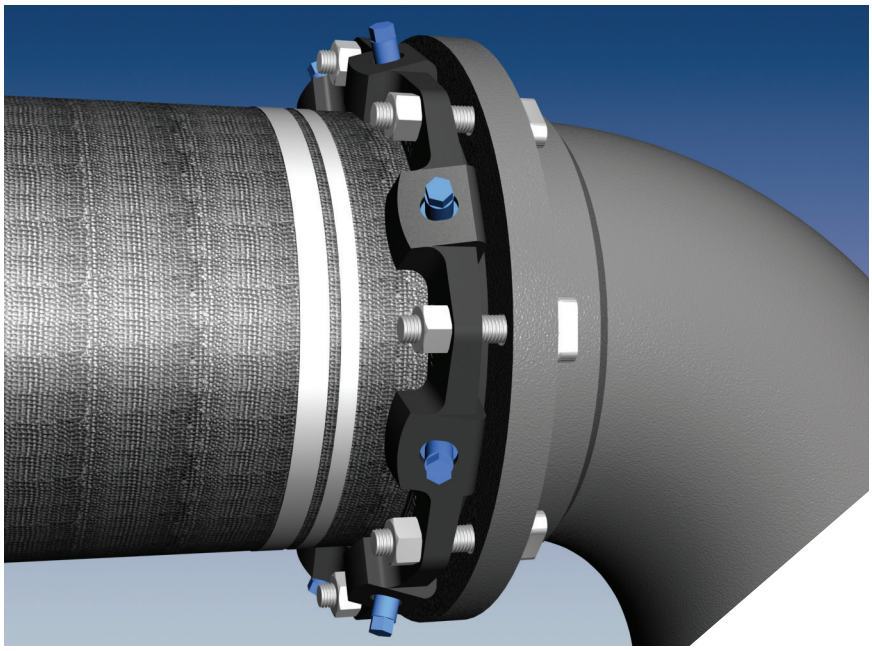
MEGALUG® Series 1100

Mechanical Joint Restraint for Ductile Iron Pipe

All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***



Nominal Pipe Size	Series Number	Shipping Weights	Post Assembly Deflection	Pressure Rating (PSI)
3	1103	6.1	3°	350
4	1104	7.7	3°	350
6	1106	11.9	3°	350
8	1108	14.8	3°	350
10	1110	23.9	3°	350
12	1112	31.2	3°	350
14	1114	48.5	2°	350
16	1116	56.4	2°	350
18	1118	63.1	1½°	250
20	1120	72.3	1½°	250
24	1124	133.1	1½°	250
30	1130	194.6	1°	250
36	1136	234.0	1°	250
42	1142	536.0	1°	250
48	1148	653.0	1°	250
54	1154	700.2	0.5°	250
60	1160	1,135.8	0.5°	200

NOTE: For applications or pressures other than those shown please contact EBAA for assistance.

Made In The USA

U.S. Patent Nos.
4092036, 4627774, 4779900, 4896903, 5544922

Features and Applications:

- Sizes 3 inch through 60 inch
- Constructed of ASTM A536 Ductile Iron
- Torque Limiting Twist-Off Nuts
- MEGA-BOND® Restraint Coating System
  For more information on MEGA-BOND, refer to www.ebaa.com
- The Mechanical Joint Follower Gland is incorporated into the restraint
- Heavy Duty thick wall design
- Support Products Available:
  Split repair style available 3 inch through 54 inch.
  EBAA Series 1100SD

  Solid restraint harness available for push-on pipe bells.
  EBAA Series 1700

  Split restraint harness available for existing push-on bells.
  EBAA Series 1100HD
- All MEGALUG and related restraint products can be furnished as packaged accessories complete with appropriate restraint, gasket, lubrication, and bolting hardware
- For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600 or ASTM D2774

MEGALUG: THE PRODUCT OF PREFERENCE SINCE 1984

Since 1984, engineers and contractors designing and installing water and wastewater pipelines and systems have come to rely on the EBAA Series 1100 MEGALUG Mechanical Joint Restraint as the "Product of Preference" for effectively and economically restraining ductile iron pipe connections above or below ground.

MEGALUG Mechanical Joint Restraints replace external restraints such as cumbersome concrete thrust blocks and corrodible metal tie rods creating a quicker, safer and more economical installation.

Major testing laboratories agree as the 3" through 24" sizes are Underwriters Laboratories (UL) listed, and the 3" through 12" sizes are Factory Mutual (FM) approved.

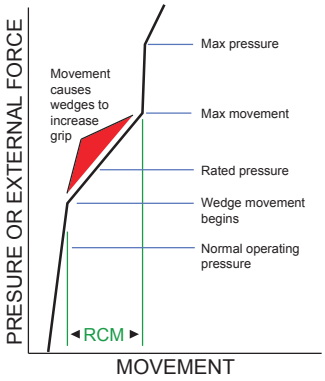
For use on all classes of ductile iron pipe (PC350 through PC150 and CL56 through CL50), for practically any application including valves, hydrants and pipe, the MEGALUG Mechanical Joint Restraint effectively and safely performs without damage to the pipe or cement linings.

THE MEGALUG GRIPPING WEDGE... PERFORMANCE PROVEN

The wedge style MEGALUG design reacts to the amount of force acting on the joint. When each wedge is set, the wedge teeth penetrate the pipe's outer surface, and the wedge does not move on the pipe. There is very little change in this interface until the wedge movement begins inside the pocket of the main casting. Once the wedge starts moving, the formation of the buttress begins.

This "dam" of material (the wedge impression) is cold formed as the wedging action continues. If the force of pressure acting on the joint is released, the wedge moves back to near its original position. This engages the reserve-controlled movement or "RCM". The wedge is then ready for another round.

After the wedge has moved to the back



of the pocket at the maximum pressure or load, the wedge buttress are in shear. The maximum movement is about 0.3 inch through the thirty-six inch size and 0.4 inch for forty-two and forty-eight inch.

The RCM is available even with severe cyclic loads. This has been tested to very high-pressure differentials and the wedge impressions look the same as if a single test had been performed.

Typically, the depth of pipe wall penetration, or wedge impression at around 25,000 pounds of force per wedge (200 PSI on a six inch and 150 PSI on a twelve inch) is 0.03". Finally, at roughly twice that force the penetration is around 0.05" At these high pressures, there is no affect on the design thickness of ductile iron pipe made according to AWWA C150. The lack of damage to the cement lining clearly indicates that the thrust load is primarily longitudinal.

This ability to move in the pocket allows for angular flexibility as well as longitudinal flexibility.

THE ORIGINAL PATENTED GRIPPING WEDGES

Since 1964 EBAA Iron has responded aggressively to the needs of the water industry for better solutions to joint restraint problems - thus the development of the family of self actuating MEGALUG wedge action restraints.

TOOLS

MEGALUGS install using an ordinary wrench (box, ratchet, or air-driven), because the torque-limiting, twist-off nuts automatically shear during tightening when the proper torque is reached. The same 1¼ wrench used to tighten the T-bolts on the 4" through 24" sizes can be used to tighten and shear the twist off nuts in all sizes. If removal becomes necessary, a 5/8 hex head remains so the screws can be loosened, and retightened with a torque-indicating wrench. During removal, the wedges are held in place by retainer clips.

DEFLECTION

The MEGALUG gripping wedges provide resiliency to your pipeline design. In addition to deflecting as much as allowed by the mechanical joint during installation, it can also deflect after assembly:
Sizes of 12" and below are capable of up to 3 degrees of deflection after installation (depending on the preset deflection.)
The 14" and 16" sizes are capable of 2 degrees deflection.
The 18" through 24" sizes are capable of 1.5 degrees deflection.
The 30" through 48" sizes are capable of 1 degree deflection.
The 54" and 60" sizes are capable of 0.5 degree deflection.

STEEL PIPE

The 1100 Series MEGALUG can be used to restrain 3" - 8" SCH 40 or 80 steel pipe when joining to mechanical appurtenances. It can also be used on steel pipe in all sizes if the pipe's outside diameter is the same as the ductile iron pipe and its thickness is equal to or greater than PC350 ductile iron pipe in sizes of 16 inch and below and PC250 ductile iron pipe 18 inches and above.

CAST IRON PIPE

Grey iron pipe diameters are often larger than ductile iron pipe diameters. The Series 1100 MEGALUG restraint may be used with grey iron pipe having standardized cast iron O.D. per AWWA C150 and C151, and with pit cast Classes "A" and "B" without modification. Use of the Series 1100 with pit cast grey iron Classes "C" and "D" will require over sizing the MEGALUG. More information on this is explained in detail in "Connections Bulletin DI-1".

MEGALUG Takes the Load

On April 11, 1997 EBAA Iron performed a remarkable force demonstration of their series 1100 MEGALUG Joint Restraint. With the use of EBAA's Series 1100 MEGALUG using a standard mechanical joint installation on 12 inch Ductile Iron Pipe, and a 80 Ton motor crane, EBAA Iron lifted a D7 Caterpillar Track Type Tractor weighing in at 50,350 lbs. Along with this, the Series 1100 MEGALUG has been tested to over 700 PSI. Concluding that EBAA's MEGALUGS can take the load.

Mechanical Joint Restraint Sample Specifications

(The text of the specifications below can be copied pasted from www.ebaa.com/download/1100Spec.DOC)

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

Design
Restraint devices for nominal pipe sizes 3 inch through 60 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating of 350 psi for 3-16 inch, 250 psi for 18-54 inch and 200 psi for the 60 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***

Material
Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

For applications requiring restraint 30 inch and greater, an alternate grade of iron meeting the material requirements of ASTM A536 is acceptable, providing the device meets all end product performance requirements.

Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) Specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

Traceability
An identification number consisting of year, day, plant and shift (YYDDD)(plant designation)(Shift number), shall be cast into each gland body.

All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.

All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

Installation
Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

Approvals
Restraint devices shall be Listed by Underwriters Laboratories (3" through 24" inch size) and Approved by Factory Mutual (3" through 12" inch size).

Mechanical joint restraint for ductile Iron pipe shall be Megalug Series 1100 produced by EBAA Iron Inc. or approved equal.

MEGA-BOND® Restraint Coating System
All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

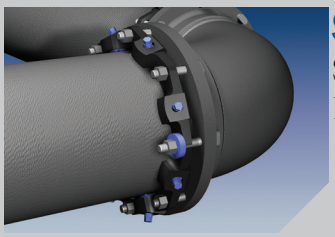
All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be MEGA-BOND by EBAA Iron, Inc. or approved equal. Requests for approved equal must submit coating material and process details for review prior to bid.

For more information regarding MEGA-BOND, refer to the MEGA-BOND brochure or visit www.ebaa.com.

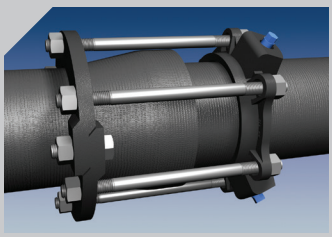
Support Products

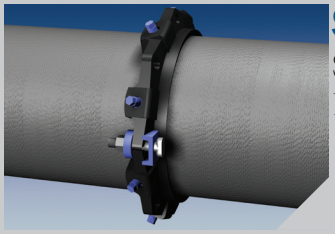
for more information concerning these products please consult the catalog or www.ebaa.com



Series 1100SD
Split MEGALUG Restraint
For Existing Mechanical Joints

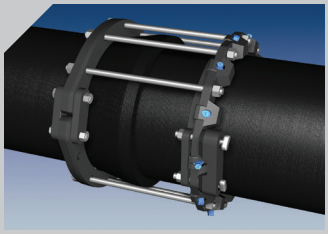
Series 1700
MEGALUG Restraint Harness
For Push-On Bell Joints





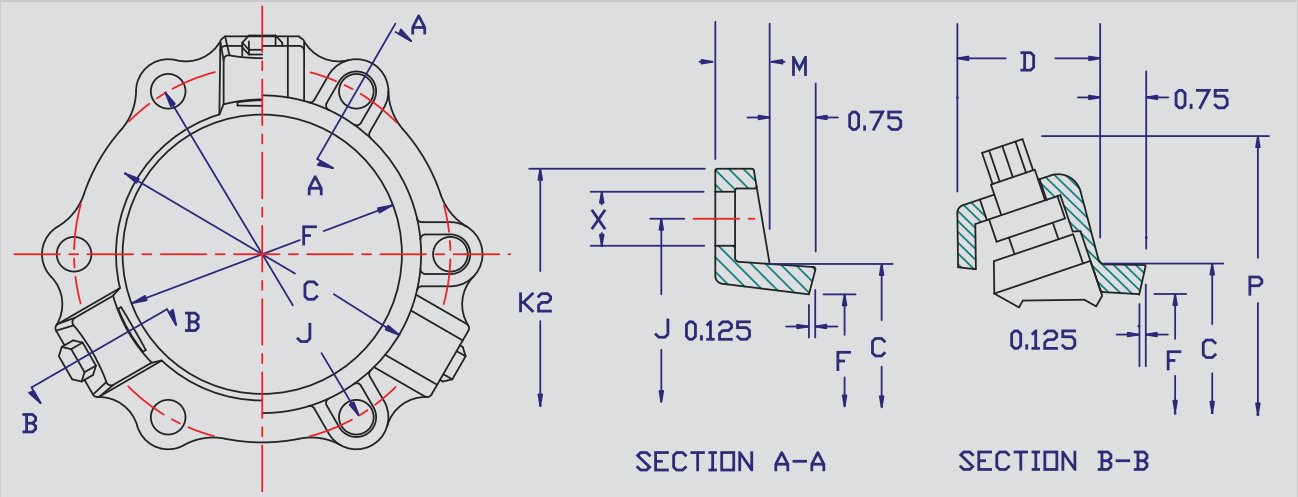
Series 1100SDB
Split MEGALUG Restraint
For Mid-Span Applications

Series 1100HD
Split MEGALUG Restraint
Harness for Existing Push-On Bells



Series 1100 Submittal Reference Drawing

EBAA IRON



MADE IN USA

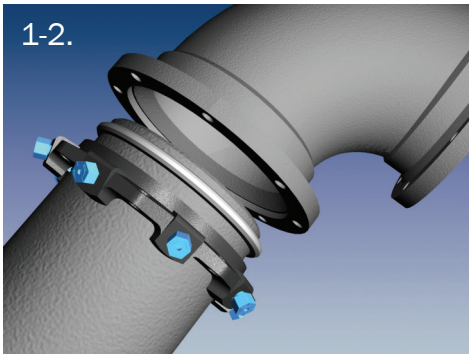
Nominal Pipe Size	Series Number	C	D	F	M	P*	X	J	K2	Wedge QTY.	Bolt (QTY.-Size)	Weight (LBS.)	Pressure Rating (PSI)
3	1103	4.48	2.27	4.06	0.62	9.06	0.750	6.19	7.69	2	4 - ⅝ x 3	6.1	350
4	1104	5.92	2.27	4.90	0.75	9.90	0.875	7.50	9.12	2	4 - ¾ x 3½	7.7	350
6	1106	8.02	2.27	7.00	0.88	12.00	0.875	9.50	11.12	3	6 - ¾ x 3½	11.9	350
8	1108	10.17	2.31	9.15	1.00	14.15	0.875	11.75	13.37	4	6 - ¾ x 4	14.8	350
10	1110	12.22	2.37	11.20	1.00	16.20	0.875	14.00	15.62	6	8 - ¾ x 4	23.9	350
12	1112	14.32	2.37	13.30	1.25	18.30	0.875	16.25	17.88	8	8 - ¾ x 4	31.2	350
14	1114	16.40	2.69	15.44	1.50	20.94	0.875	18.75	20.25	10	10 -¾ x 4½	48.5	350
16	1116	18.50	2.69	17.54	1.56	22.90	0.875	21.00	22.50	12	12 -¾ x 4½	56.4	350
18	1118	20.60	2.69	19.64	1.63	25.00	0.875	23.25	24.75	12	12 -¾ x 4½	63.1	250
20	1120	22.70	2.69	21.74	1.69	27.10	0.875	25.50	27.00	14	14 -¾ x 4½	72.3	250
24	1124	26.90	3.20	25.94	1.81	32.64	0.875	30.00	31.50	16	16 -¾ x 5	133.1	250
30	1130	33.29	3.20	32.17	2.25	38.87	1.125	36.88	39.12	20	20 - 1 x 6	194.6	250
36	1136	39.59	3.20	38.47	2.25	45.17	1.125	43.75	46.00	24	24 - 1 x 6	234.0	250
42	1142	45.79	4.56	44.67	3.88	55.57	1.375	50.62	53.48	28	28 - 1¼ x 8½	536.0	250
48	1148	52.09	4.56	50.97	3.88	61.87	1.375	57.50	60.36	32	32 - 1¼ x 8½	653.0	250
54	1154	58.82	4.56	57.73	3.88	66.40	1.375	63.20	66.33	36	36 - 1¼ x 9½	700.3	250
60	1160	62.90	6.40	61.78	4.23	73.00	1.375	67.72	70.70	36	36 - 1¼ x 11	1,135.8	200

* With Twist-Off Nuts twisted off.

