5	1	32.1	25.1	3.5	1	40.1	43.6	36.6	11.5	5	±0.216

Appendix E.
Metric System Table with English Equivalents

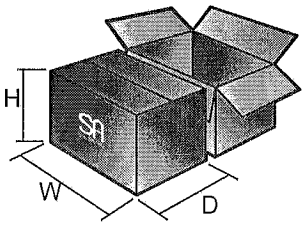
Inches		Millimeters
1/8	=	4
1/4	=	8
3/8	=	10
1/2	=	15
3/4	=	20
1	=	25
1 1/4	=	32
1 1/2	=	40
2	=	50
2 1/2	=	65
3	=	80
4	=	100
5	=	125
6	=	150

MASTER BOX



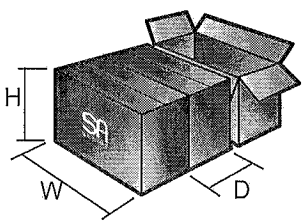
SIZE WxDxH 10 x 13 x 9 3/8"
PAPER A185/ 150 BC

B2 INNER BOX



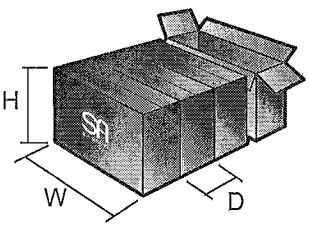
SIZE WxDxH 6 1/4 x 9 5/8 x 8 1/2"
PAPER AS125/ AS125 C

B3 INNER BOX



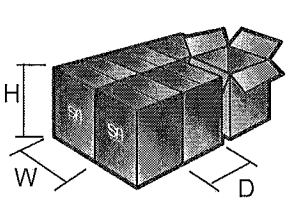
SIZE WxDxH 4 x 9 7/16 x 8 1/2"
PAPER AS125/ AS125 C

B4 INNER BOX



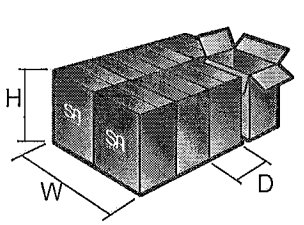
SIZE WxDxH 4 5/8 x 6 1/8 x 8 1/2"
PAPER AS125/ AS125 C

B6 INNER BOX



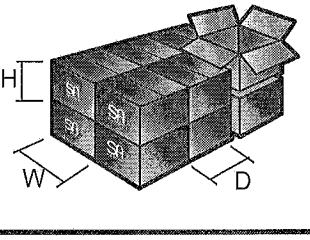
SIZE WxDxH 4 x 4 5/8 x 8 1/2"
PAPER AS125/ AS125 C

B8 INNER BOX



SIZE WxDxH 4 5/8 x 6 1/8 x 4 1/8"
PAPER AS125/ AS125 C

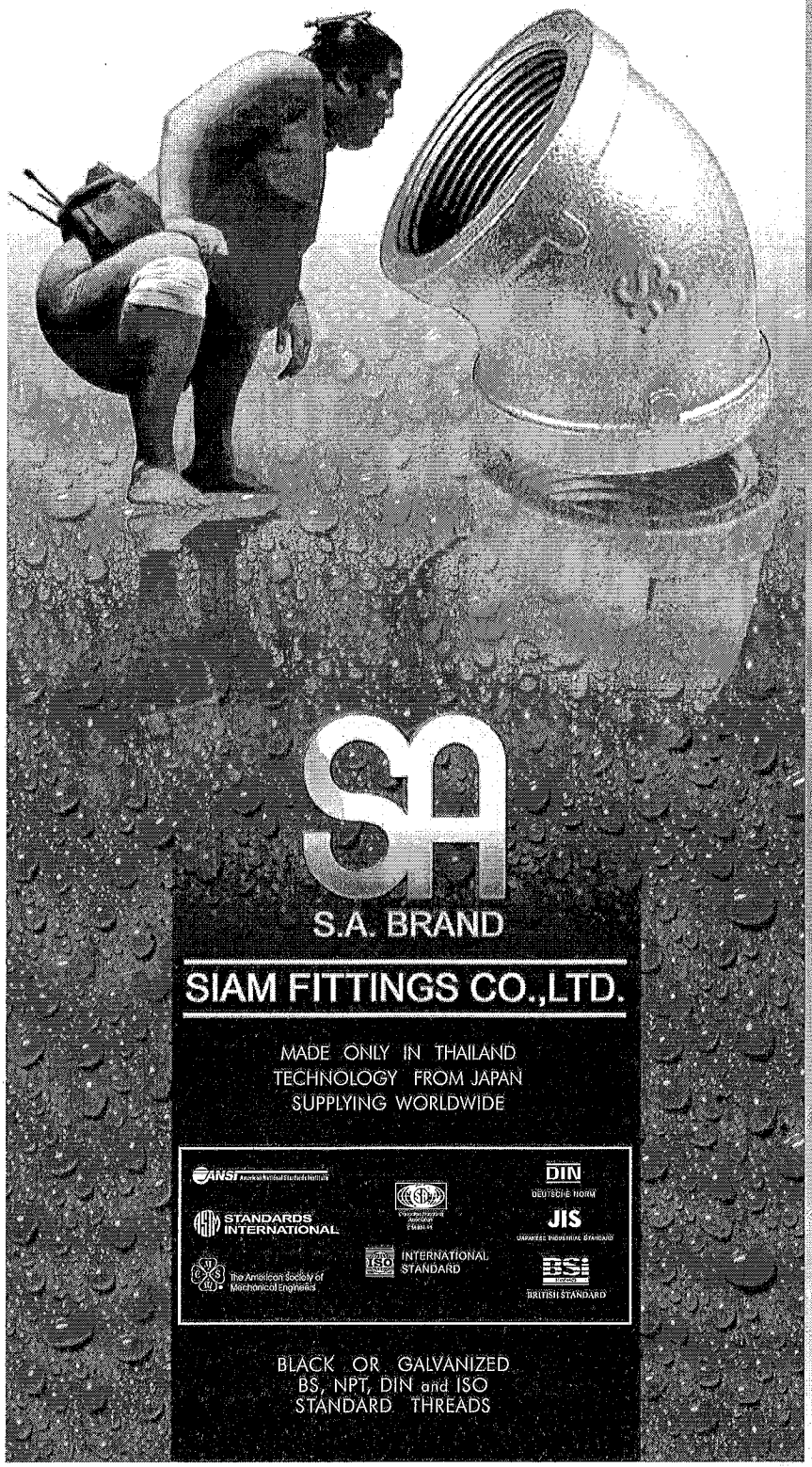
B12 INNER BOX



SIZE WxDxH 4 x 4 5/8 x 4 1/8"
PAPER AS125/ AS125 C

WHATEVER...

your size & shape we have it !!!



SA connect you to daily use of water. With world demand for water and quality of water always increse. We want to make sure that water does not goes to waste from leakage not to mention the damage that result from the leaking water can do. Every connection does matter to us.

Maintain constant product quality is our policy that lead us to ensure that our production base are stable, our people are well trained and experienced, our resources are sufficient to provide continually productivity and improvement. Above all we are motivated to be the leader.

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Fax. +66 (0) 2429 1538
Email : malleable@siamfittings.th.com

Product Specification

Cello

Product Specification:

Cello Products Inc. certifies that it manufactures all its cast brass and wrought copper solder joint fittings to the general specifications outlined in the following industry standards:

Wrought Copper and Copper Alloy Solder Joint Pressure Fittings:	ASME/ANSI Std. B16.22 - 2001
Cast Copper Alloy Solder Joint Pressure Fittings:	ASME/ANSI Std. B16.18 - 2001
Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings -- DWV	ASME/ANSI Std. B16.29 - 2001
Cast Copper Alloy Solder Joint Drainage Fittings:	ASME/ANSI Std. B16.23 - 2002
Bronze Pipe Flanges and Flanged Fittings:	ASME/ANSI Std. B16.24 - 2001
Cast Bronze Threaded Fittings:	ASME/ANSI Std. B16.15 - 1985
Wrought Copper and Copper Alloy Braze - Joint Pressure Fitting	ASME/ANSI Std. B16.50 - 2001
Cast Copper Alloy Pipe Flanges and Flanged Fittings	ASME/ANSI Std. B16.24 - 2001
Wrought Copper LW Solder Joint Pressure Fittings:	MSS SP-104 - 1990
Cast Copper Alloy Flanges and Flanged Fittings Class 125, 150, 300:	MSS SP-106 - 1990

Cello further certifies that the materials used to manufacture these fittings are made in compliance with the following industry standards:

Tubular Wrought Copper:	
Standard Specification for Seamless Copper Tube:	ASTM B75 Alloy C12200
Products Made From Sheet:	
Standard Specification for Copper Sheet, Strip, Plate and Rolled Bar:	ASTM B152 Alloy C11000
Cast Products:	
Standard Specification for Copper Alloy Sand Castings for General Applications; Federal Specification WW-U-516 for Type III, Class A and B Copper Alloy Unions:	ASTM B584 Alloy C84400

The industry standards are: ANSI (American National Standards Institute); ASME (The American Society of Mechanical Engineers); MSS (Manufacturers Standardization Society of the Valve and Fittings Industry Inc.); ASTM (American Society for Testing and Materials).

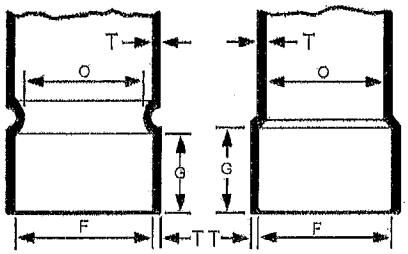
All Cello Products Inc. wrought copper fittings are NSF 61 registered.

All pressure fittings manufactured by Cello Products Inc. have Canadian Registration Numbers (CRN)

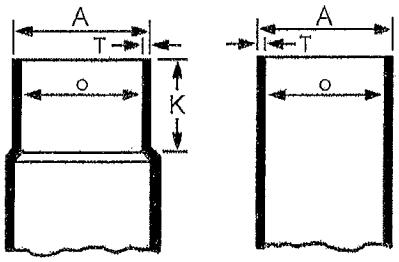
0A4925.5C Pressure pipe fittings
0B4925.5C Flanges
(note - the 5 is needed to designate the first province of registration)

International Quality Standard: Cello Products is certified to ISO 9002 standards through QMI (Quality Management Institute) and will be certified to ISO 9001:2000, by 2004.

Dimensions of Solder Joint Ends - Pressure Fittings (inches)



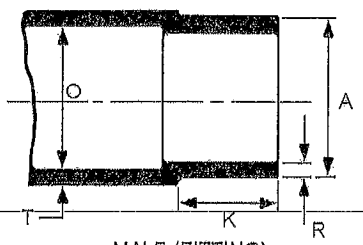
FEMALE (COPPER)



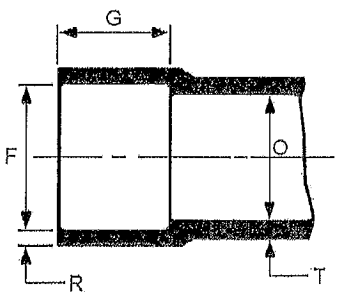
MALE (FITTING)

Wrought-Copper and Wrought-Copper Alloy Solder Joint Pressure Fittings

Standard Water Tube Size	Male End (fitting end) Outside Diameter A		Length K	Female End (copper end) Inside Diameter F		Depth G	Metal Thickness T	Inside Dia. Of Fitting O
	Min.	Max.	Min.	Min.	Max.	Min.	Min.	Min.
1/8	0.248	0.251	0.31	0.252	0.256	0.25	0.019	0.18
1/4	0.373	0.376	0.38	0.377	0.381	0.31	0.023	0.30
3/8	0.497	0.501	0.44	0.502	0.506	0.38	0.026	0.39
1/2	0.622	0.626	0.56	0.627	0.631	0.50	0.029	0.52
5/8	0.747	0.751	0.69	0.752	0.756	0.62	0.031	0.63
3/4	0.872	0.876	0.81	0.877	0.881	0.75	0.033	0.74
1	1.122	1.127	0.97	1.128	1.132	0.91	0.040	0.98
1 1/4	1.372	1.377	1.03	1.378	1.382	0.97	0.044	1.23
1 1/2	1.621	1.627	1.16	1.628	1.633	1.09	0.051	1.47
2	2.121	2.127	1.41	2.128	2.133	1.34	0.059	1.94
2 1/2	2.621	2.627	1.53	2.628	2.633	1.47	0.067	2.42
3	3.121	3.127	1.72	3.128	3.133	1.66	0.075	2.89
3 1/2	3.621	3.627	1.97	3.628	3.633	1.91	0.086	3.37
4	4.121	4.127	2.22	4.128	4.133	2.16	0.096	3.84
5	5.121	5.127	2.72	5.128	5.133	2.66	0.111	4.70
6	6.121	6.127	3.22	6.128	6.133	3.09	0.124	5.72
8	8.119	8.127	4.09	8.128	8.133	3.97	0.173	7.55



MALE (FITTING)



FEMALE (COPPER)

Cast Copper Alloy Solder Joint Pressure Fittings

Standard Water Tube Size	Male End (fitting end) Outside Diameter A		Length K	Female End (copper end) Inside Diameter F		Depth G	Metal Thickness +/- 10% Body T	Joint R	Inside Dia. Of Fitting O
	Min.	Max.	Min.	Min.	Max.	Min.			Min.
1/4	0.373	0.376	0.38	0.377	0.381	0.31	0.08	0.05	0.31
3/8	0.497	0.501	0.44	0.502	0.506	0.38	0.09	0.05	0.43
1/2	0.622	0.626	0.56	0.627	0.631	0.50	0.09	0.05	0.54
3/4	0.872	0.876	0.81	0.877	0.881	0.75	0.10	0.06	0.78
1	1.122	1.127	0.97	1.128	1.132	0.91	0.11	0.07	1.02
1 1/4	1.372	1.377	1.03	1.387	1.382	0.97	0.12	0.07	1.26
1 1/2	1.621	1.627	1.16	1.628	1.633	1.09	0.13	0.08	1.50
2	2.121	2.127	1.41	2.128	2.133	1.34	0.15	0.09	1.98
2 1/2	2.621	2.627	1.53	2.628	2.633	1.47	0.17	0.10	2.46
3	3.121	3.127	1.72	3.128	3.133	1.66	0.19	0.11	2.94
3 1/2	3.621	3.627	1.97	3.628	3.633	1.91	0.20	0.12	3.42
4	4.121	4.127	2.22	4.128	4.133	2.16	0.22	0.13	3.90
5	5.121	5.127	2.72	5.128	5.133	2.66	0.28	0.17	4.87
6	6.121	6.127	3.22	6.128	6.133	3.09	0.34	0.20	5.84
8	8.119	8.127	4.09	8.128	8.133	3.97	0.38	0.31	7.72
10	10.119	10.127	4.12	10.128	10.133	4.00	0.48	0.48	9.62
12	12.119	12.127	4.62	12.128	12.133	4.50	0.56	0.56	11.56

bare hands or oily gloves. Skin oils, lubricating oils and grease impair solder flow and wetting of the metal surfaces.

Temperature Ranges

The choice for soldering or brazing will depend upon operating conditions. Solder joints are generally used where the system temperatures do not exceed 250° F and brazed joints can be used where greater strengths are required (ie. high internal pressure), or where system temperatures are as high as 350° F.

Soldering

Applying flux (a non-aggressive soldering flux) is recommended. Stir the flux before use. Flux is designed to remove residual oxides from the surfaces to be joined, protect the surfaces from re-oxidation during heating and promote the wetting of the surfaces by the liquid solder. A thin, even coating of flux should be applied with a brush to both tube and fitting. The use of fingers to apply flux should be avoided as chemicals in the flux can be harmful if carried to the eyes or open cuts.

Types of solder -- There are a variety of solders available that will produce sound, leak-tight joints. Solders that are used for piping applications generally contain tin and varying amounts of either antimony, copper, lead or silver. For potable water systems, solders which do not contain lead are mandatory.

Assembly -- After both surfaces are properly cleaned and fluxed, they should be assembled by placing the fitting on the tube, making sure the tube seats against the base of the fitting socket. A slight twisting motion is suggested to ensure even coverage by the flux. Remove the excess flux with a rag. Because of the heat that is required during soldering and brazing, only cotton rags should be used. Complete all prepared joints within a single work day. Care must be taken to assure that the tube and fittings are properly supported with a uniform capillary space around the entire circumference of the joint. Uniformity of capillary space will ensure good filler metal penetration if the guidelines of successful joint making are followed. Excessive joint clearance can cause the filler metal to crack under stress or vibration.

Heating -- Because of the open flame and high temperatures required for soldering and the flammability of the gases used, safety precautions must be observed. The heat is generally applied by use of an air/fuel torch. These torches can use acetylene or a variety of LP gases. Electric resistance pliers can also be used.

Heating should begin with the flame perpendicular to the tube. This preheat will conduct the initial heat into the socket for even distribution of heat inside and out. Preheating time depends upon the diameter of the joint -- experience will indicate the proper amount of time. Next, move the flame onto the fitting socket then alternate the flame from the fitting socket back onto the tube a distance equal to the fitting socket. Touch the solder to the joint. If the solder does not melt, remove it and continue the heating process. Be careful not to overheat or direct the flame into the fitting socket. This action can cause the flux to burn and destroy its effectiveness. When the melting temperature has been reached, heat may be applied to the base of the socket to aid capillary action in drawing the solder into the socket.

Applying Solder -- When the tube is in a horizontal position, start applying the solder slightly off-center of the bottom of the joint. Proceed across the bottom of the fitting and up to the top-centre position. Return to the point of beginning, overlap the starting point and then proceed up the uncompleted side to the top. Again, overlapping the solder. Molten solder will be drawn into the joint by capillary action regardless if the solder is being fed upward, downward or horizontally.

Cooling and Cleaning -- After the joint has been made, natural cooling is best. Shock cooling may cause unnecessary stresses on the joint and may result in eventual failure. Once the fitting is cool, clean off any remaining flux with a wet rag.

Brazing

Applying Flux -- The fluxes used for brazing copper joints are different in composition from soldering fluxes. They cannot, and should not, be used interchangeably.

Brazing fluxes are water based. Similar to soldering fluxes, brazing fluxes remove residual oxides from the metal surfaces; they protect the metal surfaces from re-oxidation during heating and they promote the wetting of the surfaces to be joined by the brazing filler metal. Application of the flux is the same as when soldering. If the outside of the fitting and the heat affected area of the tube are covered with flux, it will prevent oxidation and greatly improve the appearance of the joint.

Brazing Filler Materials -- There are two general types of brazing filler metals used for joining copper tube: BCuP (Brazing - Copper - Phosphorous) and BAg (Brazing - Silver). These brazing filler metals are classified according to their components.

BCuP filler metals are preferred for joining copper tube and fittings. The phosphorous in these filler metals acts as a fluxing agent and the lower percentage of silver makes them relatively low cost filler metals. When using copper tube, wrought copper fittings and BCuP brazing filler metal, fluxing is an option due to the self-fluxing action of the phosphorous present in all components of the brazed joint.