NOTE: Dimensions are in inches (±1%) and are subject to change without notice.

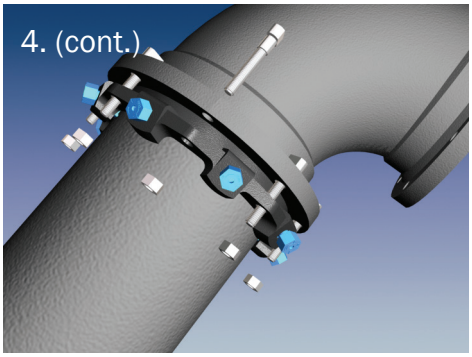
Important Notes

- The Series 1100 MEGALUG should not be used on plain end fittings.
- If encased in concrete, polyethylene wrap must be used to prevent concrete intrusion into the wedge pocket.
- For test pressures above the rated pressures shown, contact EBAA for recommendations, such as tandem restraint for high pressure applications.
- If you experience the need to install the Series 1100 MEGALUG in an unconventional manner please consult our engineering department.
- EBAA-Seal™ Mechanical Joint Gaskets are provided with 30 inch through 60 inch MEGALUG restraints. These are required on the above referenced sizes to accommodate the pressure ratings and safety factors shown.
- Extra length T-bolts are provided with the 42 inch, 48 inch, 54 inch, and 60 inch sizes to facilitate easier assembly of the mechanical joint.
- All Series 1100 MEGALUG components are made of ductile iron conforming to ASTM A536. The wedges are heat treated to a hardness range of 370 to 470 BHN.
- LISTINGS AND APPROVALS: Sizes 3 inch through 24 inch are listed by Underwriters Laboratories, Inc. Category HJKF "Fittings, Retainer Type" with a deflection angle of 5 degrees (3 inch through 12 inch) and 2½ degrees (14 inch through 24 inch). The listing file number is EX2836, Sizes 3 inch through 12 inch are Factory Mutual approved.
- The Series 1100 MEGALUG is intended for use on ductile iron pipe. The restraint can be used on grey iron pipe if the pipe is not severely corroded and is in sound condition and has an outside diameter that can be accommodated. For more information on the use of the MEGALUG restraint on grey iron pipe ask for Connections Bulletin DI-1.



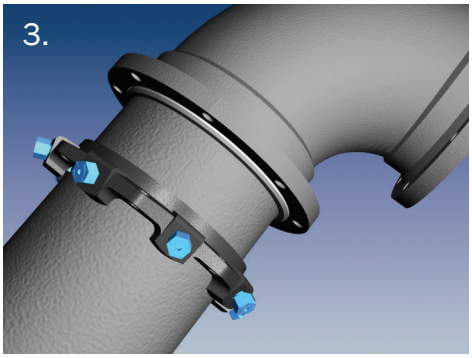
1. The Series 1100 MEGALUG® joint restraint is designed for use on ductile iron pipe conforming to ANSI/AWWA C151/A21.51 (all thickness classes) when restraining mechanical joint pipe fittings.

   All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***

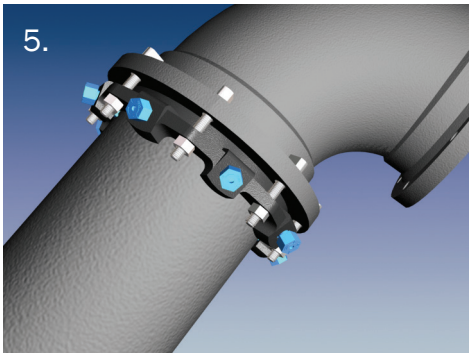


4. Push the gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening bolts.

5. Tighten the bolts to the normal range of torque as indicated [3-inch 45-60 ft.-lbs., 4 through 24-inch 75-90 ft-lbs., 30 and 36-inch 100-120 ft.-lbs., and 42, 48, 54, and 60-inch 120-150 ft.-lbs.] While at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque. In large

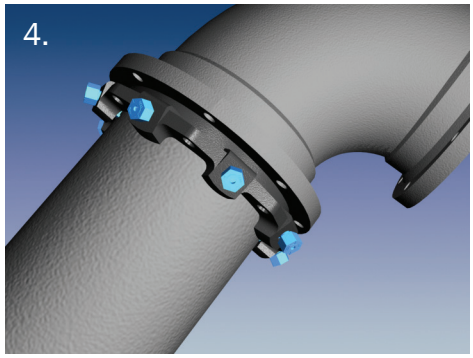


2. Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or an approved pipe lubrication meeting the requirement of ANSI/AWWA C111/A21.11 just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end. [The gasket provided may be the EBAA-SEAL®



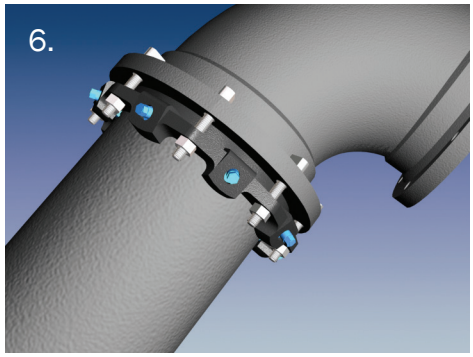
sizes (30 through 64-inch [762mm – 1,600mm]), five or more repetitions may be required. The use of a torque-indicating wrench will facilitate this procedure.

6. Tighten the torque limiting twist off nuts in a clockwise direction (direction indicated by arrow on top of nut) until all wedges are in firm contact with the pipe surface. Continue tightening in an alternating manner until all of the nuts have been twisted off.



Improved Mechanical Joint Gasket, there is no narrow end as the gasket is bi-directional. In certain sizes, use of the EBAA-SEAL is required to achieve the pressure ratings of the MEGALUG.] NOTE: In cold weather it is preferable to warm the gasket to facilitate assembly of the joint.

3. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.



7. If removal is necessary, utilize the ⅝ inch (1¼ inch on the 1160) hex heads provided. If reassembly is required, assemble the joint in the same manner as above, by tightening the wedge bolts to 90 ft-lbs (150 ft-lbs on the 1160). If the series 1100 restraint is removed from the pipe, be sure that all the collar bolts and wedges are in place before the restraint is reassembled.

Steps 2-5 are requirements of AWWA Standard C600-17

***To learn more about this addendum, please visit:**
https://ebaa.com/spec/dip

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(800) 433-1716 within US and Canada
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For More Information

For more information about MEGALUG restraints call EBAA today and request "EBAA Connections Bulletin DI-1" concerning use of the MEGALUG restraint on grey iron pipe, or "EBAA Connections Bulletin DI-2" covering the background and operation of the MEGALUG system of restraint.

"Restraint Length Calculation" Software is available for PC/Windows applications. Support documentation about the software can be found in "EBAA Connections Bulletin PD-1 through PD-5".

SIZE	A	B	C	D	F	G	H	I	J	K	L	M	N	O	P
3	8.50	2.50	8.37	.38	11.50	10	.86	8	N/A	N/A	8.50	N/A	3.09	N/A	N/A
4	9.25	2.50	9.81	.41	13.81	13	.86	9	11	3.50	9.09	10.31	4.02	N/A	N/A
6	10.50	2.50	13	.44	15.25	19	1.00	10.50	12.38	3.50	10.75	11.46	6.06	N/A	N/A
8	11.50	2.50	15.62	.50	20.18	25	1.00	11.50	14	3.75	12.50	13.06	8.06	N/A	N/A
10	14.50	2.50	19.43	.63	25.50	32	1.18	13	14.38	3.88	13.75	14	10.09	N/A	N/A
12	15	2.50	21.12	.69	26.31	37	1.18	14	14.88	3.88	14.50	14.75	12.09	N/A	N/A
14	22	3.50	25.62	.84	35.37	50	1.50	22	N/A	N/A	22	N/A	14.18	N/A	N/A
16	22	3.50	25.62	.84	35.37	50	1.50	16	23	5	19	19 7/32	16.09	28.40	7.95
18**	19.25	3.50	34.25	.97	43.50	62	1.75	19.12	N/A	N/A	19.25	N/A	18.31	N/A	N/A
20**	18.50	3.50	34.25	.97	43.50	62	1.75	19.50	23	5	19	N/A	20.16	30	8.50
24**	28.25	3.50	43.75	1.08	49.50	74	2.00	21.56	30.65	5	24.88	N/A	24.12	38.38	9

**GEAR REDUCTION RECOMMENDED

ITEM NO.	NAME OF PART	QTY. REQ'D	MATERIAL	SPECIFICATION
1	BODY	1	DUCTILE IRON	ASTM A536
2	BONNET	1	DUCTILE IRON	ASTM A536
3 *	GATE, RUBBER COVERED	1	DUCTILE IRON	ASTM A536
4 △	STEM (70T, 30Y)	1	MANG. BRONZE	ASTM B584 C865-MOD.
5	STEM NUT	1	BRONZE	ASTM B584 C836
6	OPERATING NUT	1	CAST IRON	ASTM A126 CL. B
8	CARTRIDGE	1	"DELRIN"	DUPONT CO.
9	THRUST WASHER	1	"DELRIN"	DUPONT CO.
10	RETAINER RING	1	"DELRIN"	DUPONT CO.
11	DIRT SEAL	1	RUBBER	SBR ASTM D2000
12	PIN, "SHEARPROOF"	1	STEEL	ZINC PLATED ASTM B633
13	BONNET SEAL	1	RUBBER	NBR ASTM D2000
14	"O"RING (CARTRIDGE)	1	RUBBER	NBR ASTM D2000
15	"O"RING (STEM)	2	RUBBER	NBR ASTM D2000
16	BOLT, HEX HEAD		STN. STL.	ASTM A-276 (18-8)
17	NUT, HEX		STN. STL.	

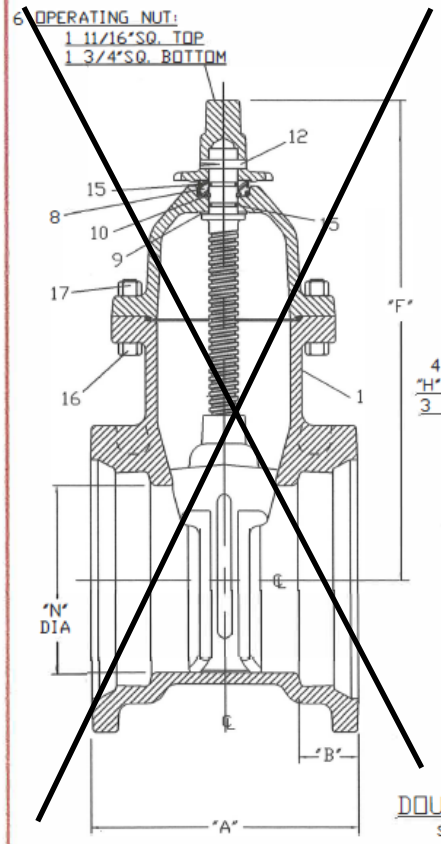
* 3" GATE MATERIAL IS BRONZE ASTM B584 C836/8345
△ 14-24 STEM MATERIAL ASTM B584 C86200

LEFT - OPEN

6 OPERATING NUT:
1 11/16"SQ. TOP
1 3/4"SQ. BOTTOM

G=NUMBER OF TURNS TO OPEN

CAST IN RAISED LETTERS
USP
YEAR
D.I.
(BODY OR BONNET)
SIZE
WP
AWWA



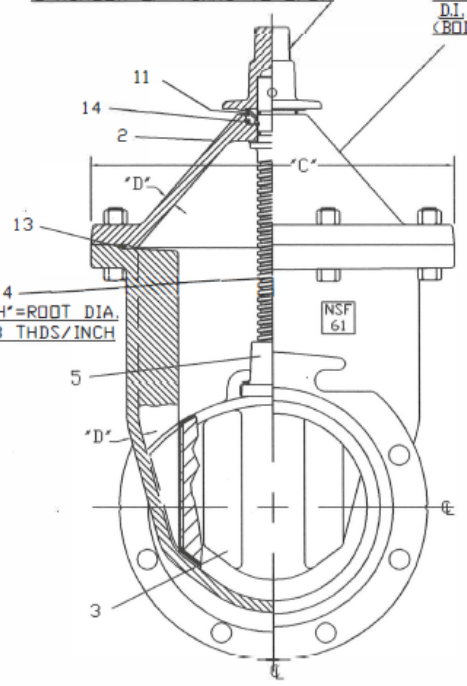


FIG. 5460
DOUBLE MECHANICAL JOINT
SEE NOTE "B", & "C"

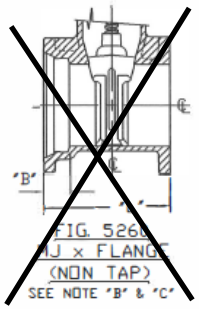


FIG. 5261
MJ x FLANGE
(NON TAP)
SEE NOTE "B" & "C"

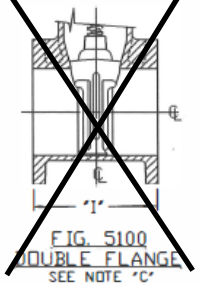


FIG. 5100
DOUBLE FLANGE
SEE NOTE "C"

NOTE "A": BODY(1) AND BONNET(2) ARE COATED ON ALL SURFACES WITH PERMAFUSE® (FUSION BONDED EPOXY) IN COMPLIANCE WITH AWWA C550 ("HOLIDAY FREE" IF SPECIFIED ON ORDER)

NOTE "B": MECHANICAL JOINT, TR® FLEX, AND TYTON® ENDS PER ANSI/AWWA C111/A21.11

NOTE "C": FLANGES ARE CLASS 125 PER ANSI/AWWA C115/A21.15. USE ONLY U.S.PIPE'S FLANGETYTE® GASKET, 1/8"THICK FULL FACE, OR RING GASKET PER ANSI/AWWA C110/A21.10

NOTE "D": 3"-16"VALVES RATED FOR 250 PSI WORKING AND 500 PSI TEST PRESSURE. STANDARD 18"-24"VALVES ARE RATED FOR 150 PSI WP AND 300 PSI TEST.