The choice of brazing filler metals depends upon four main factors:

- dimensional tolerance of the joint
- type and material of fitting (cast or wrought)
- desired appearance
- cost

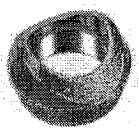
Heating -- Oxy/fuel torches are generally used when brazing because of the higher temperatures required. Due to recent innovations in air/fuel torch tip design, they can now be used on a wider variety of sizes for soldering and brazing.

When working with temperatures this high, safety precautions must be followed and care taken to protect both the operator and the materials being used.

The heating operation is the same as for soldering. First preheat the tube and then the tube and fitting socket. When the brazing filler metal starts to melt, apply the heat at the base of the fitting socket to help draw the brazing filler metal in by capillary action.

Applying Brazing Filler Metal -- Remember to allow the heat of the joint to melt the filler metal. Do not melt the filler metal with the torch. The melted filler metal will be drawn into the joint by capillary action. It is very important that the flame be in continuous motion and should not be allowed to remain on any one point long enough to burn through the tube or fitting. When the joint is complete, a continuous filler should be visible completely around the joint. If the filler metal fails to flow or has the tendency to ball-up, it indicates oxidation on the metal surfaces or insufficient heat on the parts to be joined. If the filler metal refuses to

Forged Steel Branch Outlets • Spec Sheet



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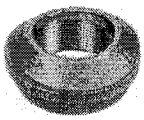

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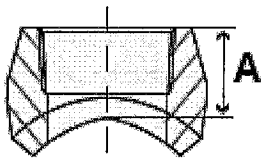

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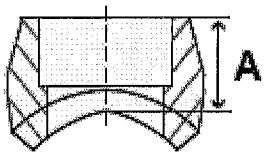

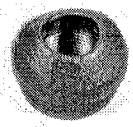

T360504

SW1051008

PART#	SIZE	A IN.	CARTON QTY.	WEIGHT
3000# THREADED				
T360201	36-3/8 RUN X 1/4	0.75	60	0.27
T360302	36-1/2 RUN X 3/8	0.81	60	0.29
T360403	36-3/4 RUN X 1/2	1.00	150	0.29
T360504	36-1 RUN X 3/4	1.06	100	0.51
T070605	1-1/2-1-1/4 RUN X 1	1.31	50	0.88
T360805	36-2 RUN X 1	1.31	50	0.88
T0706	1-1/2 RUN X 1-1/4	1.31	35	0.93
T100806	3-2 RUN X 1-1/4	1.31	35	0.93
T3610506	36-3-1/2 RUN X 1-1/4	1.31	35	0.93
T0807	2 RUN X 1-1/2	1.38	25	1.50
T110907	4-2-1/2 RUN X 1-1/2	1.38	25	1.50
T361207	36-5 RUN X 1-1/2	1.38	25	1.50
T0908	2-1/2 RUN X 2	1.50	15	2.47
T1051008	3-1/2-3 RUN X 2	1.50	15	2.47
T131108	6-4 RUN X 2	1.50	15	2.47
T361408	36-8 RUN X 2	1.50	15	2.47
T1009	3 RUN X 2-1/2	1.81	10	3.00
T1110509	4-3-1/2 RUN X 2-1/2	1.81	10	3.00
T141209	8-5 RUN X 2-1/2	1.81	10	3.00
T361509	36-10 RUN X 2-1/2	1.81	10	3.00
T10510	3-1/2 RUN X 3	2.00	6	4.30
T1110	4 RUN X 3	2.00	6	4.30
T1210	5 RUN X 3	2.00	6	4.30
T1310	6 RUN X 3	2.00	6	4.30
T161410	12-8 RUN X 3	2.00	3	4.30
T361710	36-14 RUN X 3	2.00	3	4.30
T1211	5 RUN X 4	2.25	3	7.12
T1311	6 RUN X 4	2.25	3	7.12
T1411	8 RUN X 4	2.25	3	7.12
T1511	10 RUN X 4	2.25	3	7.12
T181611	16-12 RUN X 4	2.25	3	7.12
T361911	36-18 RUN X 4	2.25	3	7.12

PART#	SIZE	A IN.	CARTON QTY.	WEIGHT
3000# SOCKET WELD				
SW360403	36-3/4 RUN X 1/2	1.00	150	0.29
SW360504	36-1 RUN X 3/4	1.06	100	0.51
SW070605	1-1/2-1-1/4 RUN X 1	1.31	50	0.88
SW360805	36-2 RUN X 1	1.31	50	0.88
SW0706	1-1/2 RUN X 1-1/4	1.31	35	0.93
SW100806	3-2 RUN X 1-1/4	1.31	35	0.93
SW3610506	36-3-1/2 RUN X 1-1/4	1.31	35	0.93
SW0807	2 RUN X 1-1/2	1.38	25	1.50
SW110907	4-2-1/2 RUN X 1-1/2	1.38	25	1.50
SW361207	36-5 RUN X 1-1/2	1.38	25	1.50
SW0908	2-1/2 RUN X 2	1.50	15	2.47
SW1051008	3-1/2-3 RUN X 2	1.50	15	2.47
SW131108	6-4 RUN X 2	1.50	15	2.47
SW361408	36-8 RUN X 2	1.50	15	2.47
SW1009	3 RUN X 2-1/2	1.81	10	3.00
SW1110509	4-3-1/2 RUN X 2-1/2	1.81	10	3.00
SW141209	8-5 RUN X 2-1/2	1.81	10	3.00
SW361509	36-10 RUN X 2-1/2	1.81	10	3.00
SW10510	3-1/2 RUN X 3	2.00	6	4.30
SW1110	4 RUN X 3	2.00	6	4.30
SW1210	5 RUN X 3	2.00	6	4.30
SW1310	6 RUN X 3	2.00	6	4.30
SW161410	12-8 RUN X 3	2.00	3	4.30
SW361710	36-14 RUN X 3	2.00	3	4.30
SW1211	5 RUN X 4	2.25	3	7.12
SW1311	6 RUN X 4	2.25	3	7.12
SW1411	8 RUN X 4	2.25	3	7.12
SW1511	10 RUN X 4	2.25	3	7.12
SW181611	16-12 RUN X 4	2.25	3	7.12
SW361911	36-18 RUN X 4	2.25	3	7.12

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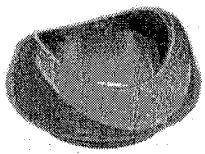
BW1110509

BW360805



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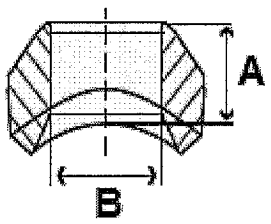

PART#	SIZE	A IN.	B IN.	CARTON QTY.	WEIGHT
BUTT WELD					
BW360403	36-3/4 RUN X 1/2	0.75	0.545	150	0.29
BW360504	36-1 RUN X 3/4	0.88	0.743	100	0.51
BW070605	1-1/2-1-1/4 RUN X 1	1.06	0.957	50	0.88
BW360805	36-2 RUN X 1	1.06	0.957	50	0.88
BW0706	1-1/2 RUN X 1-1/4	1.25	1.280	35	0.93
BW100806	3-2 RUN X 1-1/4	1.25	1.280	35	0.93
BW3610506	36-3-1/2 RUN X 1-1/4	1.25	1.280	35	0.93
BW0807	2 RUN X 1-1/2	1.31	1.502	25	1.50
BW110907	4-2-1/2 X 1-1/2	1.31	1.502	25	1.50
BW361207	36-5 RUN X 1-1/2	1.31	1.502	25	1.50
BW0908	2-1/2 RUN X 2	1.50	1.938	15	2.47
BW1051008	3-1/2-3 RUN X 2	1.50	1.938	15	2.47
BW131108	6-4 RUN X 2	1.50	1.938	15	2.47
BW361408	36-8 RUN X 2	1.50	1.938	15	2.47
BW1009	3 RUN X 2-1/2	1.62	2.322	10	3.00
BW1110509	4-3-1/2 RUN X 2-1/2	1.62	2.322	10	3.00

PART#	SIZE	A IN.	B IN.	CARTON QTY.	WEIGHT
BUTT WELD					
BW141209	8-5 RUN X 2-1/2	1.62	2.322	10	3.00
BW361509	36-10 RUN X 2-1/2	1.62	2.322	10	3.00
BW10510	3-1/2 RUN X 3	1.75	2.900	6	4.30
BW1110	4 RUN X 3	1.75	2.900	6	4.30
BW1210	5 RUN X 3	1.75	2.900	6	4.30
BW1310	6 RUN X 3	1.75	2.900	6	4.30
BW161410	12-8 RUN X 3	1.75	2.900	3	4.30
BW361710	36-14 RUN X 3	1.75	2.900	3	4.30
BW1211	5 RUN X 4	2.00	3.826	3	7.12
BW1311	6 RUN X 4	2.00	3.826	3	7.12
BW1411	8 RUN X 4	2.00	3.826	3	7.12
BW1511	10 RUN X 4	2.00	3.826	3	7.12
BW181611	16-12 RUN X 4	2.00	3.826	3	7.12
BW361911	36-18 RUN X 4	2.00	3.826	3	7.12
BW1513	10 RUN X 6	3.06	5.761	3	7.12
BW1614	12 RUN X 8	3.88	7.625	3	7.12

Note: All Butt Weld Outlets Have a Schedule 80 Bore

BRANCH OUTLET RUN SIZE COMBINATIONS

3000# THREADED & SOCKET WELD - S/80 BUTT-WELD

		OUTLET SIZE										
Run Size	Straight Way	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
		3/8" - 36"	1/2" - 36"	3/4" - 36"	1" - 36"	1-1/4" - 1-1/2"	1-1/2"	2"	2-1/2"	3"	3-1/2"	5"
						2" - 36"	2" - 3"	2-1/2" - 4"	3 - 3-1/2"	3-1/2" - 4"	4"	6"
							3-1/2" - 36"	5" - 36"	4" - 6"	5" - 8"	5"	8"
									8" - 36"	10" - 36"	6"	10"
											8" - 12"	12" - 16"
											14" - 36"	18" - 36"

Butt-Weld Outlets also available in 10" x 6" and 12" x 8".
Each charted outlet size are designed to fit a number of run pipe sizes.

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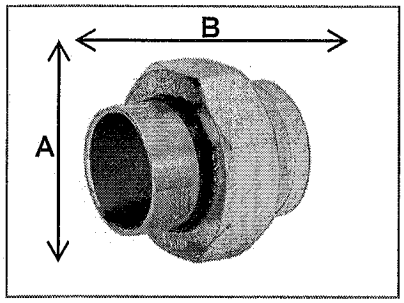
FEATURES & BENEFITS

- Rated to 250°F at 250 PSI Max
- Threaded end comply with ANSI B1.20.1
- Solder ends comply with ANSI B16.22
- Gasket - Silicone Rubber

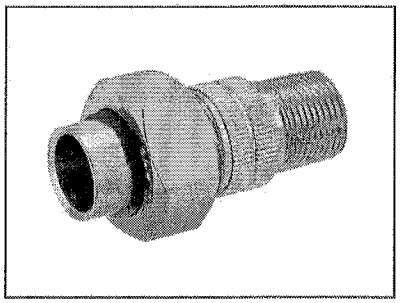
MATERIAL SPECIFICATIONS

- Nut - Steel (with Galvanized coat) ASTM A108
- Insert - Nylon
- IPS Connection - Steel (with Galvanized coat) ASTM A108
- Solder Connection - Brass ASTM B-16



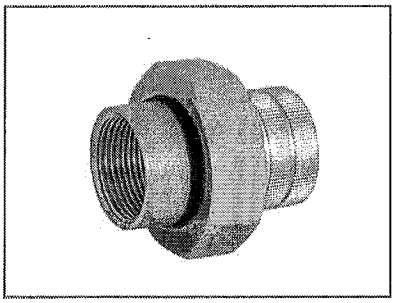
Female X Sweat

Part #	Size	A	B
DUN-0509	1/2"	1.62	1.77
DUN-0759	3/4"	1.85	2.09
DUN-7559	3/4" x 1/2"	1.85	1.93
DUN-1009	1"	2.17	2.29
DUN-1259	1-1/4"	2.64	2.60
DUN-1509	1-1/2"	3.15	2.76
DUN-2009	2"	4.02	3.09



Male X Sweat

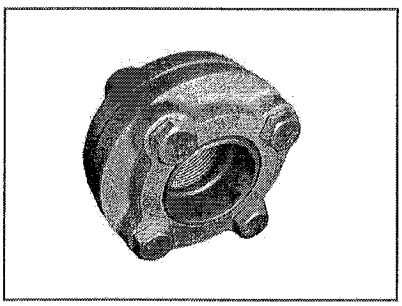
Part #	Size	A	B
DUN-0509M	1/2"	1.62	2.76
DUN-759M	3/4"	1.85	2.94



Female X BPT*

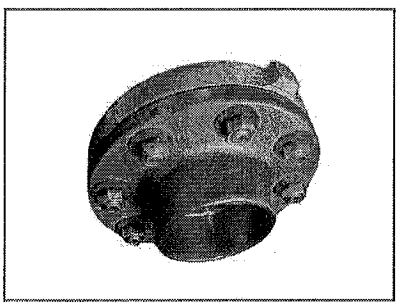
Part #	Size	A	B
DUN-EA03	1/2"	1.85	2.09
DUN-EA04	3/4"	2.17	2.13
DUN-EA05	1"	2.64	2.52
DUN-EA06	1-1/4"	3.15	2.70
DUN-EA07	1-1/2"	4.02	2.76
DUN-EA08	2"	4.43	3.15

*Brass Pipe Thread



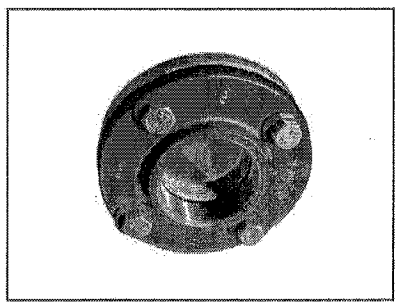
Female X Sweat

Part #	Size	A	B
DUN-0909	2-1/2"	7.01	2.36
DUN-1010	3"	7.53	2.52



Female X Sweat

Part #	Size	A	B
DUN-1111	4"	9.14	2.76



Female X BPT*

Part #	Size	A	B
DUN-GA09	2-1/2"	6.11	3.55
DUN-GA10	3"	3.70	3.75
DUN-GA11	4"	9.14	4.53

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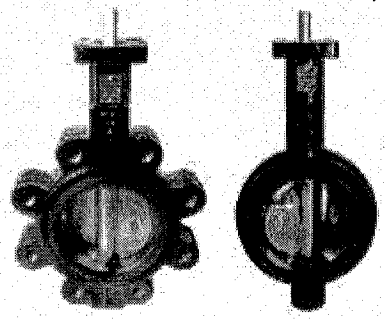
WEB: **www.matco-norca.com** EMAIL: **mail@matco-norca.com**

"Apollo" Valves

SUBMITTAL SHEET

—LD141/WD141 Series—

General Purpose **Butterfly Valves**



Job Name:	
Job Location:	
Engineer:	
Contractor:	
Tag:	
PO Number:	
Representative:	
Wholesale Distributor:	

DESCRIPTION

The Apollo® LD141/WD141 Series Ductile Iron Butterfly Valves are ideal for use in Industrial and HVAC/Mechanical applications. The WD141 Series is a wafer style valve and the LD141 Series is a companion lug style.

FEATURES

- Compatible with ANSI 125# & 150# Flanges
- ISO 5211 Top Plate Allows Choice of Apollo® Pneumatic Actuators and manual operators
- Optional square drive shaft for direct mounting actuators (2"-12")
- Conforms to MSS SP-67 & API 609
- LD141 Series Suitable for End of Line Service to Rated Pressure
- 3"-24" meet performance requirements of AWWA C-504

PERFORMANCE RATING

- Pressure Rating: 2" to 12": 200 psi
- Pressure Rating: 14" to 24": 150 psi

MATERIAL OPTIONS

Body

- Ductile Iron ASTM A536, (65-45-12)

Disc Material

- Aluminum Bronze
- Ductile Iron A536 Nickel Plated
- Stainless Steel, CF8M

Seat Material

- EPDM: -30°F to +275°F
- BUNA-N: +10°F to +180°F

Operator

- -0 - None
- -1 - 10 Position Handle
- -2 - Gear Operator (12" handwheels)
- -3 - Infinite Position Handle
- -4 - Locking Handle
- -5 - Gear Operator w/ Chain Wheel
- -7 - Locking Gear Operator
- -8 - Locking Gear Operator w/ Chain Wheel

STANDARD MATERIALS LIST

Part Name	Material
Body	Ductile Iron ASTM A536
Bushings	Glass Reinforced Epoxy Resin
Stem Seal	Buna-N
Shaft	416 SS ASTM A276 Type 416

TORQUE RATING * (INCH - LBS)

Valve Size In.	Valve Size mm	Full Rated Pressures (psi) ΔP 50	ΔP 100	ΔP 150	ΔP 200	Flow Cv Full Open
2	50	100	106	111	117	115
2.5	65	150	163	176	189	196
3	80	207	220	232	244	302
4	100	290	323	357	390	600
5	125	423	481	540	598	1022
6	150	599	691	783	875	1579
8	200	1060	1183	1307	1430	3136
10	250	1671	1872	2074	2275	5340
12	300	2568	2795	3023	3250	8250
14	350	2640	3070	3500	N/A	11917
16	400	4260	4880	5500	N/A	16388
18	450	6287	7243	8200	N/A	21705
20	500	8360	9180	10000	N/A	27908
24	600	15427	16813	18200	N/A	43116

** Lubricating media service*

WEIGHT

Weight WD141 (lbs.)	Weight LD141 (lbs.)
6	9
8	10
9	11
11	18
15	22
18	26
32	43
47	66
-	102
-	148
-	206
-	277
-	410
-	592

Apollo Valves / **Conbraco Industries, Inc.**
701 Matthews Mint-Hill Road, Matthews, NC 28105 USA
www.**apollovalves**.com | (704) 841-6000

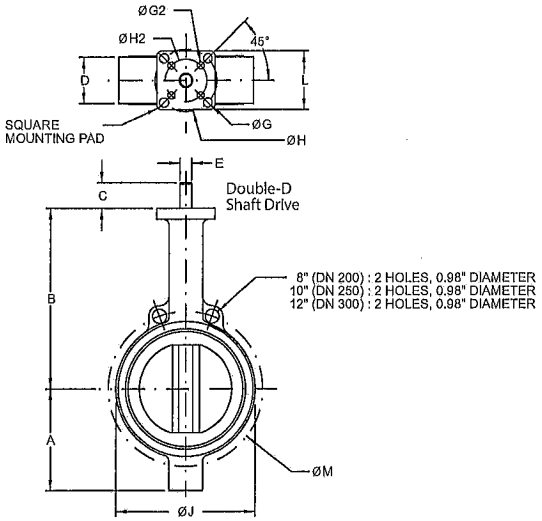
"Apollo" Valves

SUBMITTAL SHEET

—LD141/WD141 Series—

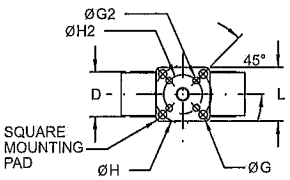
General Purpose **Butterfly Valves**

WD MODEL
2" - 12"