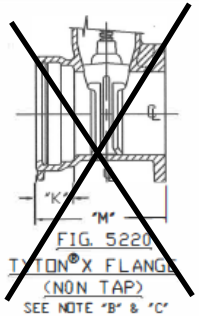


FIG. 5220
TYTON® X FLANGE
(NON TAP)
SEE NOTE "B" & "C"

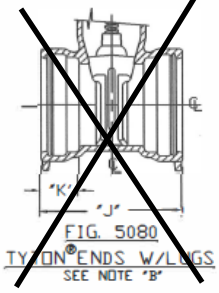


FIG. 5080
TYTON® ENDS W/LUGS
SEE NOTE "B"

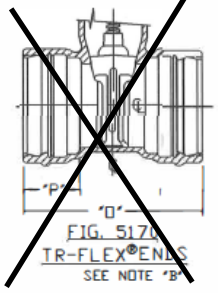


FIG. 5170
TR-FLEX® ENDS
SEE NOTE "B"

ALL VALVES ARE NSF-61 LISTED

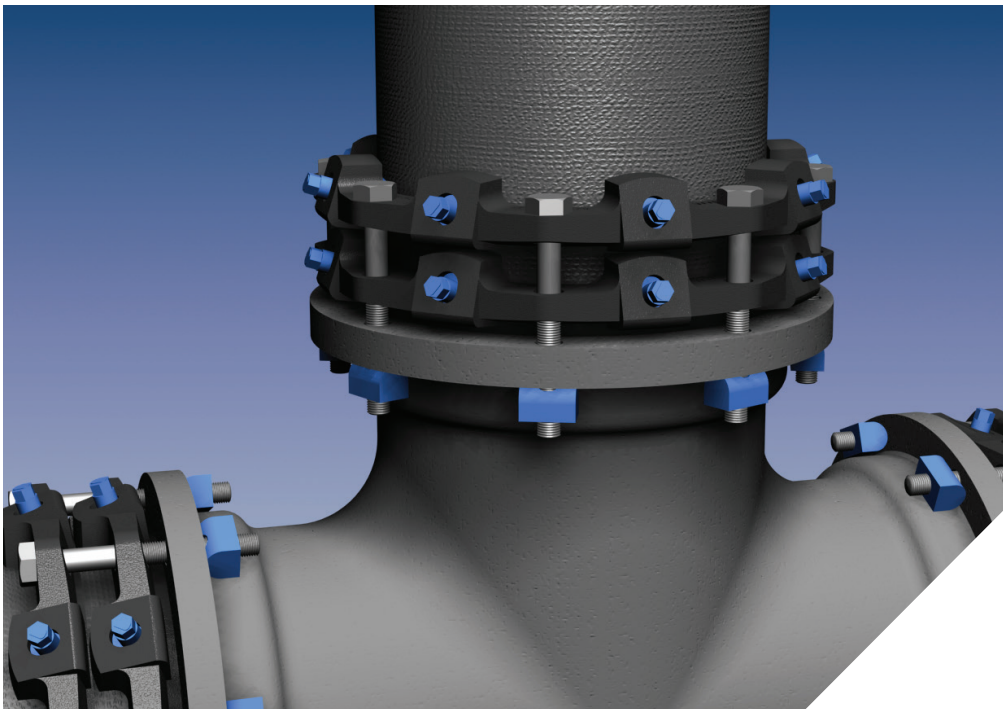
DRAWN KLC	DATE 4/7/00	UNITED STATES PIPE AND FOUNDRY CO. CHATTANOOGA VALVE & FITTINGS VALVE & HYDRANT DEPARTMENT CHATTANOOGA, TENNESSEE 37408
CHECKED DJD	DATE 4/7/00	3"-24" METROSEAL® 250 RESILIENT SEATED GATE VALVES PER ANSI/AWWA C509 VARIOUS ENDS SHOWN
APPROVED JJP	DATE 4-7-00	
REV. DATE		
MASS. WATER RESOURCE AUTHORITY		DWG. NO. 860524

Series 1100TDM

Tandem MEGALUG® Mechanical Joint Restraint

High Pressure Restraint for Ductile Iron Pipe

All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***



Series 1112TDM restraining a mechanical joint fitting.

Nominal Pipe Size	Shipping Weights*	Post Assembly Deflection	Pressure Rating (PSI)
4	21.6	3°	700
6	33.0	3°	700
8	40.0	3°	700
10	60.2	3°	700
12	75.0	3°	700
14	112.7	2°	700
16	131.6	2°	700
18	145.2	1½°	500
20	166.6	1½°	500
24	290.2	1½°	500
30	457.9	1°	500
36	553.63	1°	500
42	1,074.8	1°	500
48	1,283.1	1°	500
54	1,445.32	½°	400

NOTE: For applications or pressures other than those shown please contact EBAA for assistance.
*lbs., weights are approximate.

Features and Applications:

- For use on Ductile Iron Pipe 4 inch through 54 inch
- High Pressure Restraint
- Torque Limiting Twist-Off Nuts
- Mechanical Joint follower gland incorporated into the restraint
- MEGA-BOND® Coating System For more information on MEGA-BOND, visit our web site at www.ebaa.com
- Minimum 2 to 1 Safety Factor
- Constructed of A536 Ductile Iron
- EBAA-Seal™ Mechanical Joint Gaskets are provided with all 1100TDM MEGALUG restraints. These are required to accommodate the pressure ratings and safety factors shown.
- New: High strength heavy hex machine bolts with T-nuts are provided to facilitate easier assembly due to the fittings radius area prohibiting the use longer T-bolts.
- T-Nuts constructed of High Tensile Ductile Iron with Fluropolymer Coating.

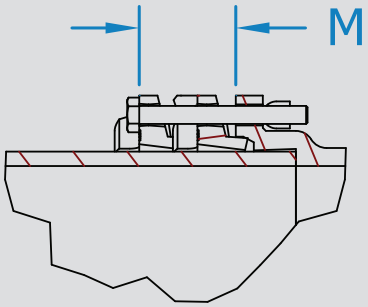
For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600, C605 or ASTM D2774.

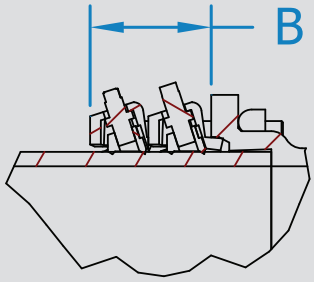
EBAA IRON Sales, Inc.
P.O. Box 857, Eastland, TX 76448
Tel: (254) 629-1731
Fax: (254) 629-8931
(800) 433-1716 within US and Canada
contact@ebaa.com
www.ebaa.com

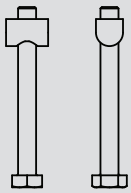
1100TDM Submittal Reference Drawing

EBAA IRON

MADE IN USA



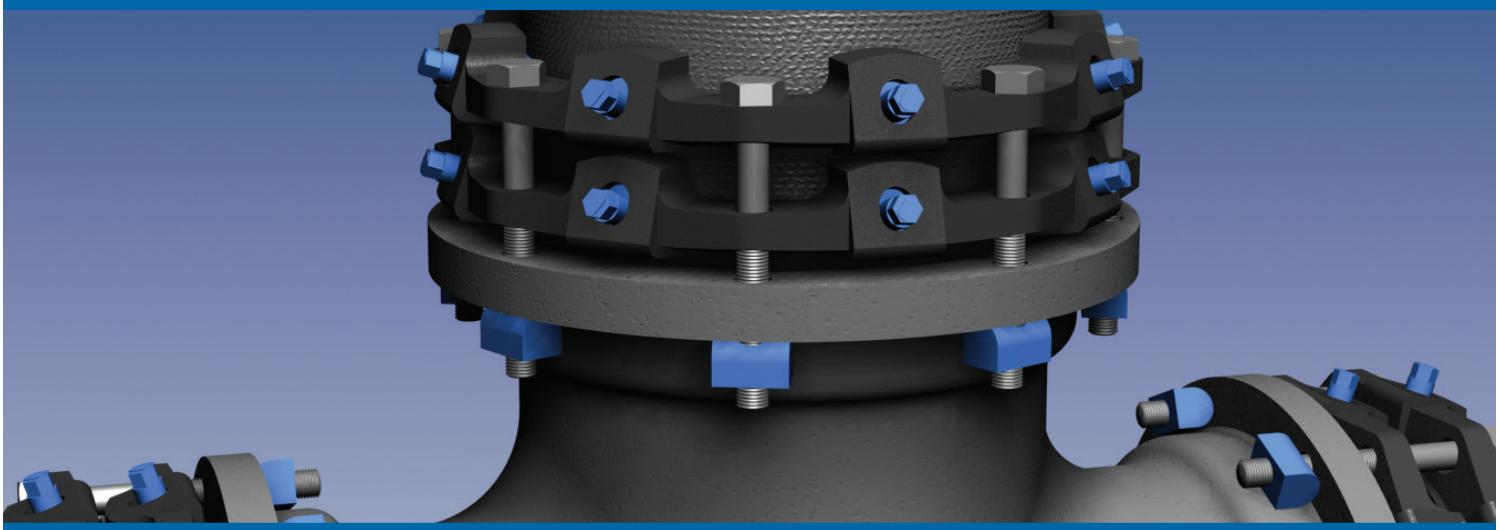




Heavy Hex Bolt with T-Nut

Due to the longer bolt requirement of the 1100TDM a Heavy Hex Bolt with T-Nuts are supplied in lieu of T-bolts.

Nominal Pipe Size	Series Number	Pipe O.D.	B	M	Wedge Per Gland	Heavy Hex Head Bolt w/ T-Nut	
					Qty	Quantity	D x L
4	1104TDM	4.80	5.30	3.80	4	4	¾ x 7
6	1106TDM	6.90	5.30	3.90	6	6	¾ x 7
8	1108TDM	9.05	5.40	4.10	6	6	¾ x 7
10	1110TDM	11.10	5.50	4.10	8	8	¾ x 7
12	1112TDM	13.20	5.50	4.40	8	8	¾ x 8
14	1114TDM	15.30	6.10	4.90	10	10	¾ x 8
16	1116TDM	17.40	6.10	5.00	12	12	¾ x 9
18	1118TDM	19.50	6.10	5.10	12	12	¾ x 9
20	1120TDM	21.60	6.10	5.10	14	14	¾ x 9
24	1124TDM	25.80	6.20	5.30	16	16	¾ x 9
30	1130TDM	32.00	6.20	6.20	20	20	1 x 12
36	1136TDM	38.30	7.20	6.20	24	24	1 x 12
42	1142TDM	44.50	9.80	9.10	28	28	1¼ x 15
48	1148TDM	50.80	9.80	9.10	32	32	1¼ x 15
54	1154TDM	57.56	9.80	9.20	36	36	1¼ x 15



Note: All dimensions are in inches ± 1% and are subject to change without notice
For additional submittal dimensional data refer to the series 1100 brochure.

Series 1100TDM Installation Instructions

1. The Series 1100TDM MEGALUG joint restraint is designed for use on ductile iron pipe conforming to ANSI/AWWA C151/A21.51 (all thickness classes) when restraining mechanical joint pipe fittings with high pressure.

   All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***

2. Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or an approved pipe lubrication meeting the requirement of ANSI/AWWA C111/A21.11 just prior to slipping the gasket onto the plain end for joint assembly. [Place the secondary restraint ring labeled "1100TDMSUB (ring without a lip)" onto the pipe with the machined smooth face toward the plain end. Place the primary 1100 restraint (gland with a lip) onto the pipe with the lip facing the plain end. Place the EBAA Seal Improved Mechanical Joint Gasket onto the pipe. The EBAA Seal gasket is bi-directional and is necessary for the high-pressure rating of the assembly.]

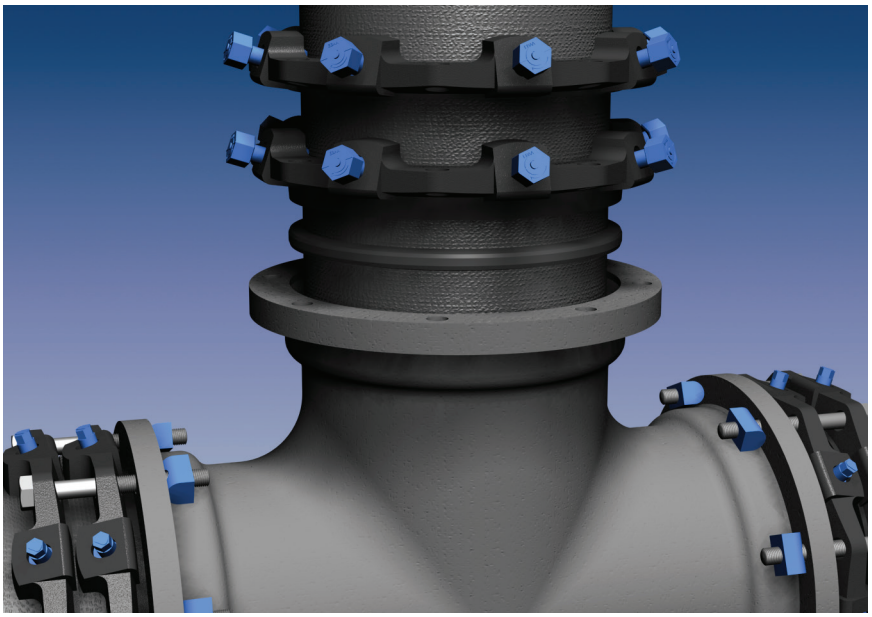
   NOTE: In cold weather it is preferable to warm the gasket to facilitate assembly of the joint.

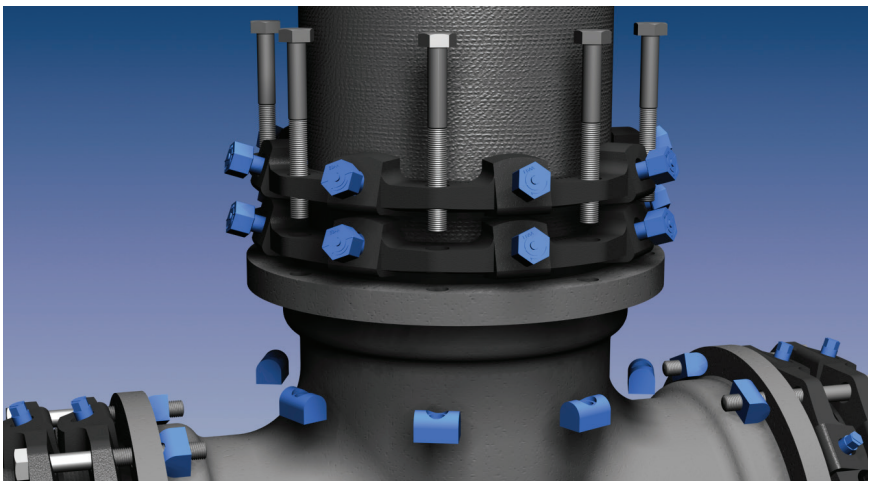
3. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.

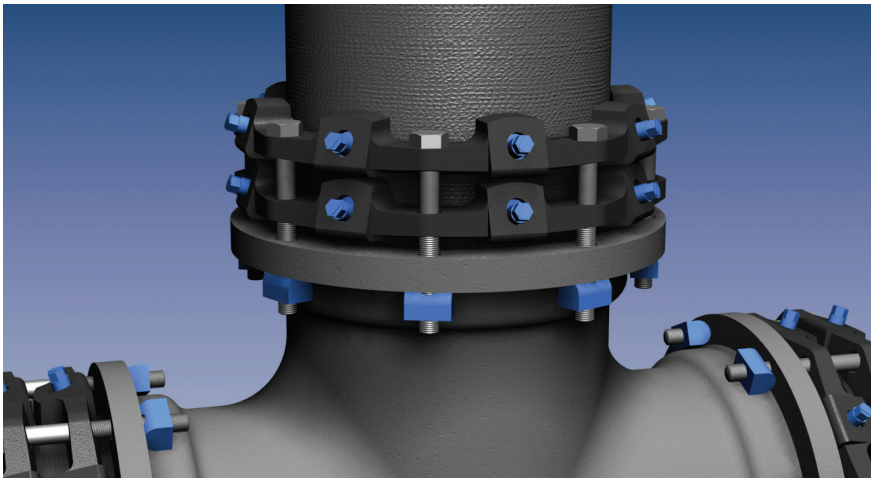
4. Push the gland[s] toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand tighten nuts. [Heavy Hex Head Bolts with T-Nuts have been provided for assembly because the radius of the fitting prevents installation of long t-bolts.] Make deflection after joint assembly but before tightening bolts.

5. Tighten the bolts to the normal range of torque as indicated [3-inch 45-60 ft.-lbs., 4 through 24-inch 75-90 ft.-lbs., 30 and 36-inch 100-120 ft.-lbs., and 42, 48 and 54-inch 120-150 ft.-lbs.] While at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque. In large sizes (30 through 64-inch [762mm through 1,600mm]), five or more repetitions may be required. The use of a torque-indicating wrench will facilitate this procedure.

6. Tighten the torque limiting twist-off nuts in a clockwise direction (direction indicated by arrow on top of nut) until all wedges are in firm contact with the pipe surface. Continue tightening in an alternating manner until all of the nuts have been twisted off.







7. If removal is necessary, utilize the ⅝ inch hex heads provided. If reassembly is required, assemble the joint in the same manner as above, by tightening the wedge bolts to 90 ft-lbs. If the series 1100 restraint is removed from the pipe, be sure that all the collar bolts and wedges are in place before the restraint is reassembled.

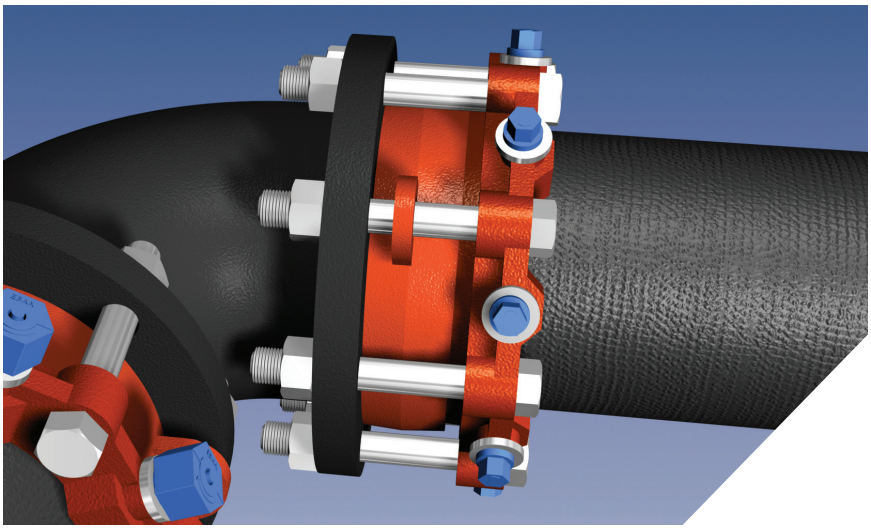
Steps 2-5 are requirements of AWWA Standard C600-17

***To learn more about this addendum, please visit:**
https://ebaa.com/spec/dip

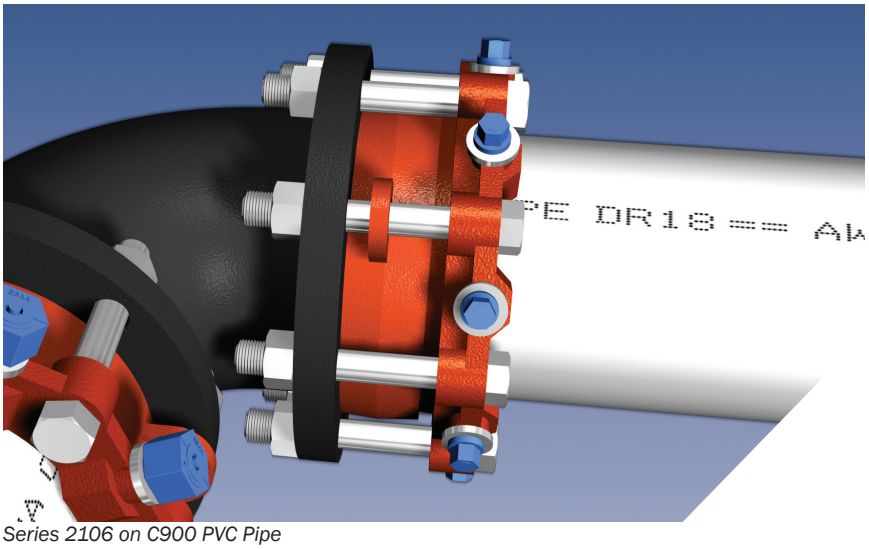
Series 2100

MEGAFLANGE®
Restrained Flange Adapter
U.S. Patent Nos. 4627774 and 5071175

All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***



Series 2106 on Ductile Iron Pipe



Series 2106 on C900 PVC Pipe

Features and Applications:

- MEGAFLANGE adapts and restrains plain end Ductile Iron, PVC, Carbon Steel and HDPE pipe to flanged pipe or fittings, where the flange conforms to ANSI/AWWA C111/A21.11 with flange surface facing in accordance with ANSI/AWWA C207 of the latest revision.
- Meets ANSI B16.5 Class 150/125 drilling pattern.
- Flange Bolts are zinc coated, fastener class coated bolts or stainless steel bolts are available
- Not for use on plain end fittings
- MEGA-BOND® Restraint Coating System
- For more information regarding MEGA-BOND, refer to our web site @ www.ebaa.com
- Minimum 2 to 1 Safety Factor
- Fully Restrained
- Constructed of ASTM A536 Ductile Iron
- UL listed on sizes 3 inch through 12 inch
- FM approved on sizes 4 inch through 12 inch on C900 Class 150 and Class 200 PVC Pipe
- Pipe can be cut to length in the field
- Joint deflection up to 5°
- Easy dismantling allows fast removal of valves, meters or fittings for replacement or repair

For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600, C605 or ASTM D2774.

Sample Specification

Restrained flange adapters shall be used in lieu of threaded or welded flanged spool pieces. Flanged adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C110/A21.10 (125#/Class 150 Bolt Pattern).

Restraint for flange adapter shall consist of a plurality of individual actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of gripping wedges.

The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6 inch gap between the end of the pipe and the mating flange without affecting the integrity of the seal.

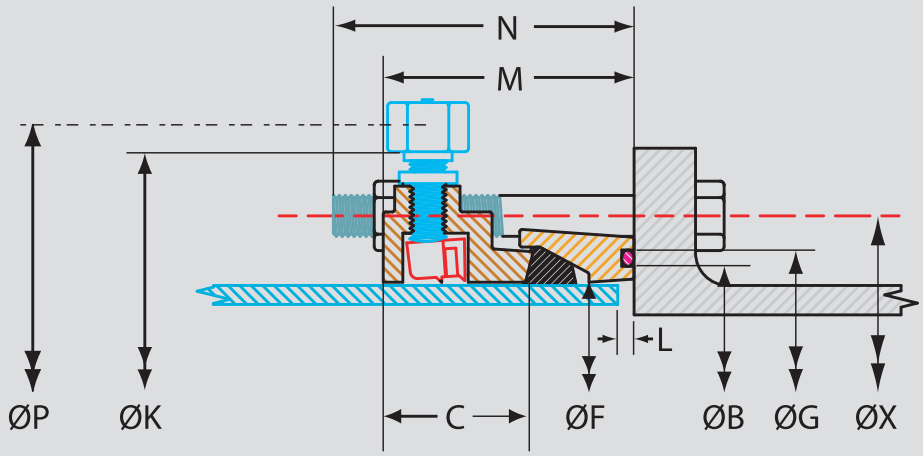
All internal surfaces of the gasket ring (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. The coating shall meet ANSI/NSF-61. Exterior surfaces of the gasket ring shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.

Restraint Ring coated with MEGA-BOND® Restraint Coating System, More information regarding MEGA-BOND can be found at www.ebaa.com.

Pressure ratings shall be a minimum of those shown in the table within current brochure.

The flange adapter shall be the Series 2100 MEGAFLANGE® Restrained Flange Adapter as produced by EBAA Iron, Inc. or approved equal.

Series 2100 Submittal Reference Drawing



Nominal Pipe Size	Series Number	Restraint Ring K	Restraint Ring F	Restraint Ring C	Gasket Ring F	Gasket Ring B	Gasket Ring G	Bolts No.	Bolts Dia.	Bolts Length	Bolts X	L MAX.	Assembly Deflection Degrees	M	P*	Ship Weight (lbs.)
3	2103	7.5	4.1	2.2	4.1	4.3	4.9	4	⅝	5½	6.00	0.7	5.0	4.0	9.2	14
4	2104	9.0	4.9	2.2	4.9	5.4	6.0	8	⅝	5½	7.50	0.6	5.0	4.0	10.0	20
6	2106	11.0	7.0	2.3	7.0	7.5	8.1	8	¾	6	9.50	0.8	5.0	4.3	12.1	32
8	2108	13.5	9.2	2.4	9.2	9.8	10.4	8	¾	6	11.75	0.9	5.0	4.5	14.3	38
10	2110	16.0	11.2	2.5	11.2	11.8	12.4	12	⅞	7½	14.25	1.0	3.0	4.7	16.3	65
12	2112	19.0	13.3	2.5	13.3	13.8	14.4	12	⅞	7½	17.00	1.0	3.0	4.8	18.4	73
14	2114	21.0	15.5	2.5	15.5	16.1	16.9	12	1	8	18.75	1.3	2.0	5.0	20.6	89
16	2116	23.5	17.6	2.5	17.6	18.2	19.0	16	1	8	21.25	1.3	2.0	5.0	22.6	109
18	2118	25.0	19.7	2.6	19.7	20.2	21.0	16	1⅛	8½	22.75	1.3	1.5	5.1	24.7	134
20	2120	27.3	21.8	2.6	21.8	22.4	23.2	20	1⅛	8½	25.00	1.3	1.5	5.1	26.8	157
24	2124	32.0	26.0	2.6	26.0	26.7	27.5	20	1¼	8½	29.50	1.3	1.0	5.1	31.0	192
30	2130	38.5	32.2	3.3	32.2	32.9	34.1	28	1¼	11	36.00	2.0	1.0	6.0	38.8	296
36	2136	45.5	38.5	3.3	38.5	39.2	40.4	32	1½	11	42.75	2.0	1.0	6.0	44.6	426
42	2142	52.3	44.7	4.1	44.7	45.8	47.0	36	1½	14**	49.50	2.0	1.0	8.0	50.8	642
48	2148	58.8	51.0	4.1	51.0	52.1	53.3	44	1½	14**	56.00	2.0	1.0	8.0	57.1	797

* The "P" dimensions is measured with torque-limiting nuts twisted off.
** Double ended rod in lieu of bolt

Nominal Pipe Size	Minimal Distance Required To Install N
3	4.75
4	4.56
6	5.00
8	4.88
10	6.31
12	6.25
14	6.62
16	6.56
18	6.94
20	6.81
24	6.62
30	8.88
36	8.63
42	11.25
48	11.38

MEGAFLANGE TESTING RESULTS

PVC TESTING

- Quick Burst Test
- DR18 tested to 755 PSI
- DR14 tested to 985 PSI
- Long Term Pressure Test
- On DR18 PVC pipe at 615 PSI for 1000 hours without failure
- Cyclic Pressure Test
- DR18 tested from 94 to 188 PSI for over 1,000,000 cycles

FM APPROVED

DUCTILE IRON AND CARBON STEEL TESTING

- Leakage Test (one minute required)
- Tested to twice rated pressure without leakage
- Hydrostatic Test (one minute required)
- 3 inch though 6 inch sizes tested to 5 times rated pressure
- 8 inch and 10 inch sizes tested to 4 times rated pressure
- 12 inch size tested to 3 times rated pressure
- Flexural Test
- Tested to withstand a bending moment based on requirements of NFPA 12-1991 "Standard for Installation of Sprinkler Systems"

UL®

Note: Dimensions are in inches and are subject to change without notice. All Dimensions are ± 1%.

Pipe Size	Ductile Iron Pipe Pressure (PSI)	Carbon Steel Pipe* Pressure (PSI)	C900 PVC Pipe DR14 Pressure (PSI)	C900 PVC Pipe DR18 Pressure (PSI)	C900 PVC Pipe DR25 Pressure (PSI)	C900 PVC Pipe DR32.5 Pressure (PSI)	IPS PVC Pipe* SDR17 Pressure (PSI)	IPS PVC Pipe* SDR21 Pressure (PSI)	IPS PVC Pipe* SDR26 Pressure (PSI)
3	350	350	-	-	-	-	250	200	160
4	350	350	305	235	165	-	250	200	160
6	350	350	305	235	165	-	250	200	160
8	350	350	305	235	165	-	250	200	160
10	350	350	305	235	165	-	250	200	160
12	350	350	305	235	165	-	250	200	160
14	350	-	-	235	165	125	-	-	-
16	350	-	-	235	165	125	-	-	-
18	300	-	-	235	165	125	-	-	-
20	250	-	-	235	165	125	-	-	-
24	200	-	-	150	165	125	-	-	-
30	150	-	-	-	-	-	-	-	-
36	150	-	-	-	-	-	-	-	-
42	150	-	-	-	-	-	-	-	-
48	150	-	-		-	-	-	-	-

*Transition Gasket Required
NOTE: For Application on HDPE pipe see EBAA's HDPE Restraint Catalog Sheet.

MEGAFLANGE Components

The Series 2100 MEGAFLANGE restrained flange adapter is comprised of two rings. The first is the restraint ring which incorporates wedges around the circumference of the ring to grip the pipe firmly and securely. The wedge style restraint offers enormous pullout strength when compared to set screw restraints. The resiliency of the wedge style restraint allows the MEGAFLANGE to withstand severe moment loads. The restraint ring and it's sub-components are protected from corrosion by the MEGA-BOND® Restraint Coating System. For more information regarding MEGA-BOND see our MEGA-BOND Brochure found at www.ebaa.com.