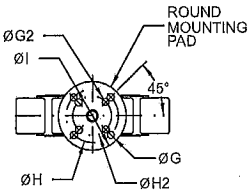


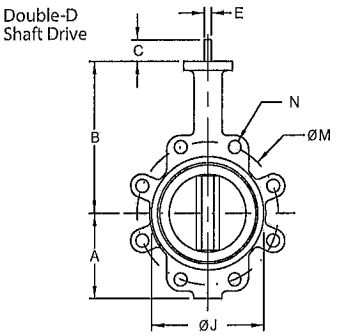
LD MODEL

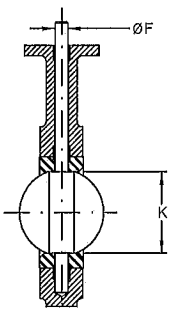
2" - 12"



14" - 24"







Shaft Drive:
Double-D (14")
Round & Keyed (16" & larger)

DOUBLE-D AND KEYED STEM

Size Inches	Size DN	Dimensions in Inches																	
		A	B	C	D	E	ØF	ØG	ØG2	Key	ØH	ØH2	ØI	ØJ	K	L	M	N (WD)	N (LD)
2	50	3.25	6.375	1.25	1.75	0.394	0.496	0.375	--	--	2.756	--	2.699	4	2.09	1.113	4.75	0.688	.625-11
2.5	65	3.75	6.880	1.25	1.88	0.394	0.496	0.375	--	--	2.756	--	2.699	4.75	2.54	1.706	5.50	0.688	.625-11
3	80	4.00	7.130	1.25	1.88	0.394	0.496	0.375	--	--	2.756	--	2.699	5.13	3.09	2.450	6.00	0.688	.625-11
4	100	4.88	7.880	1.25	2.13	0.472	0.621	0.375	--	--	2.756	--	2.699	6.75	4.09	3.488	7.50	0.688	.625-11
5	125	5.38	8.380	1.25	2.25	0.551	0.745	0.375	--	--	2.756	--	2.699	7.75	4.85	4.296	8.50	0.813	.625-11
6	150	5.88	8.880	1.25	2.25	0.551	0.745	0.375	--	--	2.756	--	2.699	8.63	6.13	5.697	9.50	0.813	.751-10
8	200	7.13	10.250	1.75	2.50	0.669	0.870	0.563	0.438	--	4.921	4.015	4.606	10.56	7.89	7.468	11.75	0.813	.750-10
10	250	8.25	11.500	1.88	2.75	0.866	1.120	0.563	0.438	--	4.921	4.015	4.606	13.06	9.89	9.484	14.25	0.938	.750-10
12	300	9.75	13.250	1.88	3.13	0.945	1.244	0.563	--	--	4.921	--	4.606	16	11.89	11.456	17.00	0.938	.875-9
14*	350	11.00	14.500	1.88	3.13	0.945	1.244	0.563	--	--	4.921	--	Ø5.91	17.13	13.38	13.000	18.75	1.060	.875-9
16*	400	12.00	15.750	2.00	3.50	--	1.313	0.563	--	0.313	4.921	--	Ø5.91	20	15.38	14.970	21.25	1.060	1.00-8
18*	450	14.38	16.630	2.00	4.25	--	1.500	0.813	--	0.375	6.496	--	Ø8.27	21.38	17.38	16.847	22.75	1.250	1.00-8
20*	500	14.63	18.880	2.50	5.25	--	1.625	0.813	--	0.375	6.496	--	Ø8.27	23.31	19.38	18.650	25.00	1.250	1.125-7
24*	600	18.00	22.130	2.75	6.13	--	2.000	0.813	--	0.500	6.496	--	Ø8.27	27.88	23.38	22.558	29.50	1.380	1.125-7

** LD141 Series only*

Apollo Valves / **Conbraco Industries, Inc.**
701 Matthews Mint-Hill Road, Matthews, NC 28105 USA
www.**apollovalves**.com | (704) 841-6000

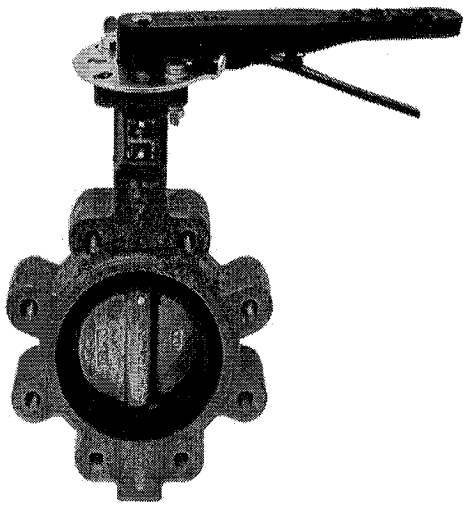
LC149 SERIES

Contractor Grade Butterfly Valves

Job Name:	**Contractor:**
Job Location:	**P.O. Number:**
Engineer:	**Representative:**
Tag:	**Wholesale Distributor:**

DESCRIPTION

The Apollo® LC149 Series Cast Iron Butterfly Valves are ideal for use in Industrial and HVAC/Mechanical applications. The LC149 Series is a lug style valve designed to be economical yet have high pressure capabilities.



FEATURES

- Compatible with ANSI 125# & 150# Flanges
- ISO 5211 Top plate allows choice of Apollo® pneumatic actuators and manual operators
- "Double-D" stem design
- Conforms to MSS SP-67, API 609 & ISO 5752
- Suitable for end of line service to rated pressure
- Extended neck for up to 2" of insulation

STANDARD MATERIALS

Body	Cast Iron, ASTM A126 Class B
Disc	Aluminum Bronze, ASTM B148-C95400
Shaft	Stainless Steel, ASTM A276, Type 416
Seat	EPDM (FDA food grade) with phenolic backing
Bushings	PTFE
Stem Seal	EPDM

PERFORMANCE RATINGS

- Max Operating Pressure: 200 psi
- Temperature Range: -30°F to +275°F

VALVE WEIGHT

VALVE		WEIGHT W/ LEVER (LBS)	WEIGHT W/ GEAR (LBS)
IN.	MM		
2	50	8	--
2.5	65	10	--
3	80	11	--
4	100	17	--
5	125	20	--
6	150	23	--
8	200	44	71
10	250	67	94
12	300	102	129

TORQUE RATING

* (INCH-LBS)						FLOW
Valve Size		Full Rated Pressures (psi)				Cv Full
IN.	MM	ΔP 50	ΔP 100	ΔP 150	ΔP 200	Open
2	50	100	106	111	117	115
2.5	65	150	163	176	189	196
3	80	207	220	232	244	302
4	100	290	323	357	390	600
5	125	423	481	540	598	1022
6	150	599	691	783	875	1579
8	200	1060	1183	1307	1430	3136
10	250	1671	1872	2074	2275	5340
12	300	2568	2795	3023	3250	8250

* Lubricating media service

Model Number Guide (example)

LC149 - 06 - 1

- SERIES NUMBER: LC149 - CAST IRON LUG BODY
- SIZE (IN): 02 - 2; 25 - 2.5; 03 - 3; 04 - 4; 05 - 5; 06 - 6; 08 - 8; 10 - 10; 12 - 12
- OPERATOR: 1 - 10 POSITION HANDLE (2" - 12"); 2 - GEAR OPERATOR (8" - 12" ONLY)

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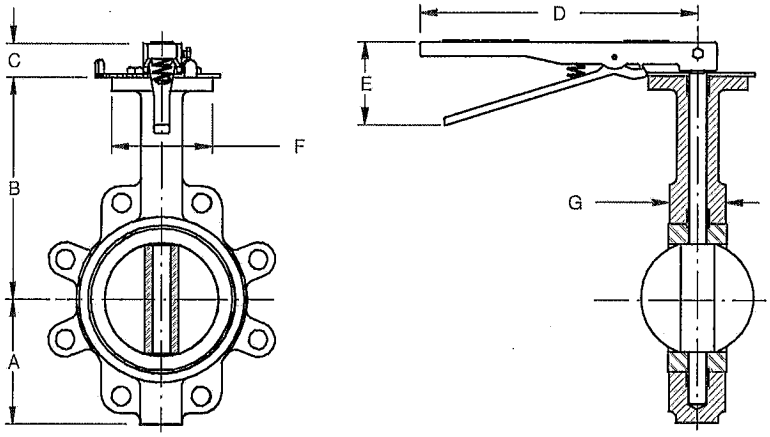
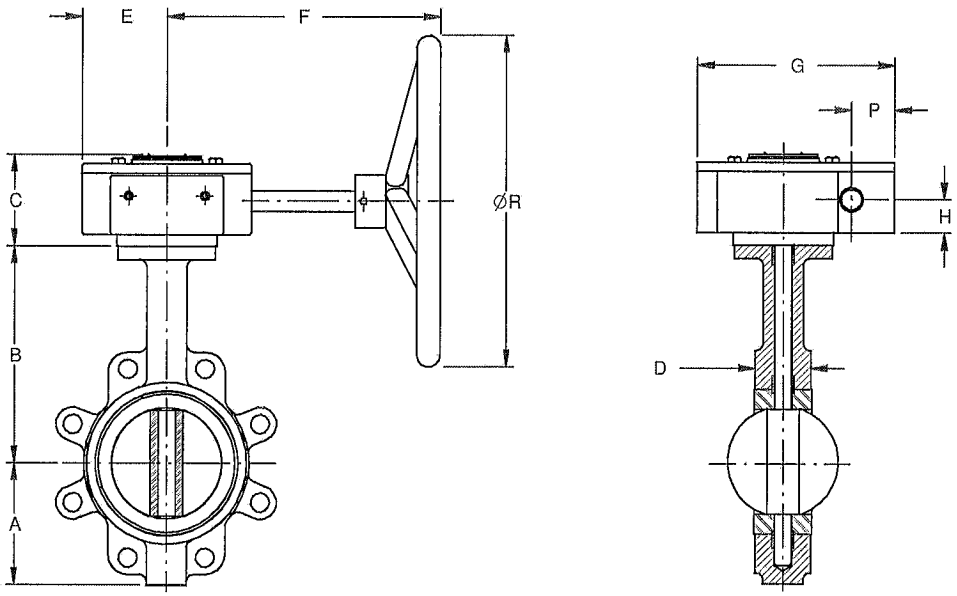
LC149 Series

Contractor Grade Butterfly Valves

DIMENSIONS



SIZE (IN)	A	B	C	D	E	F	G
2	3.25	6.38	1.25	10.50	3.00	2.70	1.75
2.5	3.75	6.88	1.25	10.50	3.00	2.70	1.88
3	4.00	7.13	1.25	10.50	3.00	2.70	1.88
4	4.88	7.88	1.25	10.50	3.00	2.70	2.13
5	5.38	8.38	1.25	10.50	3.00	2.70	2.25
6	5.88	8.88	1.25	10.50	3.00	2.70	2.25
8	7.13	10.25	2.00	14.00	3.75	4.61	2.50



SIZE (IN)	A	B	C	D	E	F	G	H	P	ØR
6.00	5.88	8.88	3.38	2.25	3.09	9.16	7.20	1.45	1.58	11.88
8.00	7.13	10.25	3.38	2.50	3.25	9.48	8.00	1.62	1.50	11.88
10.00	8.25	11.50	3.38	2.75	3.25	9.48	8.00	1.62	1.50	11.88
12.00	9.75	13.25	3.38	3.13	3.25	9.48	8.00	1.62	1.50	11.88

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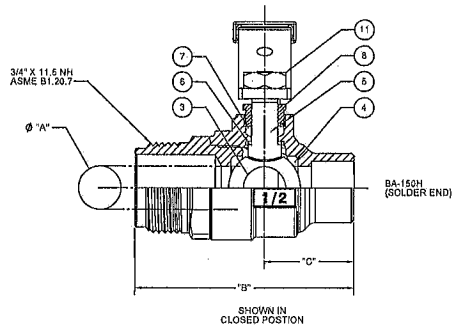
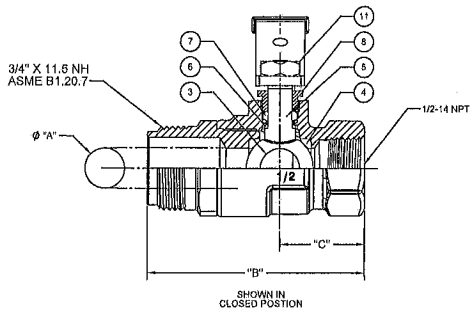
BA-100H/150H

1/2" - 3/4"

MSS SP-110

BRONZE BALL VALVE, HOSE END,
DUST CAP and CHAIN
TWO-PIECE, FULL PORT
THREADED x 3/4" HOSE END (BA100H)
SOLDER x 3/4" HOSE END (BA150H)
BLOW-OUT PROOF STEM





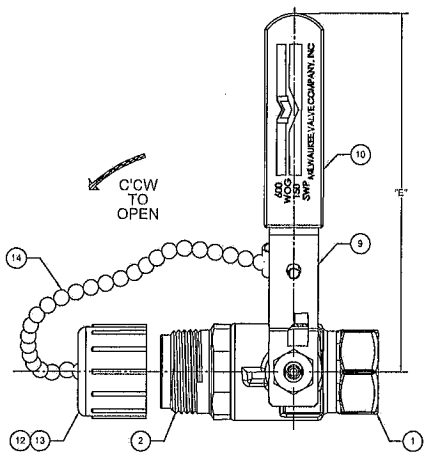
DIMENSIONS

	UNITS	1/2" DN15	3/4" DN20
Ø A	INCHES	0.50	0.76
	mm	12.7	19.3
B (BA-100)	INCHES	2.70	2.90
	mm	69	74
B' (BA-150)	INCHES	2.55	3.05
	mm	65	78
C (BA-100)	INCHES	1.10	1.30
	mm	28	33
C' (BA-150)	INCHES	1.10	1.45
	mm	28	37
D	INCHES	1.88	2.14
	mm	48	54
E	INCHES	3.81	4.62
	mm	97	117
F	THREADED INLET	NPT	NPT
Cv		13	30

Note: DN (Diameter Nominal) = Metric equivalent size.

Rev. 14

Do not pressurize cap.

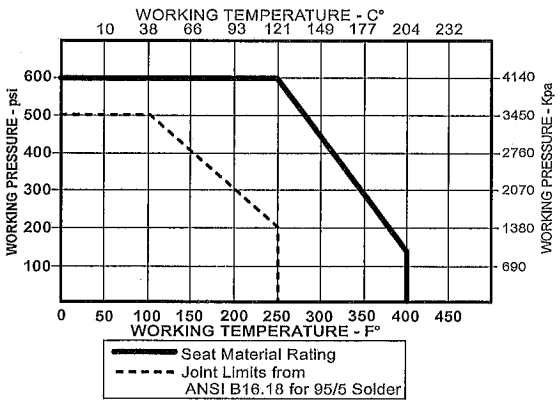


MATERIALS LIST

ITEM	DESCRIPTION	MATERIAL	ATM SPEC.
1	BODY	BRONZE	B584
2	TAILPIECE	BRASS	B16
3	BALL	BRASS, CHROME PLATED	B16
4	SEAT	RPTFE, 15% GLASS FILLED	
5	STEM	BRASS	B16
6	THRUST WASHER	RPTFE, 25% GLASS FILLED	
7	PACKING	PTFE	
8	PACKING NUT	BRASS	B16
9	HANDLE	STEEL, ZINC PLATED	
10	HANDLE GRIP	VINYL	
11	HANDLE NUT	STEEL, ZINC PLATED	
12	DUST CAP	POLYPROPYLENE	
13	GASKET	EPDM	
14	CHAIN	BRASS BEAD	

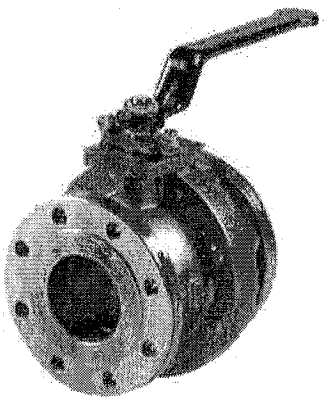
NOTE: Pressure / Temperature ratings shown are for valve only. Hose side pressure and temperature limit is based on connected hose and is the users responsibility.

PRESSURE - TEMPERATURE DATA (See Note)



The information presented on this sheet is correct at the time of publication. Milwaukee Valve reserves the right to change design, and/or material specifications without notice. For the Installation, Operation and Maintenance Manual (IOM) see the engineering section on our website. For the most current information access www.milwaukeevalve.com

F20 Series Ball Valve
Milwaukee Valve Company
F20CS/F20SS CLASS 150/300



2 Piece Full Port Flanged Ball Valve

Features and Benefits

- Locking lever for safety lockout
- Live loaded packing for extended service
- Vented ball in ball slot for cavity venting
- Standard grounded ball and stem
- ISO 5211 mounting pad for easy actuation
- Spiral wound graphite and stainless body seal
- NACE compliant fasteners for sour gas service
- Blow-out proof stem
- Fire-safe to API 607 6th edition latest revision
- Pressure relieving seat design
- Meets all of the latest: API, ASTM/ASME standards

Specification

- Valve Sizes 1" thru 12" *
- ASME/ANSI Class 150/300
- B.16.34 design
- API 608 design
- API 607 Firesafe 6th edition
- API 598, MSS SP-72
- NACE MR0175

Operators Available

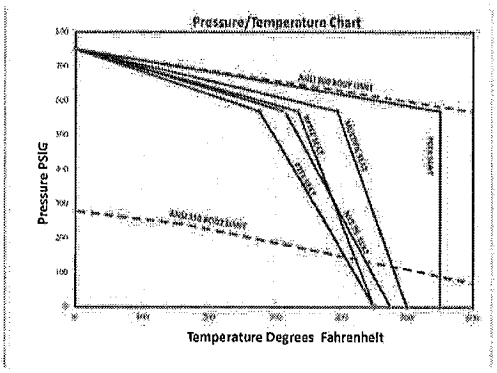
- Locking Lever Handle
- Gear operated
- Pneumatic and Electric Actuation

Pressure Ratings:	Class 150	Class 300
Carbon Steel	285 psi	740 psi
Stainless Steel	275 psi	720 psi

Materials of Construction

- Carbon steel or CF8M Stainless Steel
- Ball: 316 Stainless
- Stem: 316 Body: WCB Stainless
- Seats: Reinforced PTFE/or NXT (M-PTFE)
- Packing: Graphite

Valve is rated 150 steam @ 365 degrees F.



* 1/2" & 3/4" - See F90/91 Series

TORQUE AND CV RATINGS

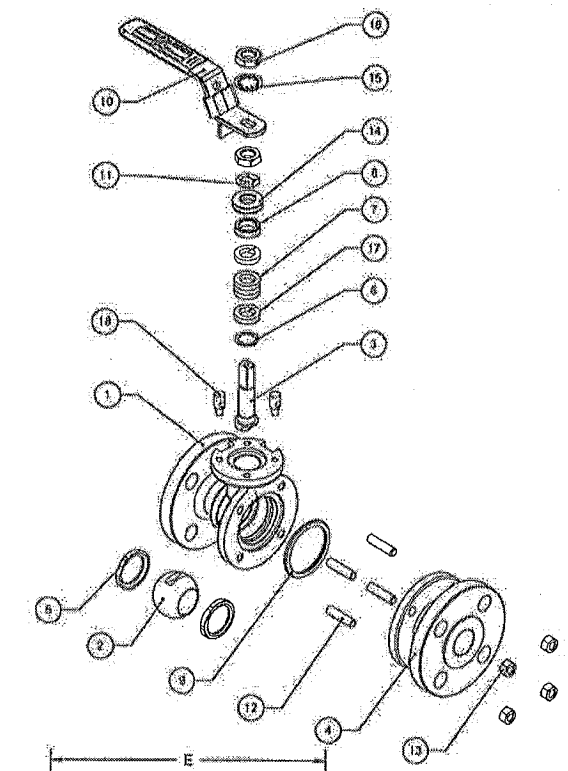
VALVE SIZE	Class 150 (0-285 PSID) TORQUE (in. lbs. / Nm)	Class 300 (285-740 PSID) TORQUE (in. lbs. / Nm)	Cv	VALVE SIZE	Class 150 (0-285 PSID) TORQUE (in. lbs. / Nm)	Class 300 (285-740 PSID) TORQUE (in. lbs. / Nm)	Cv
1	140 15.8	180 20.3	100	4	1600 180.8	1600 180.8	2500
1-1/2	220 24.9	300 33.9	270	6	2700 305.1	3000 339.0	5600
2	450 50.9	450 50.9	500	8	7200 813.6	10000 1130.0	10000
2-1/2	510 57.6	NA	785	10	8280 935.6	NA	16000
3	700 79.1	880 99.4	1300	12	13200 1491.6	NA	22300

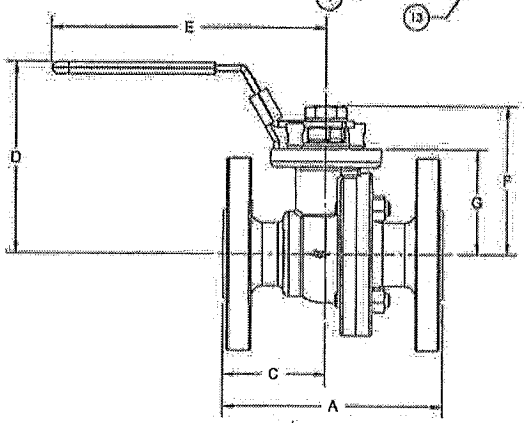
How To Order Milwaukee Valve F20 Series Full Port Two Piece Flanged Ball Valve

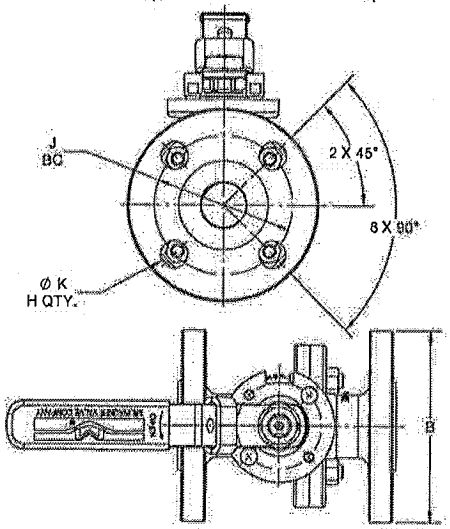
Series	ANSI Class	Body Material	Ball / Stem Material	Seat Material	Operator	Internal Options	Size
XXX	X	X	X	X	X	XXX	XXXX
F20	1-150 3-300	C-Carbon Steel (WCB) S-Stainless Steel (CF8M)	S-Stainless Steel (316) M-Monel (400)	N-NXT 1-Virgin PTFE 2-Reinforced PTFE 3-Multi-Fill PTFE	2-Lever 3-Gear Operator	A-Assemble Dry V-Vented Ball O-Oxygen Clean C-Chlorine Clean F- Flat Faced Flg. T - PTFE Pkg.	100 - 1" 112 - 1-1/2" 200 - 2" 212 - 2-1/2" 300 - 3" 400 - 4" 600 - 6" 800 - 8" 1000 - 10" 1200 - 12"
F20	1	C	S	N	3	A	100

150 Class, Carbon Steel Body,Stainless Steel Ball & Stem, NXT Seats, Gear Operator,Assembled Dry 1"

F20CS/F20SS CLASS 150/300 1"-3"







Material List

Item	Qty.	Description	F20 Class 150/300
1	1	Body	SS ATSM A351 GR CF8M
			CS ASTM A216 GR WCB
2	1	Ball	SS ASTM A351 GR CF8M
3	1	Stem	ASTM A479 Type 316
4	1	Tail Pieces	CS ASTM A216 GR WCB
			SS ASTM A351 GR CF8M
5	2	Seat Materials	NXT M-PTFE
			03-MULTI FILLED/TFE/GRAPHITE
			02-RPTFE
6	1	Thrust Washer	25% Glass Filled Reinforced Teflon
7	3	Graphite Packing	Graphite
8	1	Packing Gland	ASTM A479 Type 316
9	1	Body Seal	ASTM A240 TY 304 & Graphite
10	1	Handle Assy	Stainless Steel
10.1	1	Handle	ASTM A276 Type 304
10.2	1	Latch	ASTM A276 Type 304
11	1	Lock Tab	ASTM A276 Type 304
12	4	Body Stud	ASTM A194 GR8 Type 304
13	4	Body Stud Nut	ASTM A193 GR B8 Type 304
14	2	Belleville Washer	ASTM A276 Type 304
15	1	Lock Washer	ASTM A582 Type 303
16	2	Stem Nut	ASTM A194 GR8 Type 304
17	2	Packing End Ring	Graphite
18	2	Stop Pin	ASTM A276 Type 304

Class 150 # Dimensions

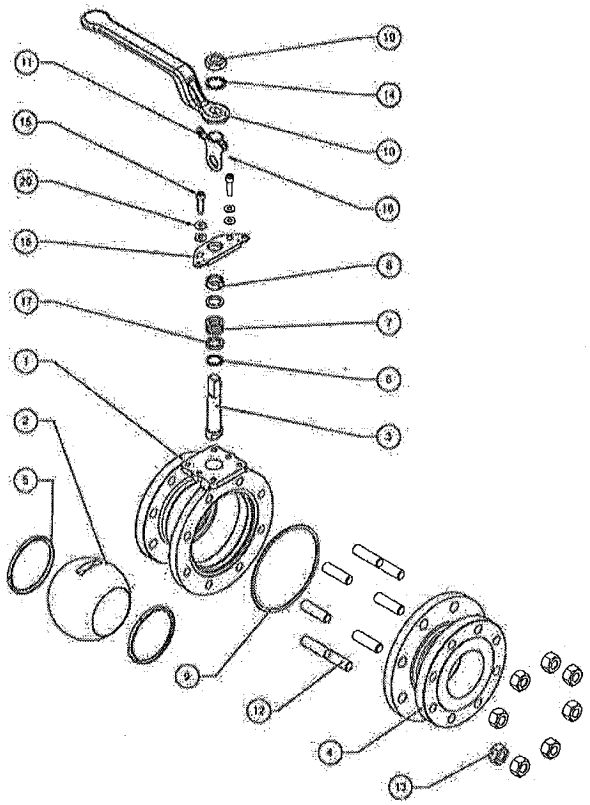
Size	Dim.	A	B	C	D	E	F	G	H (qty)	J(B.C)	K
1	in.	5	4.33	2.3	4.31	6.2	3.34	2.36	4	3.13	0.63
	mm.	127	111	58.5	109.4	157.5	84.9	60	4	79.4	15.9
1.5	in.	6.5	4.92	2.85	4.95	8.91	4.07	2.95	4	3.87	0.63
	mm.	165	125	72.5	125.7	226.4	103.4	75	4	98.4	15.9
2	in.	7.01	5.91	3.09	5.54	8.91	4.66	3.54	4	4.75	0.75
	mm.	178	150	78.5	140.7	226.4	118.4	90	4	120.7	19.1
2.5	in.	7.48	7.09	3.35	6.11	8.95	6.11	3.94	4	5.5	0.75
	mm.	190	180	85	155.2	227.3	155.2	100	4	139.7	19.1
3	in.	8	7.48	3.41	6.94	8.95	6.09	4.72	4	6	0.75
	mm.	203	190	86.5	176.3	227.3	154.6	120	4	152.4	19.1

Class 300 # Dimensions

Size	Dim.	A	B	C	D	E	F	G	H (qty)	J(B.C)	K
1	in.	6.5	4.92	3.25	4.18	6.2	3.34	2.36	4	3.5	0.75
	mm.	164	125	82.5	106.3	157.5	84.9	60	4	88.9	19.1
1.5	in.	7.51	6310	3.35	4.86	8.91	4.07	2.95	4	4.5	0.88
	mm.	190.7	155	85	123.5	226.4	103.4	75	4	114.3	22.2
2	in.	8.5	6.5	3.31	5.54	8.91	4.66	3.54	4	5	0.75
	mm.	216	165	84	140.7	225.4	118.4	90	4	127	19.1
2.5	in.	9.49	7.48	4.74	6.07	8.95	5.29	3.94	8	5.87	0.88
	mm.	241	190	120.5	154.1	227.3	14.4	100	8	149.2	22.2
3	in.	11.1	8.27	5.55	6.86	8.95	6.08	4.72	8	6.63	0.88
	mm.	282	210	141	174.1	227.3	154.4	227.3	8	168.3	22.2

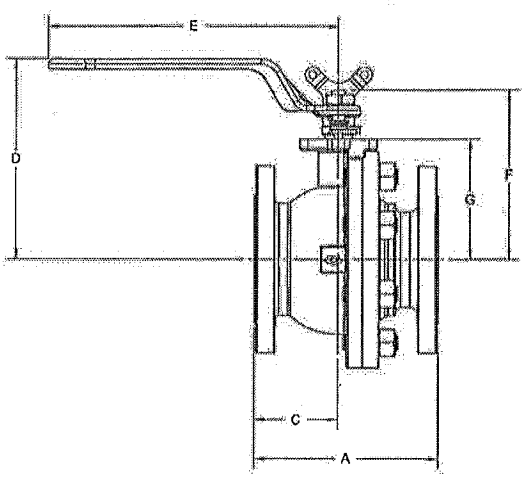
Rev. 1

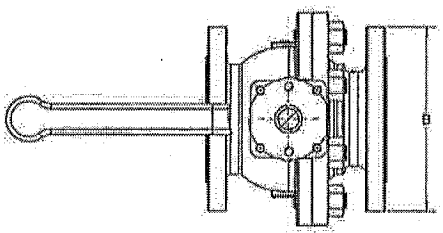
F20CS/F20SS CLASS 150/300 4"-6"

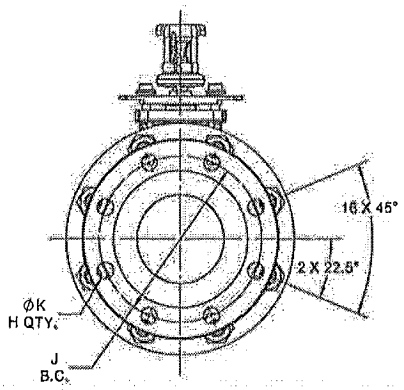


Material List

Item	Qty.	Description	F20 Class 150/300
1	1	Body	Stainless Steel A351 GR CF8M
			CS ASTM A216 GR WCB
2	1	Ball	SS ASTM A351 GR CF8M
3	1	Stem	ASTM A479 Type 316
4	1	Tail pieces	SS ASTM A351 GR CF8M
			CS ASTM A216 GR WCB
5	2	Seat Materials	NXT M-PTFE
			03-MULTI FILLED/TFE/GRAPHITE
			02-RPTFE
6	1	Thrust Washer	25% Glass Filled Reinforced Teflon
7	4	Graphite Packing	Graphite
8	1	Packing Gland	ASTM A479 Type 316
9	1	Body Seal	ASTM A240 TY 304 & Graphite
10	1	Handle Assy	Ductile Iron ASTM A536 GR. 65-45-12
11	1	Snap Ring	ASTM A276 Type 304
12	8	Body Stud	ASTM A193 GR B8 Type 304
13	8	Body Stud Nut	ASTM A194 GR 8 Type 304
14	1	Lock Washer	ASTM A582 Type 303
15	2	Gland Bolt	ASTM A193 GR B8 Type 304
16	1	Stop	SS ASTM A240 TY304
17	2	Packing End Ring	Graphite
18	1	Packing Plate	SS ASTM A351 GR CF8M
19	1	Stem Nut	ASTM A194 GR8 Type 304
20	4	Belleville Washer	ASTM A276 Type 304







Class 150 # Dimensions

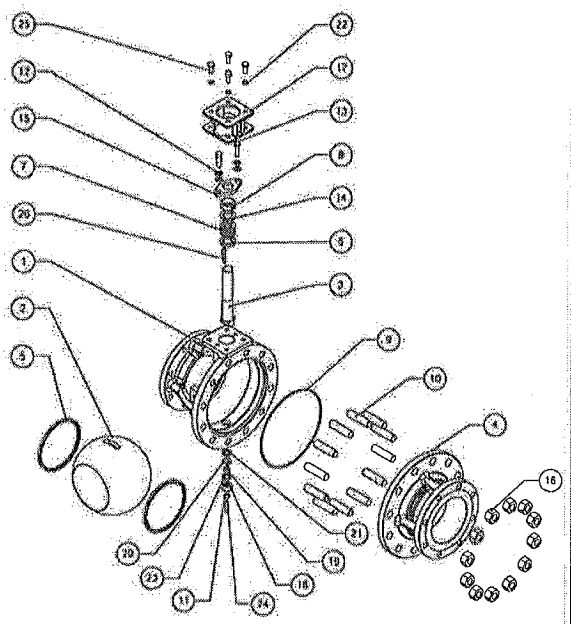
Size	Dim.	A	B	C	D	E	F	G	H (qty)
4	in.	9.02	9.06	4.11	9.7	14.13	8.2	5.83	8
	mm.	229	230	104.5	246.3	358.8	208.4	148	8
6	in.	15.51	10.94	7.76	xxx	25.13	10.6	7.87	8
	mm.	394	278	197	xxx	638.2	269.2	200	8

Class 300 # Dimensions

Size	Dim.	A	B	C	D	E	F	G	H (qty)
4	in.	12	12.5	6	9.7	14.1	9.7	5.8	8
	mm.	305	3.18	152.5	246.26	358.78	246.26	148	8
6	in.	15.8	9.44	7.93	12.5	25.13	10.56	7.87	12
	mm.	403	240	201.5	318	638.2	268.2	200	12

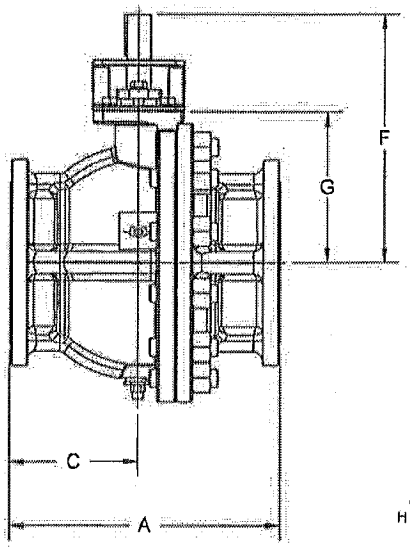
Rev. 1

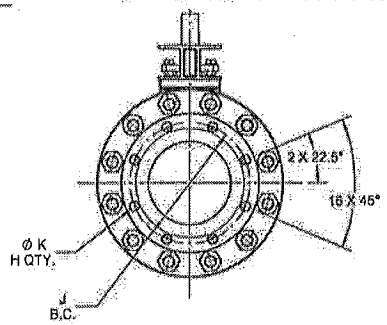
F20CS/F20SS CLASS 150/300 8"-12"

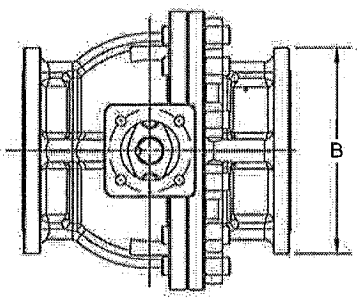


Material List

Item	Qty.	Description	F20 Class 150/300
1	1	Body	SS ASTM A351 GR CF8M
			CS ASTM A216 GR WCB
2	1	Ball	SS ASTM A351 GR CF8M
3	1	Stem	ASTM A479 Type 316
4	1	Tail Piece	SS ASTM A351 GR CF8M
			CS ASTM A216 GR WCB
5	2	Seat Materials	NXT M-PTFE
			03-MULTI FILLED/TFE/GRAPHITE
			02-RPTFE
6	1	Thrust Washer	25% Glass Filled Reinforced Teflon
7	4	Packing	Graphite
8	1	Packing Gland	ASTM A479 Type 316
9	1	Body Seal	AISI 304
10	12	Body Stud	ASTM A193 B8 Type 304
11	1	Body Stud Nut	ASTM A194 GR 8 Type 304
12	4	Disc Spring	Chrome-Vanadium Steel GR 6150
13	2	Gland Bolt	ASTM A193 B8 Type 304
14	2	Packing End Ring	Graphite
15	1	Packing Plate	SS ASTM A351 GR CF8M
16	12	Body Stud Nut	ASTM A194 GR 8 Type 304
17	1	Gear Bracket	CS ASTM A216 GR WCB
18	1	Ball Support Gland	ASTM A276 Type 316
19	1	Ball Support Holder	ASTM A276 Type 316
20	1	Ball Support Booster	15% Glass Filled Reinforced Teflon
21	1	Ball Support Booster Bearing	15% Glass Filled Reinforced Teflon
22	4	Lockwasher	ASTM A276 Type 316
23	1	Graphite Packing	Graphite
24	1	Ball Support Bolt	ASTM A193 GR B8
25	4	Gear Bracket Bolt	ASTM A275 Type 316
26	1	Stem Key	C.D.Steel-11L41, 1045 Annealed







Class 150 # Dimensions

Size	Dim.	A	B	C	F	G	H (qty)	J(B.C)	K
8	in.	17.99	13.58	8.52	16.41	9.96	8	11.75	1.03
	mm.	457	345	216.5	416.8	253.1	8	298.5	26.2
10	in.	20.98	15.94	9.86	19.62	12.31	12	14.25	1.16
	mm.	533	405	250.5	498.3	312.8	12	362	29.4
12	in.	24.02	19.09	11.63	21.26	13.96	12	17	1.16
	mm.	610	485	295.5	540	354.5	12	431.8	29.4