The second ring is the gasket ring which separates the seals dedicated to each sealing surface. This ring allows pipe to be cut to lengths in the field at a tolerance of 0.6 inch or more. In addition, the gasket ring also enables the joint to deflect during assembly. The gasket ring is coated with a NSF 61 approved Fusion Bonded Epoxy (FBE) so that it may be utilized on potable drinking water systems.

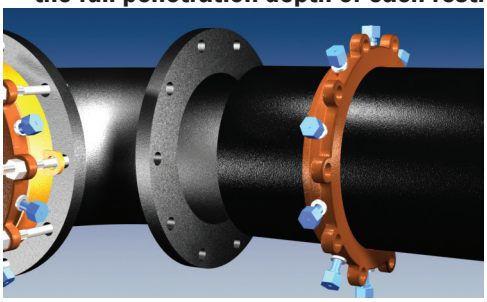
DEFLECTION

Traditional flanged joint connections require a tremendous amount of torque on the bolts to achieve a good seal. The pipe layout must be precisely planned to avoid misalignment errors due to deviations in appurtenances of pipe fabrication.

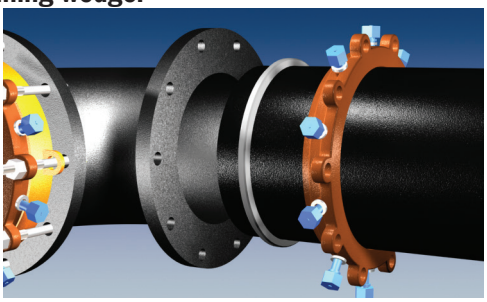
The Series 2100 MEGAFLANGE is a speedy, on-site fabrication tool which is generous in its deflection limits, from 0.5° to 5° depending on pipe size. The deflection capabilities provided by the gasket ring allow offset of almost nineteen inches of an eighteen foot length of pipe through the eight inch size.

1. Identify the pipe. The MEGAFLANGE 2100 Flange Adapter, sizes 3 inch through 12 inch, is designed for use on ductile iron pipe, PVC (C900 & IPS O.D. (ASTM D2241)) pipe, HDPE pipe, and carbon steel pipe. Check to see if the spacers under the screws are in place. If the pipe is ductile iron or C.I. O.D. PVC (C900) DO NOT REMOVE THE SPACERS. If the pipe is carbon steel or IPS O.D. PVC, REMOVE THE SPACERS (sizes 4-inch through 12-inch). The 3-inch size is designed for use on ductile iron, IPS O.D. PVC pipe. Sizes 30-inch and larger are designed for ductile iron pipe only. There are no spacers on the 3 inch and the 14 inch and larger sizes.

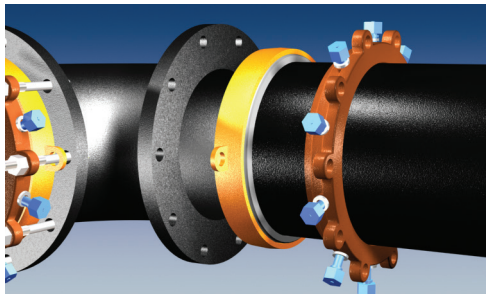
   All EBAA products intended for installation on ductile iron pipe are designed for and limited to use on ductile iron pipes that comply with the requirements of ANSI/AWWA C151/A21.51 and have a Brinell Hardness or equivalent measurement value that does not exceed 230BHN. **These requirements apply to the entire pipe wall profile at all restraining wedge engagement points and to the full penetration depth of each restraining wedge.***



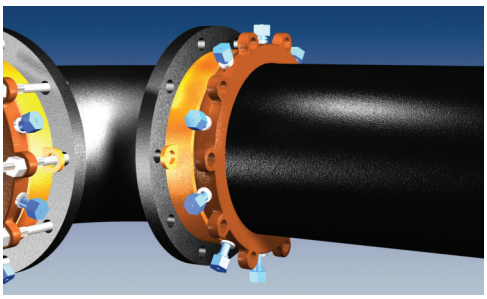
2. Cut the pipe to the required length. Clean the end of the pipe for a length approximately one foot using a wire brush if needed, removing all excess paint and foreign material. Also clean the opposing flange to be connected to the 2100. Place the 2100 restraint ring on the clean pipe with the lip facing the plain end.



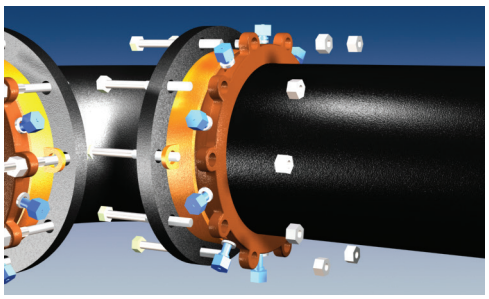
3. Lubricate and place the EBAA-Seal™ Gasket on the clean pipe following the restraint ring. (USE A TRANSITION GASKET IN PLACE OF THE EBAA-SEAL GASKET FOR CARBON STEEL AND IPS. O.D. PVC PIPE.)



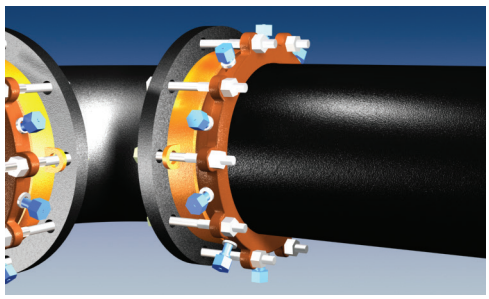
4. Place the O-ring into the groove of the 2100 Gasket Ring. (This step may have been completed at the factory, check Gasket Ring to see if O-ring is already in place.) Place the Gasket Ring on the pipe with the O-ring facing the pipe end and the gasket recess facing the EBAA-Seal (or transition) Gasket and restraint ring.



5. Bring the pipe and flanges together within the maximum assembled deflection and maximum allowable gap “L” to the flange face. Slide the gasket ring, gasket and restraint ring until contact is made with the opposing flange.



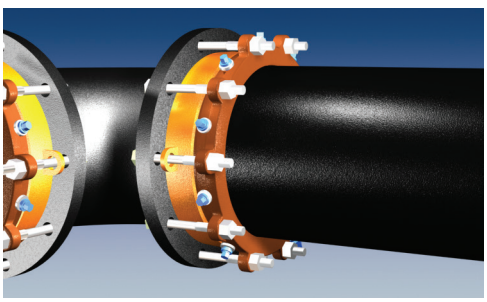
6. Insert and tighten all flange bolts. Torque all flange bolts an alternating manner to the value listed in Table 1.1. Be sure to make any necessary joint deflection before tightening the actuating screws. Joint deflection should not exceed the maximum allowable deflection. Be sure that deflection of the joint does not cause the end of the pipe to be separated from the opposing flange more than the maximum allowable gap “L”.



7. Tighten the actuating screws in an alternating manner until all wedges touch the pipe. Continue tightening the nuts in an alternating pattern until all the torque-limiting nuts have been twisted off.

Table 1.1 Flange Bolt Torques

Nominal Pipe Size	Bolt Torque (ft-lbs.)
3	45 - 60
4 - 6	75 - 90
8 - 24	90 - 110
30 - 48	110 - 130



8. If removal is necessary, utilize the ⅝ inch hex head provided. For reinstallation, repeat steps 2 through 7, torqueing the actuating screws to 70 ft.-lbs. or until the hex heads bottom out on the spacers or gland.

***To learn more about this addendum, please visit:**
https://ebaa.com/spec/dip

EBAA IRON Sales, Inc.
P.O. Box 857, Eastland, TX 76448
Tel: (254) 629-1731
Fax: (254) 629-8931
(800) 433-1716 within US and Canada
contact@ebaa.com
www.ebaa.com

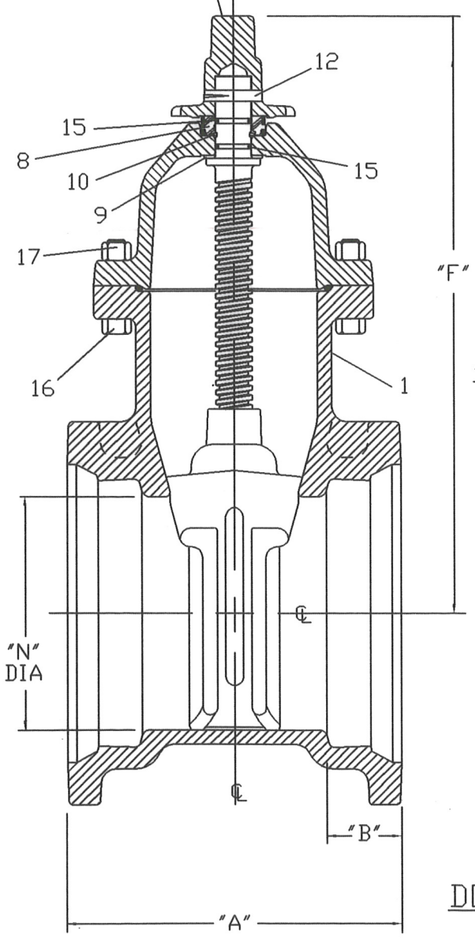
SIZE	A	B	C	D	F	G	H	I	J	K	L	M	N	O	P
3	8.50	2.50	8.37	.38	11.50	10	.86	8	N/A	N/A	8.50	N/A	3.09	N/A	N/A
4	9.25	2.50	9.81	.41	13.81	13	.86	9	11	3.50	9.09	10.31	4.02	N/A	N/A
6	10.50	2.50	13	.44	15.25	19	1.00	10.50	12.38	3.50	10.75	11.46	6.06	N/A	N/A
8	11.50	2.50	15.62	.50	20.18	25	1.00	11.50	14	3.75	12.50	13.06	8.06	N/A	N/A
10	14.50	2.50	19.43	.63	25.50	32	1.18	13	14.38	3.88	13.75	14	10.09	N/A	N/A
12	15	2.50	21.12	.69	26.31	37	1.18	14	14.88	3.88	14.50	14.75	12.09	N/A	N/A
14	22	3.50	25.62	.84	35.37	50	1.50	22	N/A	N/A	22	N/A	14.18	N/A	N/A
16	22	3.50	25.62	.84	35.37	50	1.50	16	23	5	19	19 7/32	16.09	28.40	7.95
18**	19.25	3.50	34.25	.97	43.50	62	1.75	19.12	N/A	N/A	19.25	N/A	18.31	N/A	N/A
20**	18.50	3.50	34.25	.97	43.50	62	1.75	19.50	23	5	19	N/A	20.16	30	8.50
24**	28.25	3.50	43.75	1.08	49.50	74	2.00	21.56	30.65	5	24.88	N/A	24.12	38.38	9

**GEAR REDUCTION RECOMMENDED

ITEM NO.	NAME OF PART	QTY. REQ'D	MATERIAL	SPECIFICATION
1	BODY	1	DUCTILE IRON	ASTM A536
2	BONNET	1	DUCTILE IRON	ASTM A536
3 *	GATE, RUBBER COVERED	1	DUCTILE IRON	ASTM A536
4 △	STEM (70T, 30Y)	1	MANG. BRONZE	ASTM B584 C865-MOD.
5	STEM NUT	1	BRONZE	ASTM B584 C836
6	OPERATING NUT	1	CAST IRON	ASTM A126 CL. B
8	CARTRIDGE	1	"DELRIN"	DUPONT CO.
9	THRUST WASHER	1	"DELRIN"	DUPONT CO.
10	RETAINER RING	1	"DELRIN"	DUPONT CO.
11	DIRT SEAL	1	RUBBER	SBR ASTM D2000
12	PIN, "SHEARPROOF"	1	STEEL	ZINC PLATED ASTM B633
13	BONNET SEAL	1	RUBBER	NBR ASTM D2000
14	"O"RING (CARTRIDGE)	1	RUBBER	NBR ASTM D2000
15	"O"RING (STEM)	2	RUBBER	NBR ASTM D2000
16	BOLT, HEX HEAD		STN. STL.	ASTM A-276 (18-8)
17	NUT, HEX		STN. STL.	

* 3" GATE MATERIAL IS BRONZE ASTM B584 C836/8345
△ 14-24 STEM MATERIAL ASTM B584 C86200

6 OPERATING NUT:
1 11/16"SQ. TOP
1 3/4"SQ. BOTTOM



G=NUMBER OF TURNS TO OPEN

CAST IN RAISED LETTERS
USP YEAR D.I. (BODY OR BONNET)
SIZE WP AWWA

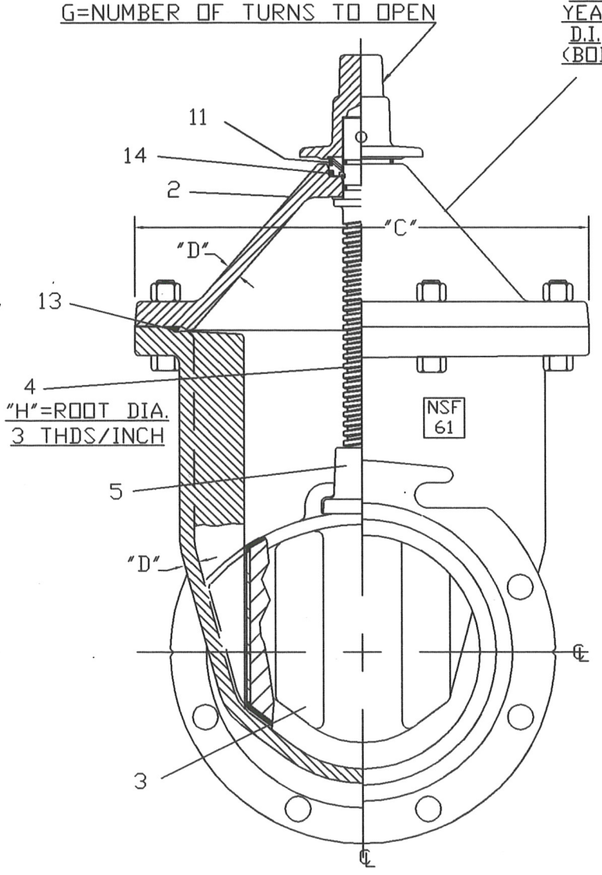


FIG. 5460
DOUBLE MECHANICAL JOINT
SEE NOTE "B", & "C"

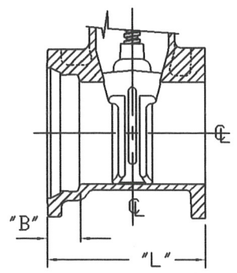


FIG. 5260
MJ x FLANGE
(NON TAP)
SEE NOTE "B" & "C"

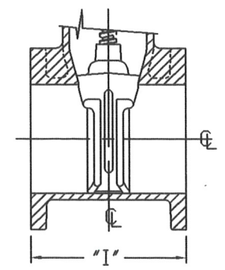


FIG. 5100
DOUBLE FLANGE
SEE NOTE "C"

NOTE "A": BODY(1) AND BONNET(2) ARE COATED ON ALL SURFACES WITH PERMAFUSE® (FUSION BONDED EPOXY) IN COMPLIANCE WITH AWWA C550 ("HOLIDAY FREE" IF SPECIFIED ON ORDER)

NOTE "B": MECHANICAL JOINT, TR® FLEX, AND TYTON® ENDS PER ANSI/AWWA C111/A21.11

NOTE "C": FLANGES ARE CLASS 125 PER ANSI/AWWA C115/A21.15. USE ONLY U.S.PIPE'S FLANGETYTE® GASKET, 1/8"THICK FULL FACE, OR RING GASKET PER ANSI/AWWA C110/A21.10

NOTE "D": 3"-16"VALVES RATED FOR 250 PSI WORKING AND 500 PSI TEST PRESSURE. STANDARD 18"-24"VALVES ARE RATED FOR 150 PSI WP AND 300 PSI TEST.