Class 300 # Dimensions

Size	Dim.	A	B	C	F	G	H (qty)	J(B.C)	K
8	in.	19.76	14.96	9.11	16.41	9.96	12	13	1.16
	mm.	502	380	231.5	416.8	253.1	12	330.2	29.4
10	in.	22.36	xxx	10.26	19.62	1.31	16	15.25	1.28
	mm.	568	xxx	260.5	498.3	312.8	16	387.4	32.6
12	in.	25.51	xxx	12.25	21.26	13.96	16	17.75	1.41
	mm.	648	xxx	311	540	354.5	16	450.8	35.7

BA-400/400S 1/4"-2"

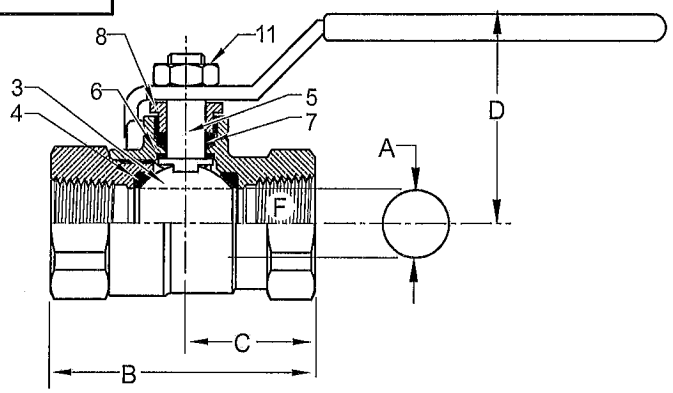
MSS SP-110

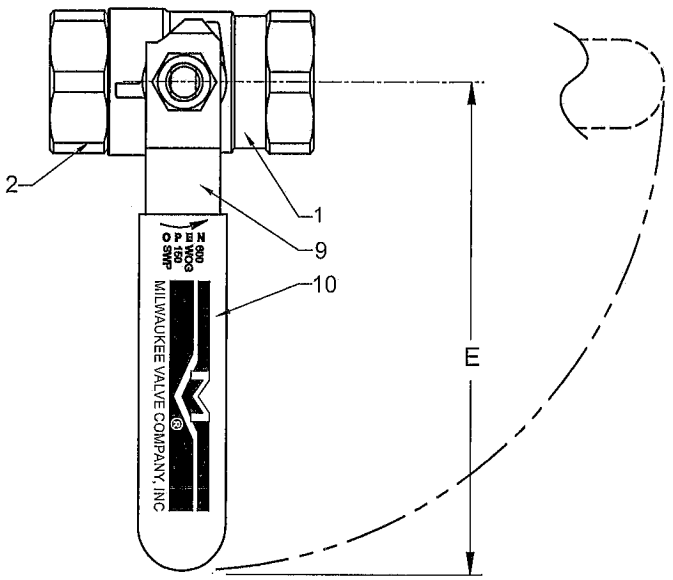
BRONZE BALL VALVE
TWO-PIECE, FULL-PORT
600 PSIG WOG / 150 PSIG SWP (1)
THREADED ENDS
BLOW-OUT PROOF STEM

MATERIALS LIST

ITEM	PART	MATERIALS	ASTM SPEC.
1	Body	Cast Bronze	B584
2	Tailpiece	Brass	B283
		Cast Bronze (1 1/4" & up)	B584
3	Ball	Brass w/ Hard Chrome Plating	B283
		316 Stainless Steel	A276
4	Seat	RPTFE, 15% Glass Filled	
5	Stem	Brass	B16
		316 Stainless Steel	A276
6	Thrust Washer	RPTFE, 25% Glass Filled	
7	Packing	PTFE	
8	Packing Nut	Brass	B16
9	Handle	Steel w/ Zinc Plating	Commercial
10	Hand Grip	Vinyl	
11	Handle Nut	Steel w/ Zinc Plating	Commercial

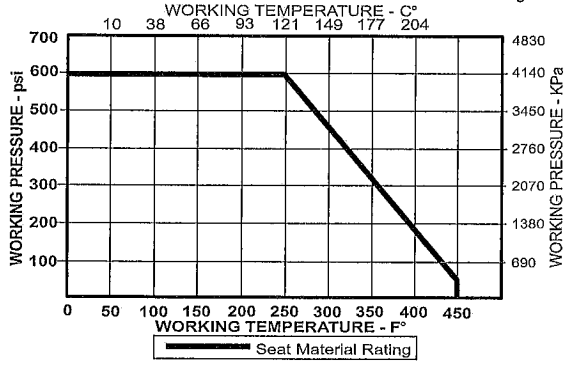
(1) For steam service specify see BA400S3





PRESSURE - TEMPERATURE DATA

VALVES RATED FOR VACUUM SERVICE TO 29 INCHES Hg.



DIMENSIONS

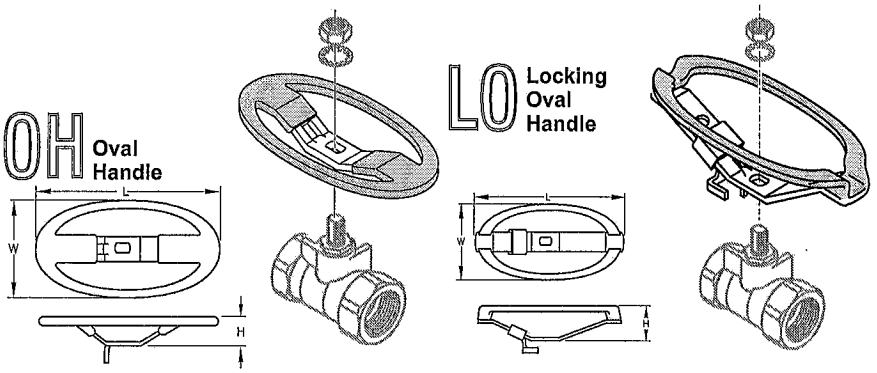
	UNITS	1/4" DN6	3/8" DN10	1/2" DN15	3/4" DN20	1" DM25	1-1/4" DM32	1-1/2" DN40	2" DN50
A(DIA)	INCHES	0.38	0.38	0.50	.76	1.06	1.31	1.56	2.00
	mm	9.7	9.7	12.7	19.3	26.9	33.3	39.6	51.0
B	INCHES	1.86	1.86	2.19	2.59	3.32	3.77	4.28	5.10
	mm	45.6	45.6	53.7	65.8	84.3	95.8	108.7	129.5
C	INCHES	1.00	1.00	1.10	1.30	1.59	1.81	2.06	2.37
	mm	24.5	24.5	27.0	33.0	40.4	46.0	52.3	60.2
D	INCHES	1.78	1.81	1.91	2.32	2.68	2.82	3.00	3.36
	mm	43.6	44.3	46.8	58.9	68.1	71.6	76.2	85.3
E	INCHES	3.82	3.82	3.82	4.55	6.33	6.33	6.33	7.19
	mm	93.6	93.6	93.6	115.6	160.8	160.8	160.8	182.6
F	THREAD SIZE	1/4" NPT	3/8" NPT	1/2" NPT	3/4" NPT	1" NPT	1-1/4" NPT	1-1/2 NPT	2" NPT
Cv		7	7	13	30	61	110	185	360

Note: DN (Diameter Nominal) = Metric equivalent size.

Rev. 13

OPTIONS

OH & LO Milwaukee offers two styles of oval handles, standard oval and a padlocking oval design. Oval handles are intended for several different applications, they can be installed where a standard lever handle might encounter interference from adjoining piping. Oval handles can also prevent accidental valve operations, since they have less projection than a lever handle, and require more turning force to operate. OSHA requires the use of oval handles in many installations for safety reasons. The locking handle design will accommodate a standard 5/16" pad-lock or other types of valve lockouts. The standard oval handle can be field or factory mounted on BA100/300/400 series valves up to 2", and the locking oval handle can be used on sizes up to 1".

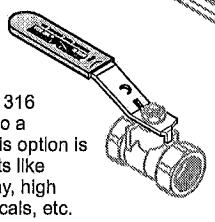


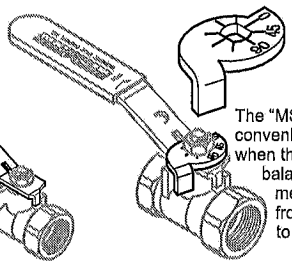
OH Oval Handle

LO Locking Oval Handle

SH Stainless Steel Handle

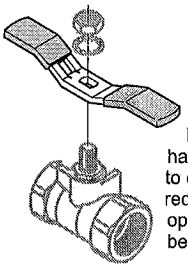
The "SH" handle option adds a 316 stainless steel handle and nut to a standard bronze ball valve. This option is intended for harsh environments like areas subject to salt water spray, high humidity, harsh cleaning chemicals, etc.





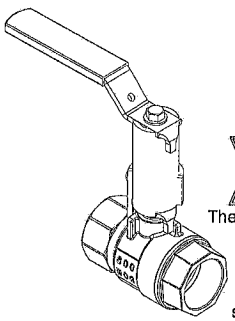
MS Memory Stop

The "MS" Memory Stop offers the convenience of a preset stop when the valve is used in a balancing application. The memory stop can be set from the full closed position, to any preset opening point.



TH Tee Handle

Tee handles offer the same installation space savings as oval handles, with a slightly shorter end to end dimension. Tee handles require more handle force to operate, so accidental openings can be reduced.

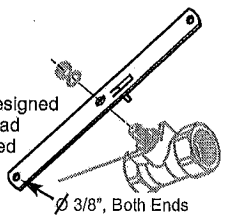


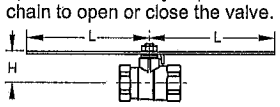
XM Extension Handle with Memory Stop

The "XM" stem extension is all-metallic with an adjustable memory stop. This option is designed for installations where pipe insulation would make standard handles inoperable. The stem extension can also be used where a handle needs to be raised above an adjoining obstruction. Installations where the valve is mounted behind a panel can be an ideal place for the "XM" stem extension. The adjustable memory stop allows the valve opening to be limited to a preset position. This option can be ordered with or without the memory stop.

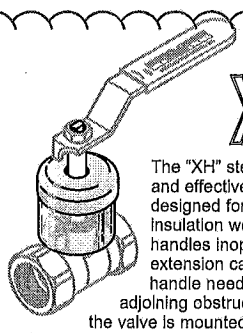
CL Chain Lever

Chain lever handle kits are designed for installations where overhead ball valves need to be operated on a regular basis. A length of chain is attached to either end of the handle, so that the operator needs only to pull down on the appropriate chain to open or close the valve.



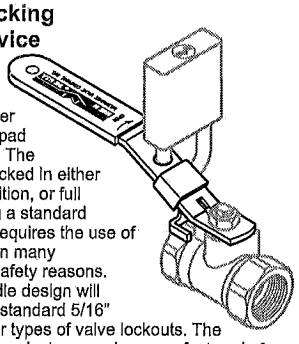


XH Extension Stem



The "XH" stem extension is simple and effective design. This option is designed for installations where pipe insulation would make standard handles inoperable. The stem extension can also be used where a handle needs to be raised above an adjoining obstruction. Installations where the valve is mounted behind a panel can be an ideal place for the "XH" stem extension. The external plastic shield helps to keep the insulation away from the stem extension, providing years of trouble free operation.

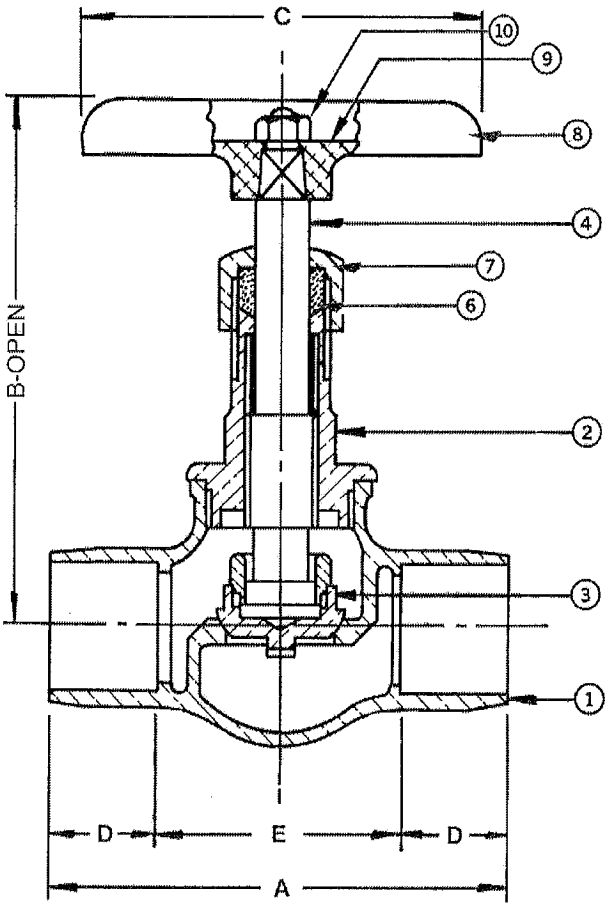
LD Locking Device



The "LD" Locking Handle offers the end user the security of a pad lockable handle. The handle can be locked in either the full open position, or full closed by adding a standard padlock. OSHA requires the use of locking handles in many installations for safety reasons. The locking handle design will accommodate a standard 5/16" pad-lock or other types of valve lockouts. The handle and locking device are also manufactured of stainless steel material for additional strength and corrosion resistance.

GLOBE 1502
BRONZE
125 lb. SWP-200 lb. WOG† • Plumbing and Heating
Bronze Disc • Threaded Bonnet • Sweat Ends

3/8" and 1/2" sizes have the disc integral with the stem and have no disc ring.



SPECIFICATIONS	
1502	Conforms to: MSS SP-80. Type 1, Class 125, Soldered Ends.

MATERIAL LIST

NO.	PART	MATERIAL	SPECIFICATION
1	Body	Bronze	ASTM B 62
2	Bonnet	Bronze	ASTM B 62
3	Disc	Bronze	ASTM B 62
4	Stem	Bronze	ASTM B 16
5	Disc Ring	Brass	ASTM B 16 3/4" to 2" Incl.
6	Packing	Graphite	Commercial
7	Packing Nut	Brass	ASTM B 16
8	Handwheel	Malleable Iron	Commercial
9	Identification Plate	Aluminum	Commercial
10	Handwheel Nut	Brass	Commercial

DIMENSIONS - INCHES / MILIMETERS

Units	Size	A	B	C	D	E	C_v
Inches	3/8	2.00	3.19	2.00	0.38	1.25	2.21
mm	9.5	50.8	81.0	50.8	9.5	31.8	
Inches	1/2	2.44	3.75	2.25	0.50	1.44	3.64
mm	12.7	61.9	95.3	57.2	12.7	36.5	
Inches	3/4	3.19	4.00	2.50	0.75	1.69	6.65
mm	19.1	81.0	101.6	63.5	19.1	42.9	
Inches	1	3.69	4.38	2.75	0.91	1.88	11.10
mm	25.4	93.7	111.1	69.9	23.0	47.6	
Inches	1 1/4	4.19	5.13	3.13	0.97	2.25	20.00
mm	31.8	106.4	130.2	79.4	24.6	57.2	
Inches	1 1/2	4.75	5.63	3.50	1.09	2.56	28.00
mm	38.1	120.7	142.9	88.9	27.8	65.1	
Inches	2	5.94	6.69	4.00	1.34	3.25	48.00
mm	50.8	150.8	169.9	101.6	34.1	82.6	

† Non-Shock

Rev. 7

INNOVATION IN EVERY VALVE

MILWAUKEE VALVE

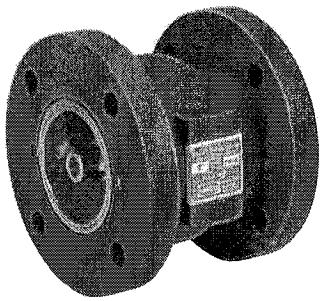
www.milwaukeevalve.com

Class 125/250 Iron Body Silent Check Valves

Flanged • Globe Style • Renewable Seat and Disc • Spring Actuated (1/2 Cracking Pressure)

Class 125, 200 PSI/13.8 Bar Non-Shock Cold Working Pressure
Class 250, 400 PSI/27.6 Bar Non-Shock Cold Working Pressure
Maximum Temperature to 200° F/93° C◆

CONFORMS TO MSS SP-125 •
CONFORMS TO MIL-V-18436F
FM APPROVED — 2½" thru 10" ONLY (F910B)



F-910, 125 lb. Class
F-960, 250 lb. Class
Flanged

MATERIAL LIST

PART	SPECIFICATION
1. Body	Cast Iron ASTM 126 Class B
2. Seat	Bronze ASTM B 584 Alloy C83600 (B)
2a. Seat	Buna-N Bonded to Bronze (W)
3. Disc	Bronze ASTM B 584 Alloy C83600
4. Spring	Stainless Steel Type 316 ASTM A 313
5. Bushing	6" and smaller ASTM B 16 8" and larger ASTM B 584 C83600
6. Set Screws	Stainless Steel Type 304

DIMENSIONS—WEIGHTS—QUANTITIES

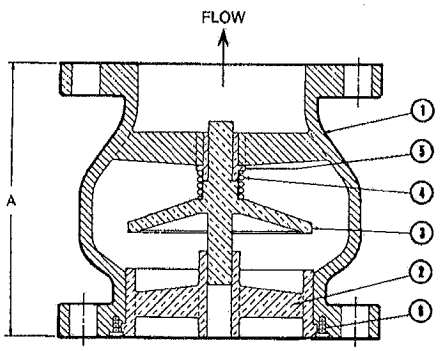
Size		Dimensions A		F-910		F-960	
In.	mm.	In.	mm.	Lbs.	Kg.	Lbs.	Kg.
2½	65	5.50	140	24	11	30	14
3	80	6.00	152	29	13	36	16
4	100	7.25	184	42	19	59	27
5	125	8.50	216	52	24	78	35
6	150	9.75	248	73	33	103	47
8	200	12.50	318	126	57	179	81
10	250	15.50	343	1205	93	253	115
12	300	14.25	362	306	139	401	182
14	350	15.75	400	350	172	511	232
16	400	17.63	448	501	227	697	316
18	450	18.75	476	724	328	959	435
20	500	20.63	524	890	404	1180	535
24	600	24.00	610	1220	553	1680	762
30	750	29.25	743	2000	907	2375	1077
36	900	45.00	1143	4421	2005	5511	2500

x Not available these sizes.
NOTE: F-910 made to 125 lb. Flange dimensions.
F-960 made to 250 lb. Flange dimensions.
A Wafer Style Butterfly Valve can be mated on the down stream side of the F-910 2½"–10" sizes without use of spacers or adapters.
316 Stainless Steel Trim available – Consult Factory.