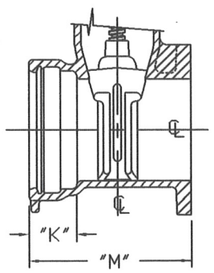


FIG. 5220
TYTON®X FLANGE
(NON TAP)
SEE NOTE "B" & "C"

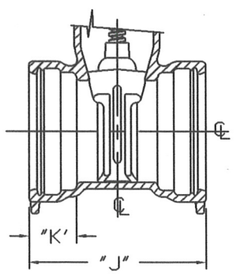


FIG. 5080
TYTON®ENDS W/LUGS
SEE NOTE "B"

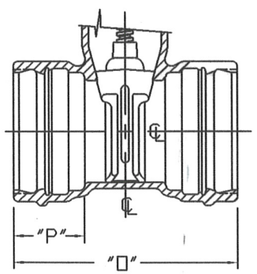


FIG. 5170
TR-FLEX®ENDS
SEE NOTE "B"

ALL VALVES ARE NSF-61 LISTED

DRAWN	DATE	UNITED STATES PIPE AND FOUNDRY CO. CHATTANOOGA VALVE & FITTINGS VALVE & HYDRANT DEPARTMENT CHATTANOOGA, TENNESSEE 37408
KLC	4/7/00	
CHECKED	DATE	
DJD	4/7/00	
APPROVED	DATE	3"-24" METROSEAL® 250 RESILIENT SEATED GATE VALVES PER ANSI/AWWA C509 VARIOUS ENDS SHOWN
JJP	4-7-00	
REV. DATE		
MASS. WATER RESOURCE AUTHORITY		DWG. NO. 860524

HYDRO-GUARD®

a MUELLER brand

HYDRO-GUARD® 300 SERIES COLD CLIMATE INGROUND PROGRAMMING

Suggested Specifications

DIRECTED DISCHARGE DEVICE CONSTRUCTION - AUTOMATIC WATER DISTRIBUTION FLUSHING EQUIPMENT

1. GENERAL DESCRIPTION

1.1 The equipment furnished under this Section shall be automatic water distribution flushing equipment designed to be permanently or semi-permanently installed on water distribution lines in moderate to severe cold climates.

1.2 The primary purpose of this equipment shall be to automatically flush the desired amounts of water from water distribution systems for the purpose of improving and/or maintaining water quality.

2. PERFORMANCE

2.1 This equipment shall be installed completely below grade and protected above grade by an at-grade cast or composite twenty-two and ¾-inch (22 ¾-inch) lid.

2.2 The equipment shall be connected to a water distribution line as required by the plans or standard installation detail. The self-contained device is designed for automatic flushing of the water distribution line through the opening of a control valve that is an integral part of the device.

2.3 This equipment shall be capable of being programmed to activate up to 24 times daily on the days desired in one (1) minute to six (6) hours increments (on a continually rotating 7-day cycle or on an interval between every 1 to 30 days).

2.4 All programming shall be accomplished by means of an integrated programmer powered by a single 9-volt Alkaline battery with the ability to install a secondary 9-volt Alkaline battery for redundancy and extended life or by a Bluetooth equipped smart phone.

2.5 The Bluetooth controlled programmer must be capable of receiving management data transmissions from up to 25 feet, line of sight.

2.5.1 The Bluetooth controller must be capable of being programmed up to 24 times per day and offer flush durations of one minute to 24 hours per event.

2.5.2 The Bluetooth controller must be capable of providing up to 5,000 separate on/off functions over the life of a single 9-volt Alkaline battery.

For more information about us or to view our full line of water products, please visit www.muellerwp.com or call Hydro-Guard customer service at: 1.800.423.1323.

F 13834 12/21

2.5.3 The Bluetooth controller must be capable of being programmed by a standard Android or iOS smart phone and the K-Rain and password protected App.

3. ACCEPTABLE MANUFACTURERS

3.1 Automatic water distribution flushing equipment to be supplied under this specification shall be Hydro-Guard® as manufactured by Mueller.

3.2 The automatic water distribution flushing system is comprised of the self-contained automatic flushing device with a sampling quick connect, freeze protection and an optional dechlorination system.

4. AUTOMATIC FLUSHING DEVICE

4.1 **Integral Piping and Control Valve** – The piping and control valve components shall include the following:

4.1.1 Device must be certified by Underwriters Laboratories (UL) as meeting or exceeding the criteria of NSF-372.

4.1.2 The device's internal control valve shall be capable of being activated by a single 9-volt Alkaline battery controlled programming interface that is managed by a Bluetooth controller.

4.1.3 The control valve shall be a globe valve type design capable of passing sand and other debris up to $^{5}/_{8}$" in diameter without obstructing the valve's throat.

4.1.4 The device's standard internal piping shall be constructed of low lead brass piping and flexible tubing that shall allow the internals of the device to be raised and lowered within a protective ground sleeve. The internals of the device must be mounted on a steel plate that is protected from corrosion by a Rilsan Nylon coating or comparable coating.

4.1.5 The device's internal piping and control valve shall have an operational rating of 200 psi.

4.1.6 The control valve shall be constructed of a non-corrosive glass-reinforced nylon, or equal, and shall be fitted with stainless steel hardware. The valve shall be of the type that can be easily rebuilt.

4.1.7 The valve shall include a single piece EPDM diaphragm.

4.1.8 The valve must be actuated by a 9-volt latching solenoid. Solenoid must be pressure rated between 0 - 10 bar (0 to 145.037738 psi). Wetted parts must be stainless steel 400 or Polyamide. Leads must be 0.32 mm^2 x 80 cm^2.

4.1.9 The device shall feature an industry standard and approved, testable, double check valve for backflow prevention. The backflow prevention device must be constructed of low lead brass and a removable composite check valve body.

4.1.10 The device must provide a standard connection for a flow meter with a removable jumper bar installed for use where a meter is not to be installed and removable when a meter is to be utilized in the application.

4.1.11 The device must provide a dechlorination chamber that will accommodate a minimum of eight (8) dechlorination tablets for the adequate dechlorination of discharged water from the device.

4.1.12 The device must offer an optional Mechanical Thermal Control Valve. The mechanical Thermal Control Valve (known as TCV), shall be a cylindrical style mechanical thermal control valve capable of detecting water temperatures ranging between 40°F and 35°F. The device must be capable of manually activating and allowing water to flow through the thermal control valve. Water passing through the thermal control valve must be capable of activating the control valve, thus initiating a flush event that will allow for warmer subterranean waters to flow through the device and reduce the potential for freeze damage to the device's piping.

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4.1.13 The device shall be supplied with both a standard one inch (1") male NPT water supply connection and a 1-inch (1") NPT water discharge connection. Both connections must be clearly identified using a stainless steel tag to prevent installation errors.

4.2 Housing

4.2.1 The components shall be protected from the environment and vandalism by a below-grade twenty-one inch (21") diameter PVC housing and a cast lid, or an optional composite lid. The lid shall be mounted at grade on top of the below grade PVC housing.

4.2.2 The self-contained device shall be supplied with a below-grade bottom-vented protective base that shall protect the internals of the flushing device; provide stability; and provide anti-buoyancy capabilities.

4.2.3 The protective ground sleeve shall be constructed of Schedule 40 PVC (ASTM D2241, grade 1120) with a minimum diameter of 21-inches.

4.3 System Sampling (Required) – The device must be capable of being equipped with an optional, fully functional, sampling system that shall draw water quality samples from a point located between the utility water service line and the one-inch (1") control valve of the flushing system. The sample collection point must be easily accessible from the top of the device. The sampling system shall include the following features:

4.3.1 The sampling system shall be constructed of Stainless Steel or other material with equal or greater resistance to bacterial regrowth and be connected with low lead brass or stainless steel fittings.

4.3.2 The sampling system shall be designed in such a way to reduce the potential for contamination of the sampling system by allowing access and inspection of the internal piping compartment and components without disassembly or depressurization of the sampling system.

4.3.3 The sampling system shall draw water for water quality sampling from the inlet side of the one-inch (1") adjustable control valve nearest to the service piping of the device. This positioning is essential in order to allow for a sample to be an accurate representation of the utility's water quality at the point of entry into the flushing device.

4.3.4 Connection to the device's sampling system shall be by means of a low lead or stainless steel quick connection. The sampling tip shall be constructed from stainless steel or low lead brass. The device's sampling connection shall be housed in a secure weather-tight area to minimize contamination of the sampling connection. The sampling connection itself shall be provided with a protective sanitary cover.

4.4 Electrical/Electronic System – The Electrical/Electronic System shall include the following features and capabilities:

4.4.1 Be capable of storing instructions via an integrated programmer and capable of operating the device's internal control valve. The controller shall be powered by a single 9-volt Alkaline battery with the ability to install a secondary 9-volt Alkaline battery for redundancy and extended life or a Bluetooth equipped smart phone (Android or iOS).

4.4.2 The Bluetooth-equipped device must be powered by a single 9-volt Alkaline battery that can power up to 5,000 on/off events over the life of the battery.

4.4.3 The Bluetooth-equipped device must allow for up to 24 flush events daily with durations of one minute to 24 hours.

4.4.4 The Bluetooth controller interface shall be capable of being managed from a maximum distance of 25 feet (line of sight/no obstructions) by way of a standard Android or iOS smart phone.

4.4.5 The Bluetooth controller interface module must be password protected to prevent unauthorized operation.

4.4.6 Offer a minimum of 24 flushing program events per day.

4.4.7 Be leap-year compatible, automatically accounting for February 29th every four years.

4.4.8 Incorporate LCD readout of clock and programming functions.

4.4.9 Offer manual on and off functions.

4.4.10 Be secured and water-resistant.

4.4.11 Have heavy-duty power cable.

4.4.12 Use an integrated latching solenoid to operate the control valve.

4.5 **Winterization (Optional)** - As per the local ordinance the device shall offer an optional TCV freeze protection system. The TCV shall be constructed with a mechanical thermal control valve that will sense water temperatures and activate only when the water temperature is determined to be less than 40° Fahrenheit.

4.5.1 The mechanical thermal control valve must be a barrel style valve constructed of stainless steel and capable of flowing water when the water temperature ranges between 40° and 35° Fahrenheit.

4.5.2 The mechanical thermal control valve must be capable of protecting flushing device from damage caused by occasional freezing temperatures by allowing warmer subterranean water to flow through the device when water temperatures at the installation point approach 40° Fahrenheit.

4.6 **OEM Installed De-chlorination System (Required)**

4.6.1 A tablet feed Dechlorination System shall be designed to accommodate 2 $^{5}/_{8}^{th}$ inch sodium sulfite or ascorbic acid tablets and it shall be installed inside of the device upon delivery.

4.6.2 A portion of the water being flushed shall be directed through the tablet feeder in the creation of a concentrated solution of the dechlorinating agent.

4.6.3 The directly treated, concentrated solution shall be introduced to the non-directly treated discharge on the device's splash plate resulting in a homogenous mixture effectively treating the entire discharge.

4.7 **Execution**

4.7.1 Prior to the installation, the drainage patterns for the intended installation location shall be shall be viewed to ensure that any discharged water will not create hazardous conditions for pedestrian or vehicular traffic. The selected location's drainage pattern shall also permit discharged water to flow away from the automatic flushing device or be absorbed by the surrounding soil as prevent pooling.

4.7.2 Remove debris that might create uneven pressure on the device from the bottom of the hole. Compact the bottom of the hole to minimize settling after installation.

4.7.3 Install a four inch (4") lift of non-compacted sand or similar bedding material into the bottom of the hole.

4.7.4 Backfill the hole around the automatic flushing valve with clean fill, #57 stone and/or a combination of other appropriate materials.

4.7.5 Backfilling shall be accomplished in 6" lifts.

4.7.6 Use a level to ensure the device is level after each lift.

4.7.7 Ensure the lid is level.

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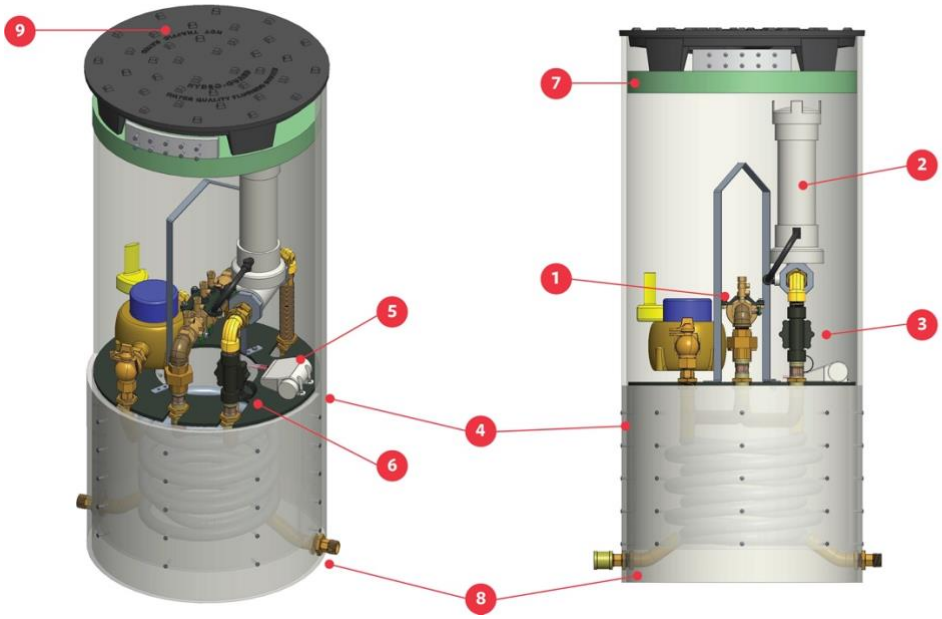
4.7.8 The automatic flushing valve shall be disinfected in accordance with ADH and AWWA standards.

6. INSTALLATION DRAWING



ID	DESCRIPTION
1	1" Wilkins 350XL/Back Flow Prev
2	320 Inline Dechlor
3	1" HITVLVE/510-000/Without Stem
4	300 Series Cold 48" Shell Sub-Assembly
5	Bluetooth Controller (Programming Option)
6	300 Series Cold CC Platform Assembly
7	Insulating Pad
8	300 Series Cold Coil Sub-Assembly
9	21" Steel Platform HC 21-25A

NOTE: Meter sold separately.