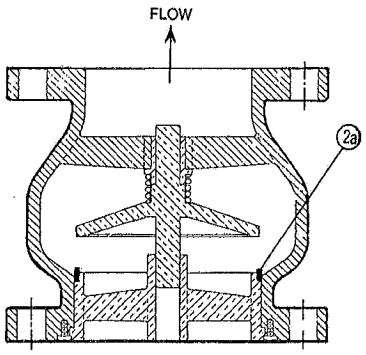
USE THIS VALVE ONLY WITH FLAT FACE FLANGE AND FULL FACE GASKET.
WARNING: 1. Seat end of valve must be mated to a standard flat faced metal flange. Rubber flanges not acceptable.
2. These are not to be used as steam valves.
3. Valves are not to be used near a reciprocating air compressor.
4. Install 5 pipe diameters minimum downstream from pump discharge or elbows to avoid flow turbulence. Flow straighteners may be required in extreme cases.

Note: On pump discharge, the preferred check valves are:
- inline, spring assisted, center-guided, lift checks
- spring assisted twin (double) disc
- swing design with lever and weight or lever and spring

You should also install the check valve as far from the pump as possible and at a minimum length of 5 times the pipe diameter. Flow straighteners may be required.



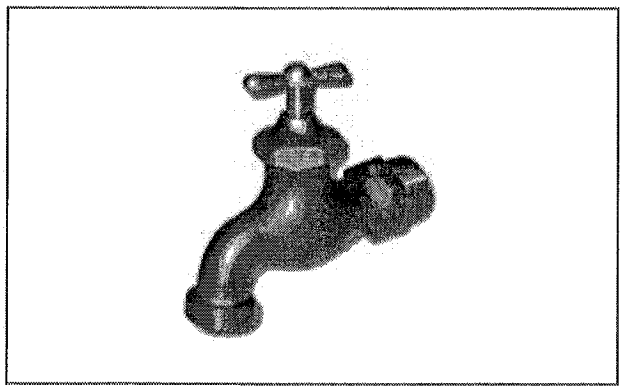
F-910-B or F-960-B
Flg x Flg Flg x Flg



F-910-W or F-960-W
Flg x Flg Flg x Flg

◆For detailed Operating Pressure, refer to Pressure Temperature Chart on page 113.

646R Hose Bibb • Spec Sheet

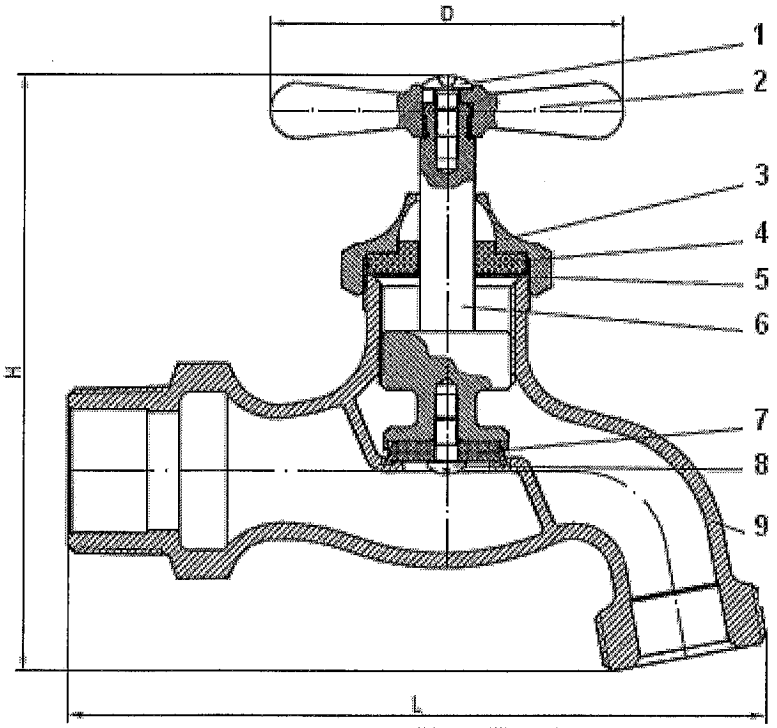


FEATURES & BENEFITS

- Cast Brass
- ISO-9002
- Hose Bibb-Male
- Hose X MIP 1/2" - 1"
- 1/2" MIP X 1/2" Solder Inlet
- 125 WOG
- Replacement Handles Available

DIMENSIONS

Part #	Size	H	L	D	Flow Rate
646R03	1/2" Male X 3/4" Hose	2.64	3.61	2.19	4.0 GPM @ 40 PSI
646R04	3/4" Male X 3/4" Hose	2.64	3.61	2.19	4.2 GPM @ 40 PSI
646R05	1" Male x 1" Hose	4.63	5.48	2.76	4.5 GPM @ 40 PSI



MATERIAL SPECIFICATIONS

No.	Part	Material
1	Bolt	Steel
2	Handle	Zinc
3	Bonnet	Brass
4	Packing	Rubber
5	Washer	Stainless Steel
6	Stem	Brass
7	Seat Packing	Rubber
8	Seat Screw	Brass
9	Body	Brass

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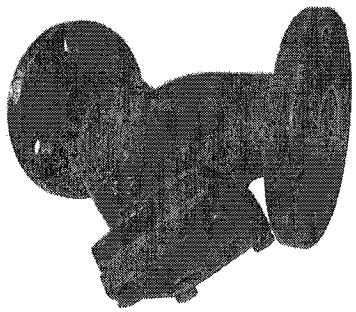
WEB: **www.matco-norca.com** EMAIL: **mail@matco-norca.com**

Model: 758

Cast Iron Flanged Ends Y Strainers
Sizes: ¾" – 24" (20 – 600mm)

Pressure/Temperature - Non-Shock		
Size	Material	Rating
¾"-12"	Cast Iron	200psi @ -20 to 150°F 13.79 bar @ 65.56°C 125psi @ 450°F 8.62 bar @ 232.22°C
14"-24"	Cast Iron	150psi @ -20 to 150°F 10.34 bar @ 65.56°C 100psi @ 353°F 6.89 bar @ 178.33°C

758 **Class 125**



Model 758

Typical Service
- Used extensively to strain foreign matter from pipe lines and provide economical protection for costly pumps, meters, valves, and other similar mechanical equipment

Features
- Mueller "BREECH-LOK STRAINERS" furnished as standard in sizes 8" and larger.
  - A one-quarter turn securely locks the screen in its seat.
  - Allows for easy bolting of the cover flange.
  - Tapered seats in both the body and cover flange retain screen and prevent particle bypass

Construction
- All covers have NPT blowoff outlet at location C. See next page.
- Recessed seat in the cover assures accurate screen alignment.
- Bosses at the inlet and outlet flanges are provided for the gauge taps.

Self-cleaning
- Self-cleaning is accomplished by opening the plug or valve connected to the blowoff outlet
- Advise when strainers are to be mounted in vertical piping so we can rotate the cover to position the blowoff at the lowest point.

Blowoff Outlets
- Outlets are NPT tapped
- Sizes of tapping specified on next page.
- Not normally furnished with plug. Plug available, specify with order

Capacity
- Generously proportioned bodies
- Open Area Ratio much greater than pipe size, ensuring low pressure drop

Screens

		STANDARD (WATER)		STEAM RECOMMENDATION	
MODEL	SIZES	MATERIAL	OPENING	MATERIAL	OPENING
758	¾" – 4"	304SS	.062 perf	304SS	.045 perf
758	5" – 10"	304SS	.125 perf	304SS	.045 perf
758	12" and Up	304SS	.125 perf	304SS	.062 perf

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

Mueller Steam Specialty™

Material

	758
Body	Cast Iron ASTM A126-B
Cover	Carbon Steel ASTM A126-B
Gasket	Compressed Fiber

Consult factory for other materials.

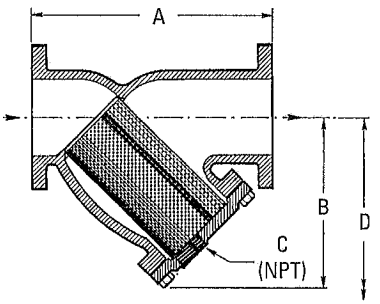
Pressure Drop

- See Pressure Drop Charts in Technical Data section of the Mueller Steam Specialty Engineering binder.

Dimensions and Weights

SIZE		DIMENSIONS								WEIGHT	
		A		B		C (NPT)		D Screen Removal			
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.
¾	20	7⅜	187	3¾	95	½	15	5	127	10	4.5
1	25	7⅜	187	3⅞	98	½	15	5	127	10	4.5
1¼	32	7½	190	4¾	120	½	15	6½	165	13	5.9
1½	40	7½	190	4¾	120	½	15	6½	165	13	5.9
2	50	7⅞	200	5¼	133	½	15	7	178	18	8
2½	65	10	254	6½	165	1	25	9¾	248	28	12
3	80	10⅛	257	7	178	1	25	10	254	34	15
4	100	12⅛	308	8¼	210	1½	40	12	305	60	27
5	125	15⅝	397	11¼	286	2	50	17	432	95	43
6	150	18½	470	13½	343	2	50	20	508	133	60
8	200	21⅝	549	15½	394	2	50	22¾	578	247	112
10	250	25¾	654	18½	470	2	50	28	711	370	168
12	300	29⅞	759	21¾	553	2	50	30	762	579	263
14	350	33¼	846	25	635	2	50	36½	927	863	392
16	400	38¾	984	26½	673	2	50	42	1067	1380	627
18	450	43⅛	1105	31	788	2	50	45½	1156	2272	1032
20	500	49½	1257	38 3/16	970	2	50	55⅜	1407	2675	1213
24	600	58½	1486	44 1/16	1119	2	50	67¼	1708	4880	2213

Apply For Certified Drawings.



Model 758

Mueller Steam Specialty™

ISO 9001-2008 CERTIFIED

A Watts Water Technologies Company

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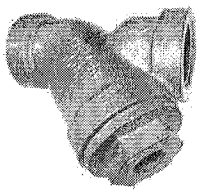
Models: 351M, 352M, 352½MM, 358S

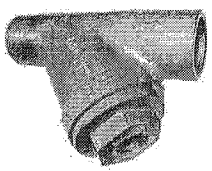
Cast Bronze Screwed, Solder, and Sil-Braze Ends Y Strainers
Sizes: ¼" - 4" (8 - 100mm)

Pressure/Temperature - Non-Shock		
Model	Material	Rating
351M	Bronze	200psi @ -20 to 150°F 13.8 bar @ 66°C 50psi @ 350°F 10.3 bar @ 177°C
352M	Bronze	400 psi @ -20 to 150°F 27.6 bar @ 66°C 300psi @ 350°F 20.7 bar @ 177°C
358S	Bronze	400psi @ -20 to 100°F 27.6 bar @ 37.8°C
352½	Bronze	250psi @ 425°F 17.2 bar @ 218°C

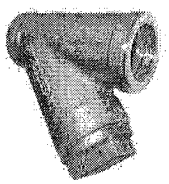
351M Screwed **Class 125**
352M Screwed **Class 250**
352½M Sil-Braze **Class 125**
358S Solder **Class 125**



351M Screwed ends (shown)
352M Screwed ends



358SN Solder Joint



352-½MM Sil-Braze ends

Typical Service

- Used to strain foreign matter from pipelines and provide economical protection for costly pumps, meters, valves, and other similar mechanical equipment

Features

- Machined seats in both body and cap align and lock the screen in place to stop sediment bypass.
- 352-½ conforms to Military specifications
- 352-½ conforms to the latest revision of BuShip Drawing 80064-810-841499.
- All sizes of 352-½ are furnished grooved less rings.

Self-Cleaning

- Self-cleaning is accomplished by opening the plug or valve connected to the blowoff outlet

Blowoff Outlets

- Outlets are NPT tapped
- Sizes of tapping are specified on next page
- Not normally furnished with plug. Plug is available, specify with order.
- BuShip Drawing strainers are supplied without blowoff outlets.

Capacity

- Generously proportioned bodies
- Open Area Ratio much greater than pipe size, ensuring low pressure drop.

Screens

		STANDARD (WATER)		STEAM RECOMENDATION	
MODEL	SIZES	MATERIAL	OPENING	MATERIAL	OPENING
All	¼" - 2"	304SS	20 mesh	304SS	.033 perf
	2½" - 4"	304SS	.062 perf	304SS	.033 perf

Materials

	351M, 352M, 358S	352½MM
Body	Bronze ASTM B62	Bronze ASTM B61
Cap	Bronze ASTM B62	Bronze ASTM B61
Screen	304SS	304SS
Gasket	Metal Filled Graphite	Copper

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

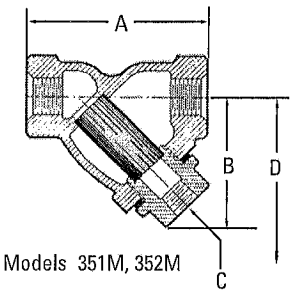
Mueller Steam Specialty™

Pressure Drop

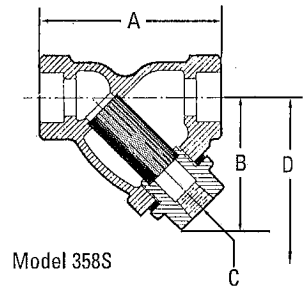
See Pressure Drop Charts in Technical Data Section of the Mueller Steam Specialty Engineering binder.

Dimensions and Weights

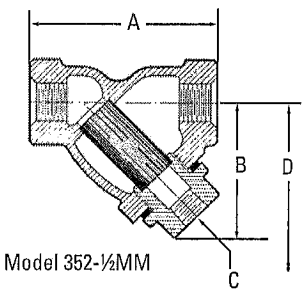
SIZE		DIMENSIONS								WEIGHT	
		A		B		C (NPT)		D Screen Removal			
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.
351M, 352M											
¼	8	2¾	70	2¼	57	¼	6	2½	64	.75	.34
⅜	10	2¾	70	2¼	57	¼	6	2½	64	.75	.34
½	15	2¾	70	2¼	57	¼	6	2½	64	.75	.34
¾	20	3	76	2 9/16	65	⅜	10	2⅝	67	1.38	.62
1	25	3¾	95	2¾	70	⅜	10	3⅜	86	2.13	.96
1¼	32	4 7/16	113	3⅝	81	¾	20	4⅝	117	3.13	1.4
1½	40	4 15/16	125	3⅞	98	¾	20	5	127	4.5	2
2	50	6⅛	156	5⅛	130	1	25	6⅞	175	7	3.1
2½	65	8¼	210	6	152	1¼	32	8¾	222	12.5	5.6
3	80	9	229	6¾	171	1½	38	9¾	248	18	8
358S											
¼	8	3	76	2¼	57	¼	6	¼	6	.75	.34
⅜	10	3	76	2¼	57	¼	6	¼	6	.75	.34
½	15	3	76	2¼	57	¼	6	¼	6	.75	.34
¾	20	3 1/16	93	2 9/16	65	⅜	10	⅜	10	1.38	.62
1	25	4¾	120	2¾	70	⅜	10	⅜	10	2.13	.96
1¼	32	5 7/16	138	3⅝	81	¾	20	¾	20	3.13	1.4
1½	40	5 15/16	150	3⅞	98	¾	20	¾	20	4.5	2
2	50	7 9/16	192	5⅛	130	1	25	1	25	7	3.1
2½	65	9¾	248	6	152	1¼	32	1¼	32	12.5	5.6
3	80	10⅜	264	6¾	171	1½	38	1½	38	18	8
352½MM											
¼	8	2 9/16	65	1⅞	48	⅛	3	2¾	70	.75	.34
⅜	10	2 9/16	65	1⅞	48	⅛	3	2¾	70	.75	.34
½	15	2 15/16	75	2⅛	54	⅛	3	3	76	1	.45
¾	20	3⅜	86	2 9/16	65	¼	6	4	102	1.75	.79
1	25	4⅛	105	3⅛	79	¼	6	4½	114	2.5	1.1
1¼	32	4 13/16	122	3½	90	⅜	10	5½	140	4.25	1.9
1½	40	5⅜	137	4 3/16	122	½	15	6½	165	5.5	2.5
2	50	6⅝	168	5⅜	137	¾	20	8¼	210	8.25	3.7
2½	65	7⅞	200	6½	165	1	25	10	254	15.5	7
3	80	11¾	298	7	178	1	25	10½	267	36	16
4	100	15 3/16	386	11⅜	289	Blind Cover		16	406	90	41



Models 351M, 352M



Model 358S



Model 352-½MM

Mueller Steam Specialty product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Mueller Steam Specialty Technical Service. Mueller Steam Specialty reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Mueller Steam Specialty products previously or subsequently sold.

Mueller Steam Specialty™

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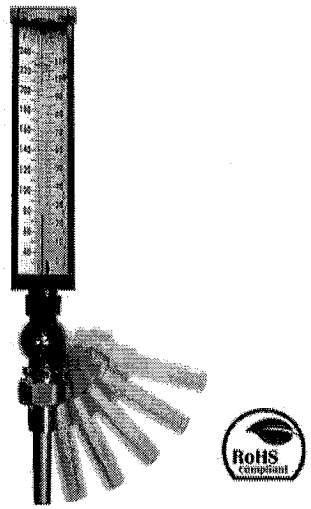
ES-MS-351M_358 1337



Note: RoHS applies only with SS TIW thermowell

Description & Features:

- Widely specified in the industrial and commercial plumbing trade
- Includes a separable thermowell
- 3.5" (90mm) and 6" (150mm) stem
- Available in aluminum or Valox® (9") case
- Organic filled tube (non-mercury)
- Dual scale (°F & °C)
- Vari-angle connection and 360 degree case rotation for easy installation
- Graphite filled bulb chamber for maximum heat conduction
- ±1% accuracy
- 5 year warranty

Applications:

- New construction, plumbing, water lines, boilers, heating, ventilation and air conditioning

Specifications	
Scale	9" (230mm) aluminum or Valox® case, impact resistant
Lens	Glass
Connection	¾" NPT with thermowell 1¼" - 18 UNEF swivel nut (no thermowell)
Scales	Aluminum painted white with black markings
Bulb Chamber	Tapered cast aluminum with graphite fill
Sensing Liquid	Organic fluid
Adjustment	Fully adjustable
Thermowell	¾" brass separable socket, (SS optional)
Accuracy	±1%
Enclosure Rating	IP54

Note: For an Industrial 9IT Thermowell, please refer to the Industrial 9IT Thermowell product page

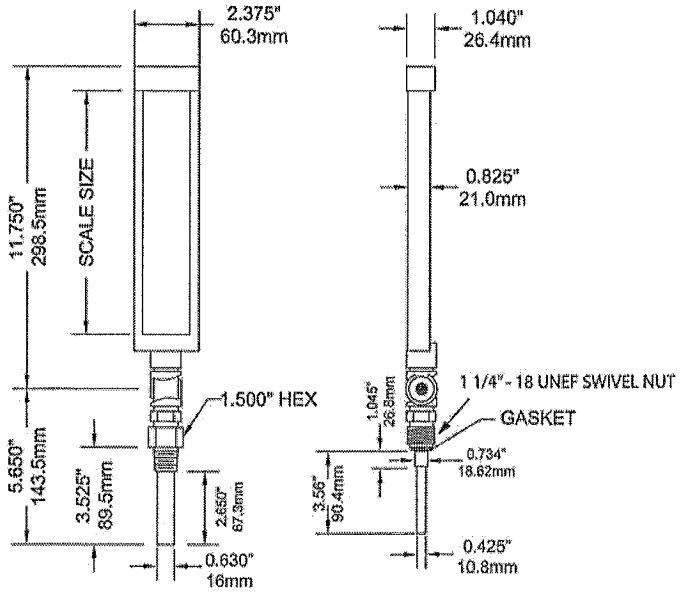
Order Codes (products in bold are normally in stock)

	Aluminum Case		Valox® Case	
Stem	3.5" (90mm)	6" (150mm)	3.5" (90mm)	6" (150mm)
-40°F to 110°F & -40°C to 40°C	**TIM101A**	TIM101-6A	**TIM101**	TIM101-6
0°F to 120°F & -15°C to 50°C	**TIM102A**	**TIM102-6A**	**TIM102**	**TIM102-6**
0°F to 160°F & -15°C to 70°C	**TIM103A**	**TIM103-6A**	**TIM103**	TIM103-6
30°F to 180°F & 0°C to 80°C	**TIM104A**	**TIM104-6A**	**TIM104**	TIM104-6
30°F to 240°F & 0°C to 115°C	**TIM100A**	**TIM100-6A**	**TIM100**	**TIM100-6**
30°F to 300°F & 0°C to 150°C	**TIM105A**	**TIM105-6A**	**TIM105**	TIM105-6

Other ranges and connection sizes available upon request. Duct flange available upon request. Union connection available upon request.

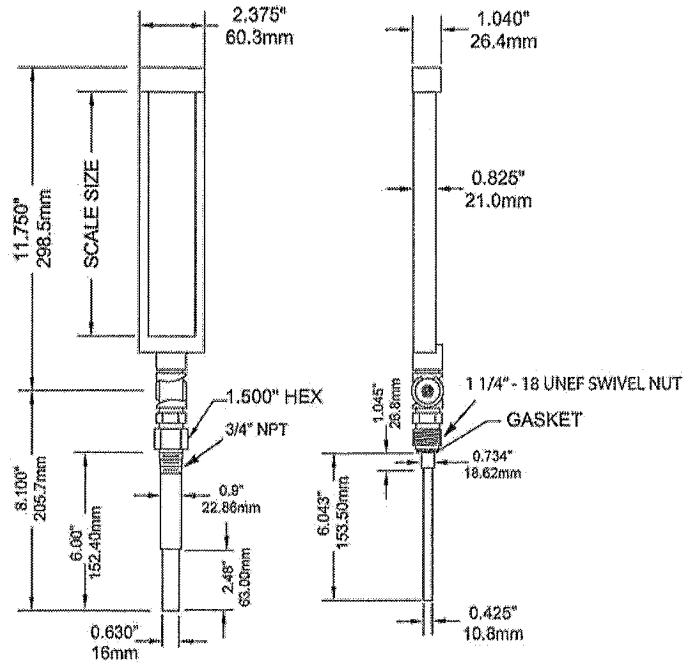
Valox® is a registered trademark of the General Electric Company

3.5" Stem



With Socket Without Socket

6" Stem



With Socket Without Socket

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1-800-752-2082

SUBMITTAL SHEET

JOB NAME | ITEM TAG

JOB LOCATION | PART NUMBER

CONTRACTOR | DATE

ENGINEER APPROVAL | DATE

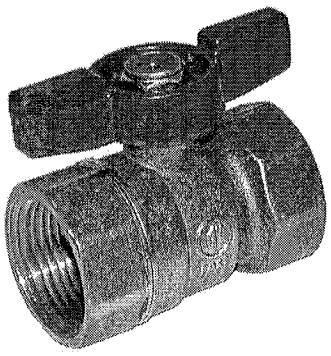
BALL VALVE

Model T-800-T

400 W.O.G.

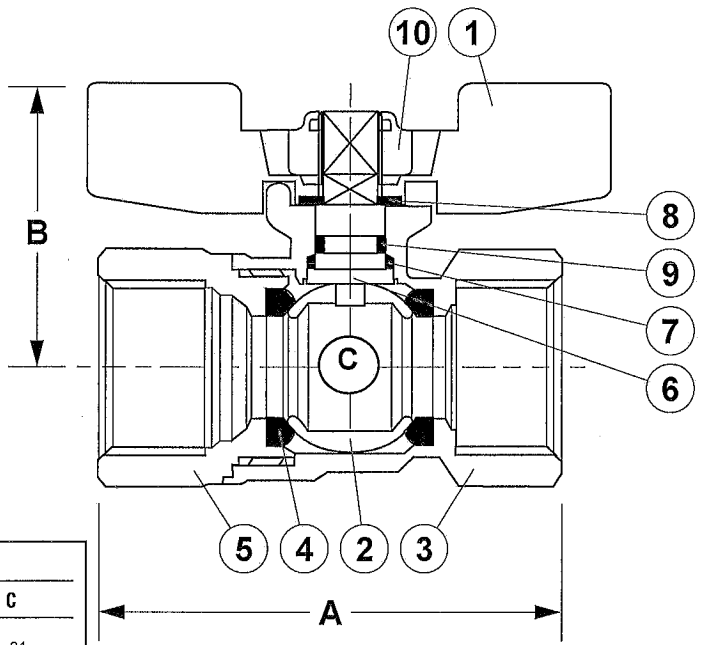
125 W.S.P.

Working Pressure, Non Shock (PSI)
Cold working pressure (CWP): 400 CWP
Saturated steam (WSP): 125 WSP



Pictured
Model T-800-T

Pictured
Model
T-800-T
Cut-away

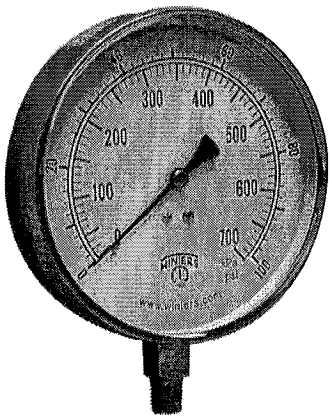


MATERIAL SPECIFICATION

	PART	MATERIAL	SPECIFICATION
1	T-handle	Aluminum	
2	Ball	Brass	ASTM B124-C37700/ B16-C3600
3	Body	Brass	B124-C37700
4	Seats	PTFE	DUPONT TEFLON
5	End adapter	Brass	B124-C37700
6	Stem	Brass	B124,c37700,en12164
7	Thrust washer	PTFE	DUPONT TEFLON
8	Anti friction washer	PTFE	DUPONT TEFLON
9	O-ring	FPM	Viton
10	Handle nut	Anti-vibration nut	ASI-1010

DIMENSIONS

Size	A	B	C
1/8"	1.54	.98	.31
1/4"	1.61	.99	.31
3/8"	1.59	1.03	.31
1/2"	1.94	1.35	.39
3/4"	2.04	1.47	.59
1"	2.62	1.70	.79



Description & Features:

- Economical 4.5" (115mm) stainless steel case gauge
- ±1% accuracy
- Zero adjustment screw
- ¼" NPT
- CRN registered
- 5 year warranty

Applications:

- Most commercial air, water and steam services that require a ±1% full-scale accuracy

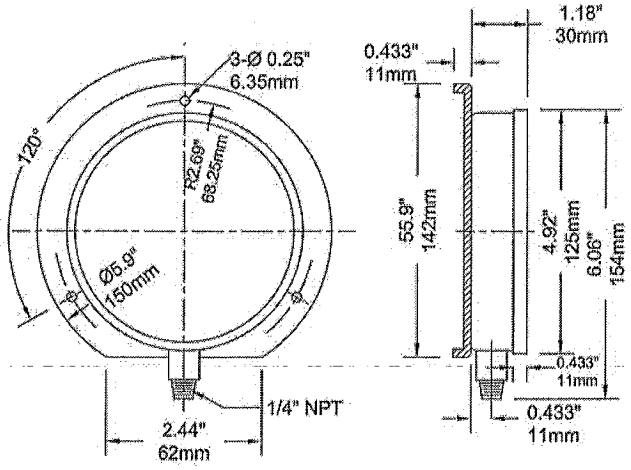
Specifications	
Dial	4.5" (115mm) white aluminum dial with black and red markings
Case	304 SS
Lens	Acrylic
Ring	304 SS
Socket	Brass
Connection	¼" NPT standard
Bourdon Tube	Phosphor bronze
Movement	Brass
Pointer	Aluminum, anodized black, recalibrator screw
Welding	Silver solder
Over-Pressure Limit	25% for pressures up to 1,400 psi (9,653 kPa) 15% for pressures over 1,400 psi (9,653 kPa)
Working Pressure	Maximum 75% of full scale value
Ambient/Process Temperature	-40°F to 200°F (-40°C to 93°C)
Accuracy	±1% ANSI/ASME Grade 1A
Enclosure Rating	IP52

Order Codes (products in bold are normally in stock)

Connection	¼ Bottom
30" Hg Vac/kPa	**PCT320**
30"/0/30 psi/kPa	**PCT329**
30"/0/60 psi/kPa	**PCT330**
30"/0/100 psi/kPa	**PCT328**
30"/0/160 psi/kPa	**PCT332**
30"/0/200 psi/kPa	PCT333
30"/0/300 psi/kPa	PCT334
0/15 psi/kPa	**PCT319**
0/30 psi/kPa	**PCT321**
0/60 psi/kPa	**PCT322**
0/100 psi/kPa	**PCT323**
0/160 psi/kPa	**PCT324**
0/200 psi/kPa	**PCT325**
0/300 psi/kPa	**PCT326**
0/400 psi/kPa	**PCT327**
0/600 psi/kPa	**PCT331**
0/1,000 psi/kPa	PCT293
0/3,000 psi/kPa	PCT294
0/5,000 psi/kPa	PCT295

Other ranges and connection sizes available upon request. For scale change, refer to How to Order Guide for scale codes. **For options, attach suffix to end of order code: i.e. PCT322-45QBF for BACK FLANGE.**

Option suffix:
45QBF = 4.5" (115mm) Back Flange



Submittal Data Information

100-2.3

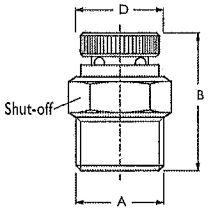
Automatic Air Vents

Effective: June 1, 2010 **Supersedes:** March 3, 2008

Job: _____ Engineer: _____ Contractor: _____ Rep: _____

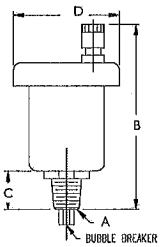
ITEM NO.	MODEL NO.	

417 Coin Vent



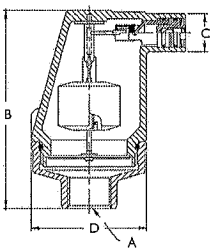
Installed on water or stream radiators the Taco automatic coin vent is the ideal air purging device. The coin vent features special hygroscopic cellulose discs in the valve body. When dry the discs allow air to be released from the system. Once all the air is purged the discs would then come in contact with system water, where upon they would swell to create a positive shut-off. This continuous cycle prevents the radiators from becoming air bound and speeds the process of filling the system. The vent can also be manually shut-off by means of an internal ball check. The 417 coin vent is suitable for use in water and low pressure steam applications.

Hy-Vent®



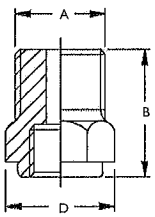
The Taco Hy-Vent® has become the industry standard for dependable long life service. Available in 1/8", 1/4" and 1/2" x 3/4" threaded connections, the high capacity float style vents can be placed either on the boiler or at the high points throughout the system. Now with operating pressure ratings of up to 250 psi, the brass body, nickel plated vents meet the system requirements of even the largest installation. The vents are also easily serviceable if needed, by just unscrewing the vent cap.

409 Vent



The Taco 409 air vent is a heavy duty brass vent rated to 150 psi system operating pressure. The conical shape of the vent significantly increases the clearance between the water level and internal mechanisms, reducing the potential that dirt floating on the top of the water could foul the venting operation. It features a convenient outlet connection for a 3/4" ID flex tube waste connection. It's high capacity design makes it ideal for placement throughout commercial systems.

Hy-Vent® Waste Connector



The Hy-Vent® Waste Connector screws onto the outlet connection of the Hy-Vents (models 400, 426, 418, 416) to provide a worry-free installation. The 1/4" threads easily connect to a waste line, preventing water damage if the vent ever leaks.

Dimensions

Product Number	Description	A	B	C	D	Bubble Breaker	Quantity Per Box	Max. System Conditions	Max. Venting Pressure
417	Taco-Vent® Coin Vent	1/8" NPT	1"	----	35/64"	No	12	125 psi, 240°F *	125 psi
400	Hy-Vent®	1/8" NPT	3 3/16"	13/32"	1 13/16"	Yes	1	150 psi, 240°F	50 psi
416	Slim-Line Hy-Vent®	1/8" NPT	3 1/8"	13/32"	1 1/2"	Yes	14	150 psi, 240°F	115 psi
426	Hy-Vent®	1/4" NPT	3 3/16"	13/32"	1 13/16"	Yes	1	150 psi, 240°F	50 psi
418	Hy-Vent®	1/2" x 3/4" NPT	3 11/32"	17/32"	1 13/16"	No	1	150 psi, 240°F	50 psi
419	High Pressure Hy-Vent®	1/2" x 3/4" NPT	3 1/2"	17/32"	1 13/16"	No	1	250 psi, 240°F	150 psi
409	Commercially Rated Brass Vent**	3/4" NPT	4 3/4"	**	2 13/16"	No	1	150 psi, 240°F	150 psi
414	Waste Connector	1/4" NPT	3/4"	----	5/8"	----	1	150 psi, 240°F	----

* Suitable for use in low pressure steam systems.

** Outlet connection fits 3/4" ID Flex tubing.

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TACO INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 Fax: 942-2360

TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3 Telephone: (905) 564-9422 Fax: (905) 564-9436

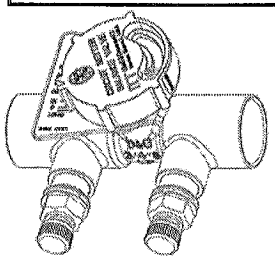
Visit our website at: www.taco-hvac.com

Bell & Gossett
a xylem brand

SUBMITTAL

A-549LFP(C)

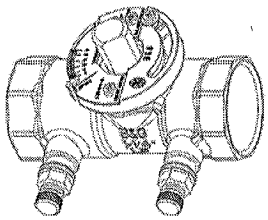
JOB:	REPRESENTATIVE:	
UNIT TAG:	ORDER NO.	DATE:
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:



Circuit Setter® Plus

Calibrated Balance Valves with NPT and Solder Connections

LEAD FREE*



DESCRIPTION

The Bell & Gossett CIRCUIT SETTER PLUS and CIRCUIT SETTER PLUS "RF" calibrated balance valves are a precision machined ball type triple purpose balancing instrument. They are precisely calibrated for use as a presettable balance valve, variable orifice flow meter and positive shut-off service valve.

Valves are furnished with a calibrated nameplate and memory stop indicator which permits a preset to a fixed open position and then closed for service without disturbing valve setting.

Valves are equipped with capped readout valves fitted with internal check valves and 1/4" NPT tapped and plugged drain port.

CONSTRUCTION

Body: Brass ASTM B283-C69300*
Ball: 304 Stainless Steel
Seat Rings: Glass and Carbon filled TFE
Readout Valves: Brass with EPT check valves
Stem "O" Ring: EPDM

MAXIMUM WORKING PRESSURE

NPT Models: 400 psig (2069 kPa)
Sweat Models: See table below

MAXIMUM OPERATING TEMPERATURE

-4°F(-20°C) to 250°F(121°C)

*Contains less than 0.25% lead content by weight on wetted surfaces.
CSA CERTIFIED: AB1953; Vermont S152.
Maryland House Bill 372 [statute 12-605].
ANSI/NSF-61 Annex G Compliant.

Type Solder	Maximum Pressure Limitations for 1/2"-1" With Solder Connections	
	Pressure PSI (KPa)	Temp °F (°C)
95-5 Tin-Antimony	300 (2069)	200 (93)
	250 (1724)	225 (107)
	200 (1379)	250(121)

xylem
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Bell & Gossett
a xylem brand

LEAD-FREE CIRCUIT SETTER PLUS Calibrated Balance Valves

A-549LFP(C)

SCHEDULE

MODEL NO.	PART NUMBER	TAGGING INFORMATION	QUANTITY
RF-1/2S LF	117410LF		
RF-3/4S LF	117411LF		
CB-1/2S LF	117412LF		
CB-3/4S LF	117413LF		
CB-1S LF	117401LF		
CB-1-1/4S LF	117402LF		
CB-1-1/2S LF	117403LF		
CB-2S LF	117404LF		
CB-1/2 LF	117414LF		
CB-3/4 LF	117415LF		
CB-1 LF	117416LF		
CB-1-1/4 LF	117103LF		
CB-1-1/2 LF	117104LF		
CB-2 LF	117105LF		
CB-2-1/2 LF	117106LF		
CB-3 LF	117107LF		

Xylem Inc.
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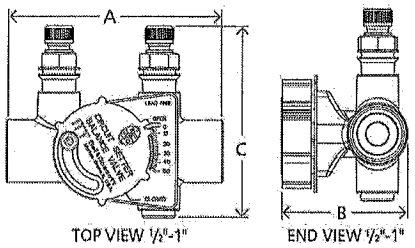
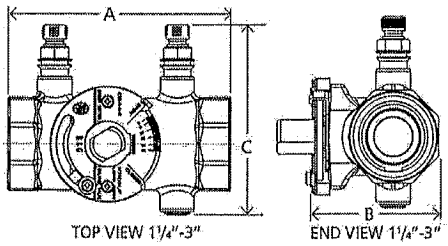
LEAD-FREE CIRCUIT SETTER PLUS Calibrated Balance Valves

A-549LFP(C)



TOP VIEW ½"-1" END VIEW ½"-1"



TOP VIEW 1¼"-3" END VIEW 1¼"-3"

DIMENSIONS AND WEIGHTS *

MODEL NUMBER A	SIZE	B CONNECTION TYPE C	DIMENSIONS IN INCHES (MM) LBS. (KG)			WEIGHT IN
RF-1/2S LF	1/2"	SWEAT	2.91 (73.9)	1.82 (46.2)	2.85 (72.4)	0.6 (0.27)
RF-3/4S LF	3/4"	SWEAT	3.51 (89.2)	2.05 (52.1)	3.10 (78.7)	0.75 (0.34)
CB-1/2S LF	1/2"	SWEAT	2.91 (73.9)	1.82 (46.2)	2.85 (72.4)	1 (0.5)
CB-3/4S LF	3/4"	SWEAT	3.51 (89.1)	2.05 (52.1)	3.10 (78.7)	1.25 (0.6)
CB-1S LF	1"	SWEAT	4.29 (109)	2.33 (59.2)	3.33 (84.6)	2 (0.9)
CB-1-1/4S LF	1-1/4"	SWEAT	4.91 (124.7)	3.08 (78.2)	3.69 (93.7)	3.5 (1.6)
CB-1-1/2S LF	1-1/2"	SWEAT	5.21 (132.2)	3.27 (83)	3.95 (100.2)	3.8 (1.7)
CB-2S LF	2"	SWEAT	6.31 (160.3)	3.83 (97.4)	4.44 (112.8)	6.2 (2.8)
CB-1/2 LF	1/2"	NPT	2.94 (74.6)	1.98 (50.3)	3.02 (76.7)	1.25 (0.6)
CB-3/4 LF	3/4"	NPT	3.06 (77.7)	2.17 (55.1)	3.12 (79.2)	1.5 (0.7)
CB-1 LF	1"	NPT	3.81 (96.8)	2.47 (62.7)	3.42 (86.9)	2 (0.9)
CB-1-1/4 LF	1-1/4"	NPT	4.41 (112)	3.19 (81)	3.69 (93.7)	3.8 (1.7)
CB-1-1/2 LF	1-1/2"	NPT	4.42 (112.1)	3.37 (85.7)	3.95 (100.2)	3.5 (1.6)
CB-2 LF	2"	NPT	5.13 (130.2)	3.98 (101.1)	4.44 (112.8)	6.2 (2.8)
CB-2-1/2 LF	2-1/2"	NPT	6.00 (152.4)	4.51 (114.7)	4.83 (122.6)	9 (4.1)
CB-3 LF	3"	NPT	6.50 (165.1)	5.12 (130.1)	5.44 (138.2)	12 (5.4)

*All dimensions +/-0.125 (3.2 mm) tolerance. Dimensions are subject to change. Not to be used for construction purposes unless certified.