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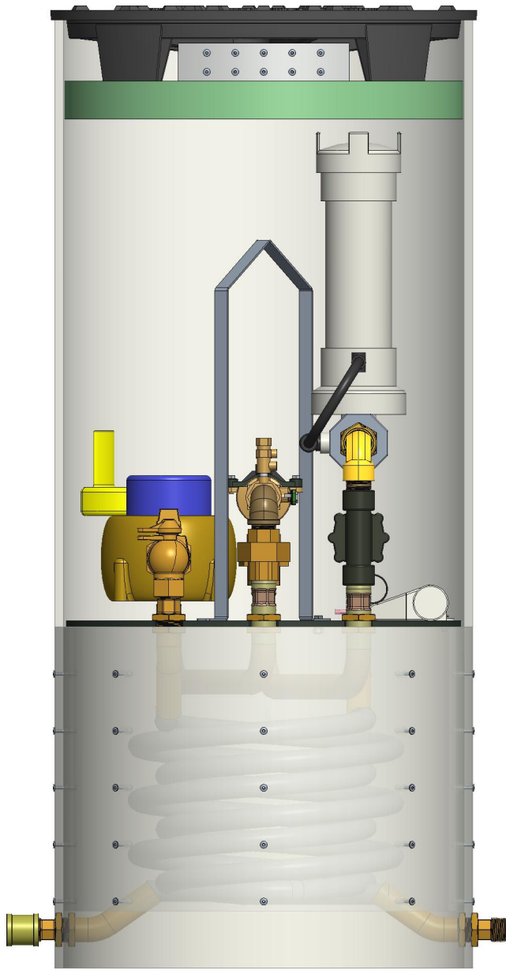


UL APPROVED NSF/ANSI 372

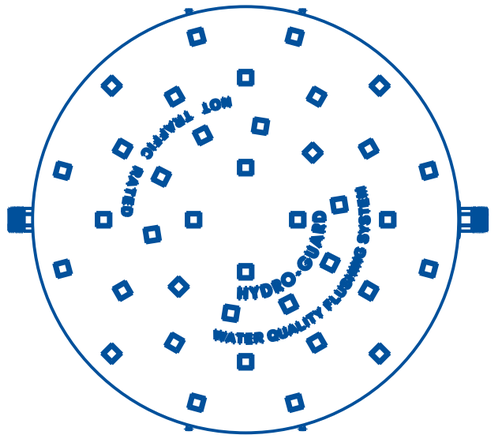
DR. BY	AOD	6/17/21	UNLESS OTHERWISE NOTED	THIRD ANGLE PROJECTION	C.B. NO.
CHKR			BREAK CAST CORNER(S)---		
ENGR			BREAK MACH CORNER(S)---	PURCH. / FINISH	PATT. NO.
MGR			TOLERANCES UNLESS OTHERWISE NOTED		
MFG				REF. NO. / SCALE: NONE	
TOOL			LINEAR ± .005 ANGULAR ±	STK. NO.	
FDRY					
DESCR.					

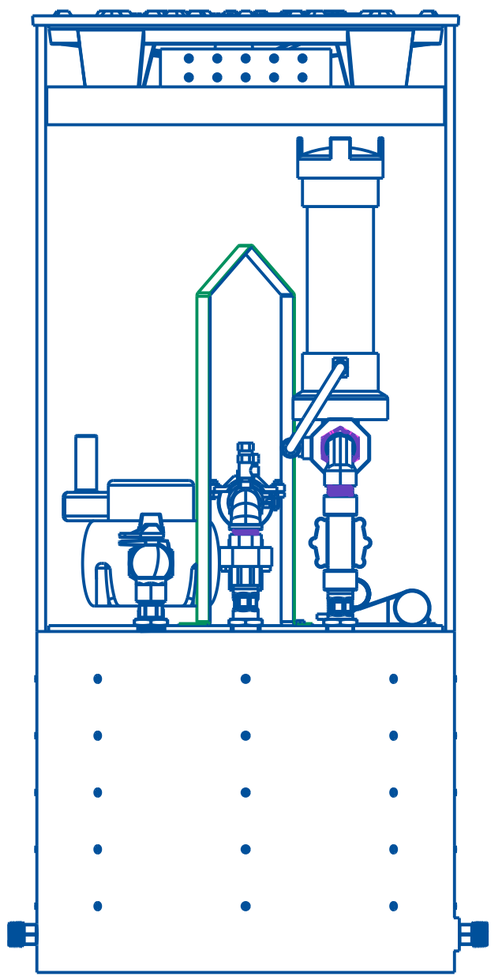
MUELLER

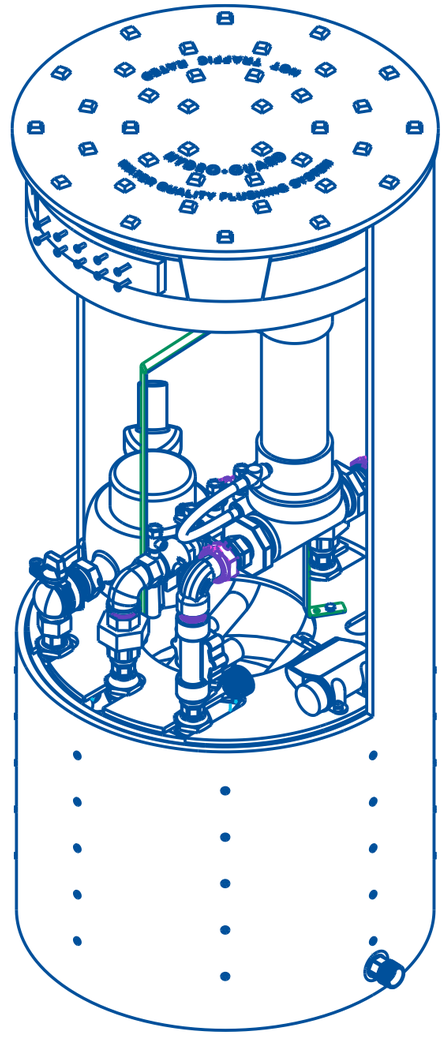
MODEL: FC300

NUMBER: FC300

FC300







FC300

UL APPROVED NSF/ANSI 372

DR. BY	AOD	6/17/21	UNLESS OTHERWISE NOTED	THIRD ANGLE PROJECTION	C.B. NO.
CHKR			BREAK CAST CORNER(S)---		
ENGR			BREAK MACH CORNER(S)---	PURCH. / FINISH	PATT. NO.
MGR			TOLERANCES UNLESS OTHERWISE NOTED		
MFG				REF. NO. / SCALE NONE	
TOOL			LINEAR ± .005 ANGULAR ±	STK. NO.	
FDRY					

DESCR.

MUELLER

MODEL: FC300

NUMBER FC300

PACT Project No: 279 **Engineers Project No: 1018620.000**

PACT One, LLC
P.O. BOX 74
RINGOES, NJ 08551

Date: November 30, 2023

Engineer: **Barry Isett & Associates, Inc.**
Attn: Mr. Charles L. Myers, P.E.
Hayden Tower at The Markle Building
8 West Broad Street, Suite 1100
Hazleton, PA 18201

Project: **2022 SR 940 WATER MAIN REPLACEMENT PROJECT - CONTRACT #2**
HAZLETON CITY AUTHORITY – WATER DEPARTMENT

Submittal No: 1018620-008

Item: SITE WATER DISTRIBUTION PIPING - AUTOMATIC GROUND TYPE FLUSHING ASSEMBLY

Subcontractor: N/A

Specification Section No: 331415

Page No: 331415-10

Paragraph: 3.10

Manufacturer(s): Mueller

Supplier(s): Core & Main

PACT One, LLC certifies that we have reviewed the submittal, verification of products, field measurements, field construction criteria and coordination of the information contained within this submittal with requirements of the work and of the contract documents.

By: FERNANDO VELOSO

Fernando C Veloso – Project Manager
PACT Construction Inc.

HYDRO-GUARD®

a MUELLER brand

HYDRO-GUARD® 300 SERIES COLD CLIMATE INGROUND PROGRAMMING

Suggested Specifications

DIRECTED DISCHARGE DEVICE CONSTRUCTION - AUTOMATIC WATER DISTRIBUTION FLUSHING EQUIPMENT

1. GENERAL DESCRIPTION

1.1 The equipment furnished under this Section shall be automatic water distribution flushing equipment designed to be permanently or semi-permanently installed on water distribution lines in moderate to severe cold climates.

1.2 The primary purpose of this equipment shall be to automatically flush the desired amounts of water from water distribution systems for the purpose of improving and/or maintaining water quality.

2. PERFORMANCE

2.1 This equipment shall be installed completely below grade and protected above grade by an at-grade cast or composite twenty-two and ¾-inch (22 ¾-inch) lid.

2.2 The equipment shall be connected to a water distribution line as required by the plans or standard installation detail. The self-contained device is designed for automatic flushing of the water distribution line through the opening of a control valve that is an integral part of the device.

2.3 This equipment shall be capable of being programmed to activate up to 24 times daily on the days desired in one (1) minute to six (6) hours increments (on a continually rotating 7-day cycle or on an interval between every 1 to 30 days).

2.4 All programming shall be accomplished by means of an integrated programmer powered by a single 9-volt Alkaline battery with the ability to install a secondary 9-volt Alkaline battery for redundancy and extended life or by a Bluetooth equipped smart phone.

2.5 The Bluetooth controlled programmer must be capable of receiving management data transmissions from up to 25 feet, line of sight.

2.5.1 The Bluetooth controller must be capable of being programmed up to 24 times per day and offer flush durations of one minute to 24 hours per event.

2.5.2 The Bluetooth controller must be capable of providing up to 5,000 separate on/off functions over the life of a single 9-volt Alkaline battery.

For more information about us or to view our full line of water products, please visit www.muellerwp.com or call Hydro-Guard customer service at: 1.800.423.1323.

F 13834 12/21

2.5.3 The Bluetooth controller must be capable of being programmed by a standard Android or iOS smart phone and the K-Rain and password protected App.

3. ACCEPTABLE MANUFACTURERS

3.1 Automatic water distribution flushing equipment to be supplied under this specification shall be Hydro-Guard® as manufactured by Mueller.

3.2 The automatic water distribution flushing system is comprised of the self-contained automatic flushing device with a sampling quick connect, freeze protection and an optional dechlorination system.

4. AUTOMATIC FLUSHING DEVICE

4.1 **Integral Piping and Control Valve** – The piping and control valve components shall include the following:

4.1.1 Device must be certified by Underwriters Laboratories (UL) as meeting or exceeding the criteria of NSF-372.

4.1.2 The device's internal control valve shall be capable of being activated by a single 9-volt Alkaline battery controlled programming interface that is managed by a Bluetooth controller.

4.1.3 The control valve shall be a globe valve type design capable of passing sand and other debris up to $^{5}/_{8}$" in diameter without obstructing the valve's throat.

4.1.4 The device's standard internal piping shall be constructed of low lead brass piping and flexible tubing that shall allow the internals of the device to be raised and lowered within a protective ground sleeve. The internals of the device must be mounted on a steel plate that is protected from corrosion by a Rilsan Nylon coating or comparable coating.

4.1.5 The device's internal piping and control valve shall have an operational rating of 200 psi.

4.1.6 The control valve shall be constructed of a non-corrosive glass-reinforced nylon, or equal, and shall be fitted with stainless steel hardware. The valve shall be of the type that can be easily rebuilt.

4.1.7 The valve shall include a single piece EPDM diaphragm.

4.1.8 The valve must be actuated by a 9-volt latching solenoid. Solenoid must be pressure rated between 0 - 10 bar (0 to 145.037738 psi). Wetted parts must be stainless steel 400 or Polyamide. Leads must be 0.32 mm^2 x 80 cm^2.

4.1.9 The device shall feature an industry standard and approved, testable, double check valve for backflow prevention. The backflow prevention device must be constructed of low lead brass and a removable composite check valve body.

4.1.10 The device must provide a standard connection for a flow meter with a removable jumper bar installed for use where a meter is not to be installed and removable when a meter is to be utilized in the application.

4.1.11 The device must provide a dechlorination chamber that will accommodate a minimum of eight (8) dechlorination tablets for the adequate dechlorination of discharged water from the device.

4.1.12 The device must offer an optional Mechanical Thermal Control Valve. The mechanical Thermal Control Valve (known as TCV), shall be a cylindrical style mechanical thermal control valve capable of detecting water temperatures ranging between 40°F and 35°F. The device must be capable of manually activating and allowing water to flow through the thermal control valve. Water passing through the thermal control valve must be capable of activating the control valve, thus initiating a flush event that will allow for warmer subterranean waters to flow through the device and reduce the potential for freeze damage to the device's piping.

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4.1.13 The device shall be supplied with both a standard one inch (1") male NPT water supply connection and a 1-inch (1") NPT water discharge connection. Both connections must be clearly identified using a stainless steel tag to prevent installation errors.

4.2 Housing

4.2.1 The components shall be protected from the environment and vandalism by a below-grade twenty-one inch (21") diameter PVC housing and a cast lid, or an optional composite lid. The lid shall be mounted at grade on top of the below grade PVC housing.

4.2.2 The self-contained device shall be supplied with a below-grade bottom-vented protective base that shall protect the internals of the flushing device; provide stability; and provide anti-buoyancy capabilities.

4.2.3 The protective ground sleeve shall be constructed of Schedule 40 PVC (ASTM D2241, grade 1120) with a minimum diameter of 21-inches.

4.3 System Sampling (Required) – The device must be capable of being equipped with an optional, fully functional, sampling system that shall draw water quality samples from a point located between the utility water service line and the one-inch (1") control valve of the flushing system. The sample collection point must be easily accessible from the top of the device. The sampling system shall include the following features:

4.3.1 The sampling system shall be constructed of Stainless Steel or other material with equal or greater resistance to bacterial regrowth and be connected with low lead brass or stainless steel fittings.

4.3.2 The sampling system shall be designed in such a way to reduce the potential for contamination of the sampling system by allowing access and inspection of the internal piping compartment and components without disassembly or depressurization of the sampling system.

4.3.3 The sampling system shall draw water for water quality sampling from the inlet side of the one-inch (1") adjustable control valve nearest to the service piping of the device. This positioning is essential in order to allow for a sample to be an accurate representation of the utility's water quality at the point of entry into the flushing device.

4.3.4 Connection to the device's sampling system shall be by means of a low lead or stainless steel quick connection. The sampling tip shall be constructed from stainless steel or low lead brass. The device's sampling connection shall be housed in a secure weather-tight area to minimize contamination of the sampling connection. The sampling connection itself shall be provided with a protective sanitary cover.

4.4 Electrical/Electronic System – The Electrical/Electronic System shall include the following features and capabilities:

4.4.1 Be capable of storing instructions via an integrated programmer and capable of operating the device's internal control valve. The controller shall be powered by a single 9-volt Alkaline battery with the ability to install a secondary 9-volt Alkaline battery for redundancy and extended life or a Bluetooth equipped smart phone (Android or iOS).

4.4.2 The Bluetooth-equipped device must be powered by a single 9-volt Alkaline battery that can power up to 5,000 on/off events over the life of the battery.

4.4.3 The Bluetooth-equipped device must allow for up to 24 flush events daily with durations of one minute to 24 hours.

4.4.4 The Bluetooth controller interface shall be capable of being managed from a maximum distance of 25 feet (line of sight/no obstructions) by way of a standard Android or iOS smart phone.