TYPICAL SPECIFICATION

Furnish and install as shown on plans with manufacturer recommendations Model CB or "RF" calibrated balance valves.

PRE-SET BALANCE FEATURE

Valves to be designed to allow installing contractor to pre-set balance points for proportional system balance prior to system start-up in accordance with pre-set balance schedule.

VALVE DESIGN AND CONSTRUCTION

All valves 1/2" to 3" pipe size to consist of Lead Free Brass** body/SS ball construction with glass and carbon filled TFE seat rings. Valves to have differential pressure read-out ports across valve seat area. Read-out ports to be fitted with internal EPT inserts/check valves. Valve bodies to have 1/4" NPT tapped drain/purge port. Valves to have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves to have calibrated nameplates to assure specific valve settings. Valves shall be designed for positive shut-off.

DESIGN PRESSURE/TEMPERATURE

A. 1/2" - 3" NPT connections 400 psig (2069 kPa) at 250°F (121°C)

B. 1/2" - 2" Sweat connections (see table page1)

All balance valves to be ITT Bell & Gossett Model No. CB-_____LF or Model No. RF-_____LF (note sizes).

IMPORTANT:

When monitoring system flow, care must be exercised to avoid direct skin or eye contact with liquids that may escape. Liquids with temperatures in excess of 120°F (49°C) may cause burns.

Bell & Gossett Circuit Setter Balance Valves are not recommended for use with meter connections pointing downward.

wetted surfaces.
CSA CERTIFIED: AB1953; Vermont S152; Maryland House Bill 372 [statute 12-605]. ANSI/NSF-61 Annex G Compliant.

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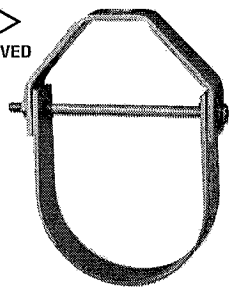
CLEVIS HANGERS

ANVIL INTERNATIONAL

Fig. 260

Adjustable Clevis Hanger

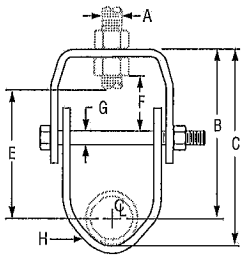


c UL us LISTED FM APPROVED

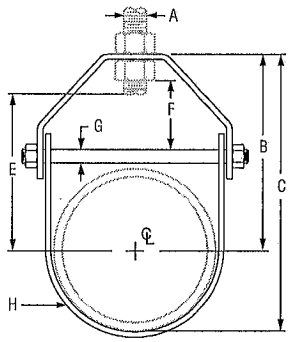
Size Range: 1/2" through 30"
Material: Carbon steel
Finish: ☐ Plain, ☑ Galvanized, or ☐ Primed, also available in ☐ Plastic or ☐ Epoxy Coated
Service: Recommended for the suspension of stationary pipe lines.
Maximum Temperature: Plain 650° F, Galvanized and Epoxy 450° F
Approvals: Complies with Federal Specification A-A-1192A (Type 1), *WW-H-171-E (Type 1)*, ANSI/MSS SP-69 and MSS SP-58 (Type 1). UL (Sizes 3/4" through 8"), ULC Listed (Sizes 3/4" through 4") and FM Approved (Sizes 3/4" through 8").
Installation: Hanger load nut *above* clevis must be tightened securely to assure proper hanger performance.
Adjustment: Vertical adjustment without removing pipe may be made from 3/8" through 5 1/8", varying with the size of clevis. Tighten upper nut after adjustment.
Features:

- Design has yoke on outside of lower U-strap so yoke cannot slide toward center of bolt, thus bending of bolt is minimized.
- Sizes 5" and up have rod and two nuts instead of bolt and nut; thread length on clevis rod is such that the thread locks the nuts in place, and threads are not in shear plane.

Ordering: Specify pipe size, figure number, name and finish.
Notes: Punched forming holes may be present on certain sizes of this clevis hanger. These holes are solely for the purpose of manufacturing, and do not effect the structural integrity or load carrying capacities of these hangers. For insulated line options without shields, see Figures 260 ISS and Figure 300. For insulated line options with shields, see Figures 167 and 168. For ductile iron pipe sizes, see Figure 590.
Caution: When an oversize clevis is used, a pipe spacer or multispacer should be placed over clevis bolt to ensure that the lower U-strap will not move in on the bolt.



Pipe Size 1/2" to 3/4"



Pipe Sizes 1" and Larger

FIG. 260: LOADS (LBS) • WEIGHTS (LBS) • DIMENSIONS (IN)

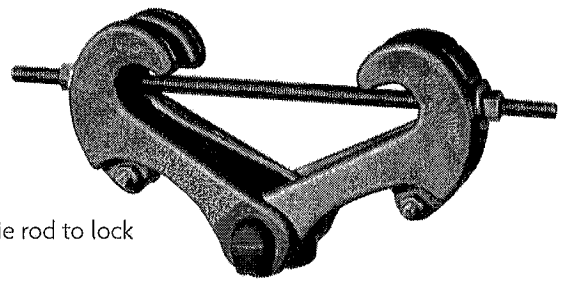
Pipe Size	Max Load	Span Ft.	Weight	Rod Size A	B	C	Rod Take Out E	Adjust. F	G	H Width Lower
1/2	610	7*	0.34	3/8	2 3/16	2 11/16	1 1/2	5/8	1/4	1
3/4			0.34		2		1 5/16			
1	730		0.35		2 5/16	3	1 5/8			
1 1/4			0.40		2 3/8	3 1/4	1 11/16			
1 1/2		9*	0.45		2 13/16	3 13/16	2 1/8	7/8		
2		10*	0.50		3 5/16	4 1/2	2 5/8	1 1/8		
2 1/2	1,350	11*	0.65	1/2	4 1/16	5 1/2	3 3/16	1 5/16	3/8	
3		12*	0.85		4 3/4	6 1/2	4 1/16	1 5/8		
3 1/2		13*	1.10		5 1/16	7 1/16	4 3/16	1 13/16		1 1/4
4	1,430	14*	1.51	5/8	5 9/16	7 13/16	4 1/2	1 11/16	3/8	
5		16*	1.70		6 9/16	8 15/16	5 1/2	1 15/16		1 3/16
6	1,940	17*	3.10	3/4	6 15/16	10 1/4	5 3/4	1 11/16	1/2	1 7/16
8	2,000	19*	4.75		8 3/8	12 11/16	7 3/16	2		
10	3,600	22*	8.60	7/8	9 7/8	15 1/4	8 7/16	2 1/8	5/8	1 3/4
12	3,800	23*	11.20		11 9/16	17 15/16	10 1/8	2 13/16		2
14	4,200	25*	12.50	1	12 9/16	19 9/16	10 11/16	2 11/16	3/4	
16	4,600	27	19.85		14	22	12	2 3/4	1	2 1/2
18	4,800	28	22.25		15 15/16	24 15/16	13 15/16	3 13/16		
20	4,800	30	40.33	1 1/4	17 9/16	27 9/16	15 3/16	3 7/8	1 1/4	3
24	4,800	32	49.83		19 13/16	31 13/16	17 5/16			
30	6,000	33	70.18		24 3/16	39 3/16	21 9/16	5 1/8		

"Span" represents the maximum recommended distance between hangers on a continuous and straight run of horizontal standard weight steel pipe filled with water. In all cases, verify that chosen location of hangers does not subject hangers to a load greater than the maximum recommended load shown above. *Indicates that span represents the maximum span for water filled pipe as given in Table 1 of page 225.

PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

Fig. 228

Universal Forged Steel (UFS) Beam Clamp with UFS (Upper) Nut Right-Hand Thread



Material: Forged steel
Finish: ☑ Plain or ☐ Galvanized
Service: For suspension of heavy loads from beams with flange widths to 15" and flange thickness to 1.031.
Approvals: Complies with Federal Specification A-A-1192A (Type 28 without links; Type 29 with links), *WW-H-171-E* (Type 30 & 31), ANSI/MSS SP-69 and MSS SP-58 (Type 28 without links; Type 29 with links).
Installation: Fit jaws over edges of lower beam flange and tighten nuts on tie rod to lock clamp in place.
Features:

- Upper nut is tapped to any specified size up to the maximum rod size.
- Quickly, easily, economically installed.
- Tie rod insures a tight non-slip fit to the beam.
- Clamps are available, tapped to any specified rod size up to the maximum rod size.

Ordering: Specify clamp size, figure number, name, rod size and finish.
Note: The application of a load to a structural beam by means of a beam clamp produces a transverse stress, perpendicular to the axis of the beam, in the flange to which the load is applied. Size per load, beam flange width and rod size

FIG. 228: LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)

Clamp Size No.	Max Rod Size A	Max Load ■	Weight	Z Max ✣	B	Jaw and Nut Size ▲
1	5/8	2,160	3.3	0.60	1 1/16	228 - 1
2	7/8	4,480	7.0		1 3/8	228 - 2
3•			10.6			
4	1 1/2	11,500	19.3	1.031	2 3/8	228 - 3
5•			31.0			

▲ For reference only, order by clamp size.
• Furnished with links.
■ Note: Load capacity based on rod sizes shown. For load capacity of other rod sizes see page 233.
✣ For actual "Z" dimensions see table on page 234.

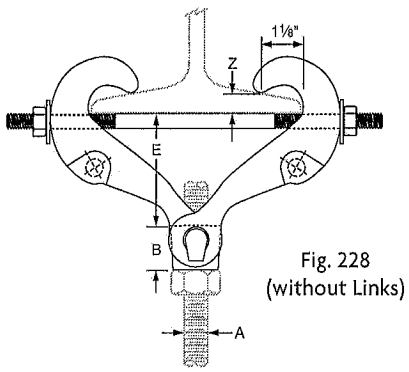


Fig. 228 (without Links)

Clamp Size No.	Width of Beam Flange (in) / Rod Take Out - E (in)												
	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1 9/16	1 1/2	1 5/16	1 1/8	3/4	–	–	–	–	–	–	–	–
2	–	1 7/16			11/16	–	–	–	–	–	–	–	–
3•	–	–	–	–	1 15/16	1 13/16	1 1/2	1 5/16	–	–	–	–	–
4	–	2 5/16	2 3/16	2 1/16	1 13/16	1 7/8	1 9/16		–	–	–	–	–
5•	–	–	–	–	–	–	–	3	2 11/16	2 9/16	2 1/4	1 15/16	1 5/8

• Furnished with links.

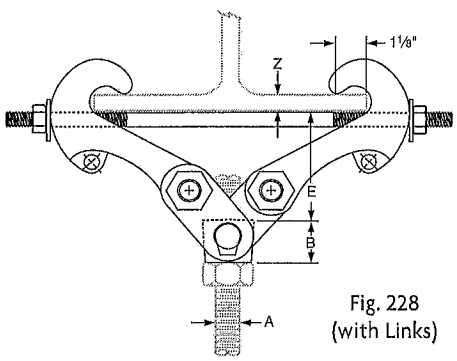


Fig. 228 (with Links)

PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ Approved
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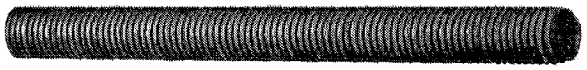
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

Fig. 146

Continuous Threaded Rod

Size Range: 1/4" through 1 1/2" Stocked in six, ten, and twelve foot lengths. Other even foot lengths can be furnished to order.
Material: Carbon steel or Stainless Steel Gr 304
Threads: National Coarse (USS), rod threaded complete length.
Finish: ☐ Plain or ☑ Galvanized.
Maximum Temperature: 650° F.
Ordering: Specify rod diameter and length, figure number, name and finish.
Note: The acceptability of galvanized coatings at temperatures above 450°F is at the discretion of the end user.



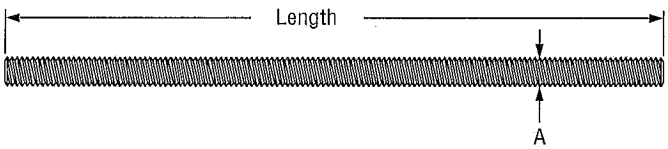


FIG. 146:
LOADS (LBS) • WEIGHTS (LBS) • DIMENSIONS (IN)

Rod Size A	Threads per Inch	Max Load 650° F	Weight per Ft.
1/4	20	240	0.12
3/8	16	730	0.30
1/2	13	1,350	0.53
5/8	11	2,160	0.84
3/4	10	3,230	1.20
7/8	9	4,480	1.70
1	8	5,900	2.30
1 1/4	7	9,500	3.60
1 1/2	6	13,800	5.10

Note: Other rod sizes available upon request. Class 2 fit is available upon request.

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Fig: 66

Welded Beam Attachment

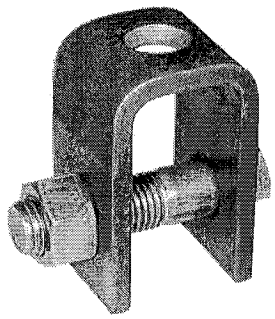
Size Range: 3/8" through 3 1/2"
Material: Carbon steel
Finish: ☑ Plain or ☐ Galvanized

WITHOUT NUT AND BOLT

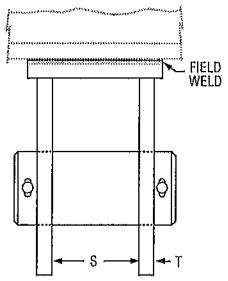
Service: Recommended for attachment to bottom of beams, especially where loads are considerable and rod sizes are large.
Maximum Temperature: Plain 750° F, Galvanized 450° F
Approvals: Complies with Federal Specification A-A-1192A (Type 22), *WW-H-171-E (Type 22)*, ANSI/MSS SP-69 and MSS SP-58 (Type 22).
Installation: If flexibility at the beam is desired, use with bolt and eye rod Fig. 278, page 93, or with weldless eye nut Fig. 290, page 97. If vertical adjustment is desired, use with threaded rod and nut and weld the attachment in an inverted position to the beam.
Features:

- Will accommodate very heavy loads and rod sizes through 3 1/2".
- Can be installed so as to provide for either flexibility or for vertical adjustment.
- Versatility affords economical stocking and erection.
- Beam size need not be considered.

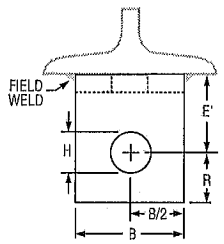
Ordering: Specify rod size, figure number, name and finish. Sizes 1" and smaller are typically supplied with a bolt and nut. Sizes 1 1/4" and larger are typically supplied with a pin and cotters.



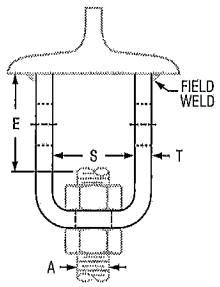
Using Hanger Rod with Attachment in Inverted Position.



2" Rod Dia. and Larger are Fabricated.



1 3/4" Rod Dia. and Smaller are Formed using Bolt or Pin and Eye Rod.



1 1/4" Rod Dia. and Smaller Only.

FIG: 66: LOAD (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)

Rod Size A	Pin or Bolt Size	Max Load		Weight		Rod Take Out		B	H	R	S	T
		650° F	750° F	Without Bolt and Nut	With Bolt and Nut	E	E'					
3/8	1/2 x 2 1/2	730	572	0.96	1.2	1 7/8	2	2	9/16	7/8	1 1/4	1/4
1/2	5/8 x 2 1/2	1,350	1,057		1.3	1 3/4			11/16			
5/8	3/4 x 2 3/4	2,160	1,692		1.6				13/16			
3/4	7/8 x 4	3,230	2,530	1.9	2.8			2 1/2	15/16	1 1/8	1 7/8	3/8
7/8	1 x 4	4,480	3,508	2.5	3.9	2 5/8	3		1 1/8	1 1/4	2	
1	1 1/8 x 5	5,900	4,620	4.3	6.3	2 3/4		3	1 1/4	1 1/2	2 1/2	1/2
1 1/4	1 3/8 x 5 3/8	9,500	7,440	8.1	10.2	2 7/8		4	1 1/2	2		5/8
1 1/2	1 5/8 x 6	13,800	10,807	–	19.0	–	4	5	1 3/4	2 1/2	3	3/4
1 3/4	1 7/8 x 6 7/8	18,600	14,566	–	24.2	–	5		2	2 3/4	3 3/4	
2	2 1/4 x 6 7/8	24,600	19,265	–	30.6	–		6	2 3/8	3 1/4	3 1/2	1/2
2 1/4	2 1/2 x 7 3/8	32,300	25,295	–	36.8	–	5 3/4		2 5/8	3 1/2		5/8
2 1/2	2 3/4 x 7 5/8	39,800	31,169	–	39.7	–			2 7/8	3 3/4	3 3/4	
2 3/4	3 x 7	49,400	38,687	–	40.8	–			3 1/8	4		
3	3 1/4 x 7	60,100	47,066	–	46.7	–	6 1/4	7	3 3/8			
3 1/4	3 1/2 x 7 3/4	71,900	56,307	–	62.1	–	7		3 5/8	4 1/2	4 1/4	3/4
3 1/2	3 3/4 x 7 3/4	84,700	66,331	–	72.4	–	7 1/2	8	3 7/8			

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