4.4.5 The Bluetooth controller interface module must be password protected to prevent unauthorized operation.

4.4.6 Offer a minimum of 24 flushing program events per day.

4.4.7 Be leap-year compatible, automatically accounting for February 29th every four years.

4.4.8 Incorporate LCD readout of clock and programming functions.

4.4.9 Offer manual on and off functions.

4.4.10 Be secured and water-resistant.

4.4.11 Have heavy-duty power cable.

4.4.12 Use an integrated latching solenoid to operate the control valve.

4.5 **Winterization (Optional)** - As per the local ordinance the device shall offer an optional TCV freeze protection system. The TCV shall be constructed with a mechanical thermal control valve that will sense water temperatures and activate only when the water temperature is determined to be less than 40° Fahrenheit.

4.5.1 The mechanical thermal control valve must be a barrel style valve constructed of stainless steel and capable of flowing water when the water temperature ranges between 40° and 35° Fahrenheit.

4.5.2 The mechanical thermal control valve must be capable of protecting flushing device from damage caused by occasional freezing temperatures by allowing warmer subterranean water to flow through the device when water temperatures at the installation point approach 40° Fahrenheit.

4.6 **OEM Installed De-chlorination System (Required)**

4.6.1 A tablet feed Dechlorination System shall be designed to accommodate 2 $^{5}/_{8}^{th}$ inch sodium sulfite or ascorbic acid tablets and it shall be installed inside of the device upon delivery.

4.6.2 A portion of the water being flushed shall be directed through the tablet feeder in the creation of a concentrated solution of the dechlorinating agent.

4.6.3 The directly treated, concentrated solution shall be introduced to the non-directly treated discharge on the device's splash plate resulting in a homogenous mixture effectively treating the entire discharge.

4.7 **Execution**

4.7.1 Prior to the installation, the drainage patterns for the intended installation location shall be shall be viewed to ensure that any discharged water will not create hazardous conditions for pedestrian or vehicular traffic. The selected location's drainage pattern shall also permit discharged water to flow away from the automatic flushing device or be absorbed by the surrounding soil as prevent pooling.

4.7.2 Remove debris that might create uneven pressure on the device from the bottom of the hole. Compact the bottom of the hole to minimize settling after installation.

4.7.3 Install a four inch (4") lift of non-compacted sand or similar bedding material into the bottom of the hole.

4.7.4 Backfill the hole around the automatic flushing valve with clean fill, #57 stone and/or a combination of other appropriate materials.

4.7.5 Backfilling shall be accomplished in 6" lifts.

4.7.6 Use a level to ensure the device is level after each lift.

4.7.7 Ensure the lid is level.

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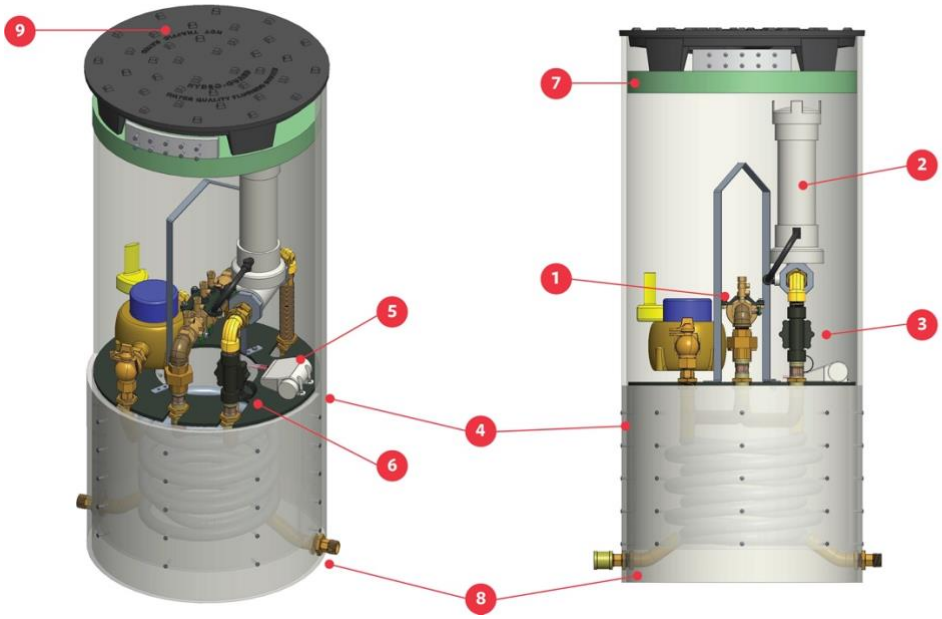
4.7.8 The automatic flushing valve shall be disinfected in accordance with ADH and AWWA standards.

6. INSTALLATION DRAWING



ID	DESCRIPTION
1	1" Wilkins 350XL/Back Flow Prev
2	320 Inline Dechlor
3	1" HITVLVE/510-000/Without Stem
4	300 Series Cold 48" Shell Sub-Assembly
5	Bluetooth Controller (Programming Option)
6	300 Series Cold CC Platform Assembly
7	Insulating Pad
8	300 Series Cold Coil Sub-Assembly
9	21" Steel Platform HC 21-25A

NOTE: Meter sold separately.

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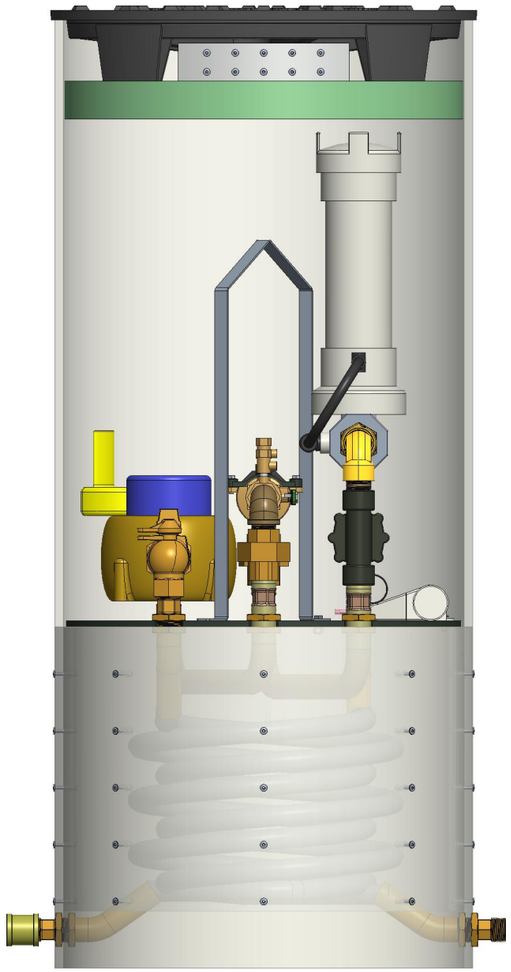


UL APPROVED NSF/ANSI 372

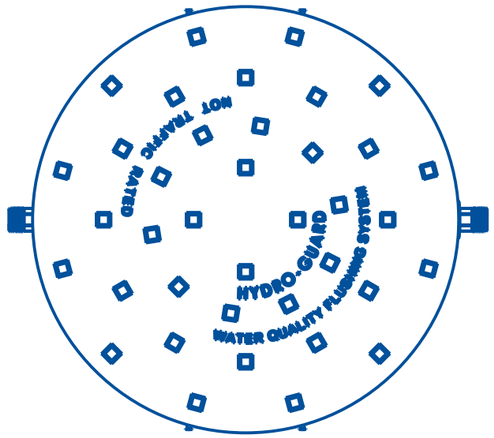
DR. BY	AOD	6/17/21	UNLESS OTHERWISE NOTED	THIRD ANGLE PROJECTION	C.B. NO.
CHKR			BREAK CAST CORNER(S)---		
ENGR			BREAK MACH CORNER(S)---	PURCH. / FINISH	PATT. NO.
MGR			TOLERANCES UNLESS OTHERWISE NOTED		
MFG				REF. NO. / SCALE: NONE	
TOOL			LINEAR ± .005 ANGULAR ±	STK. NO.	
FDRY					
DESCR.					

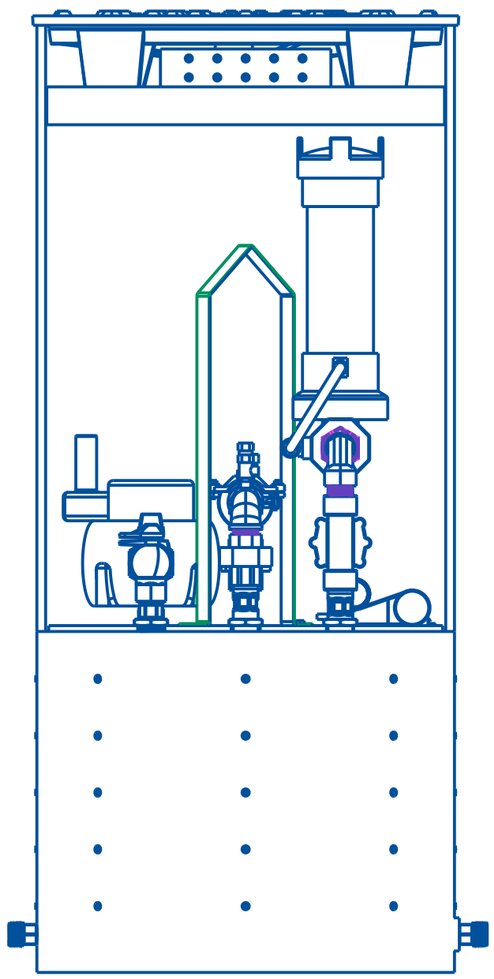
MUELLER

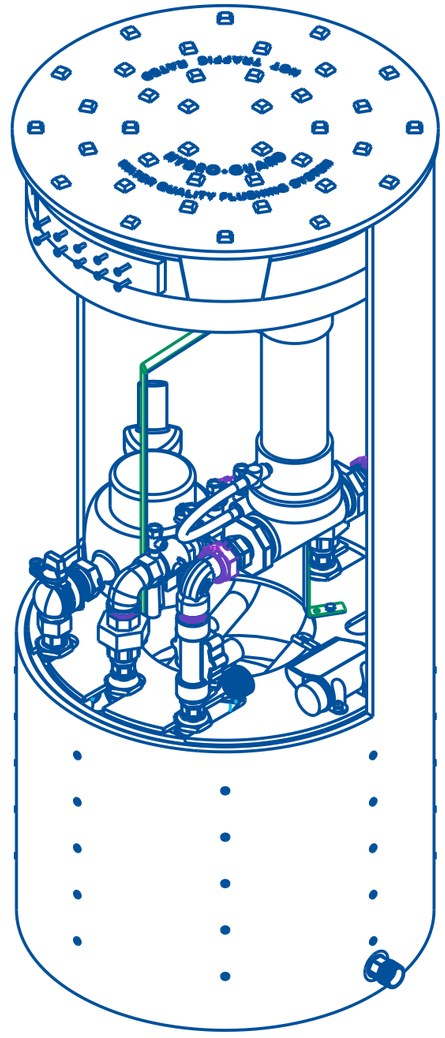
MODEL: FC300

NUMBER: FC300

FC300







FC300

UL APPROVED NSF/ANSI 372

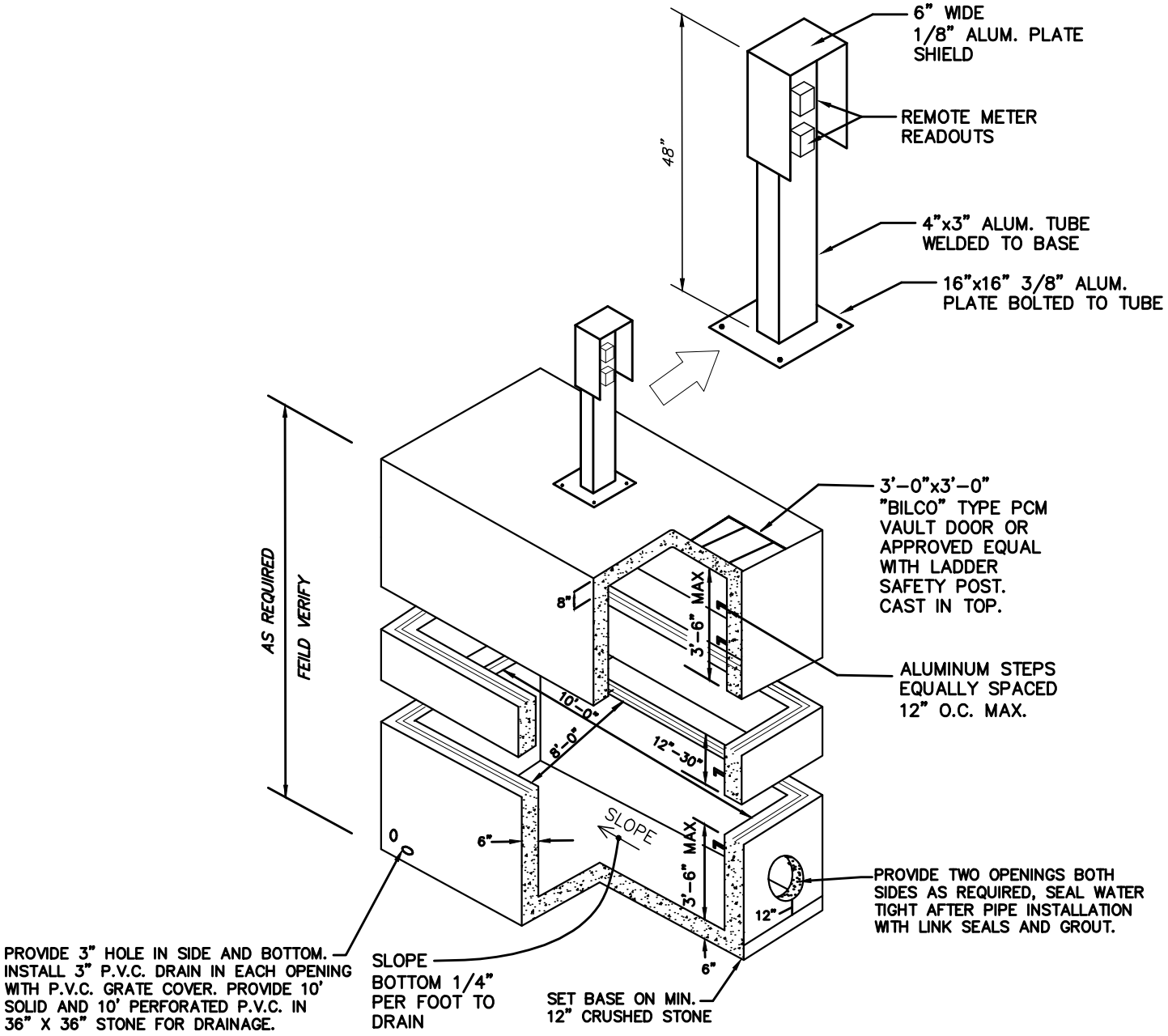
DR. BY	AOD	6/17/21	UNLESS OTHERWISE NOTED	THIRD ANGLE PROJECTION	C.B. NO.
CHKR			BREAK CAST CORNER(S)---		
ENGR			BREAK MACH CORNER(S)---	PURCH. / FINISH	PATT. NO.
MGR			TOLERANCES UNLESS OTHERWISE NOTED		
MFG				REF. NO. / SCALE NONE	
TOOL			LINEAR ± .005 ANGULAR ±	STK. NO.	
FDRY					

DESCR.

MUELLER

MODEL: FC300

NUMBER FC300



TYPICAL PRECAST VAULT- DETAIL

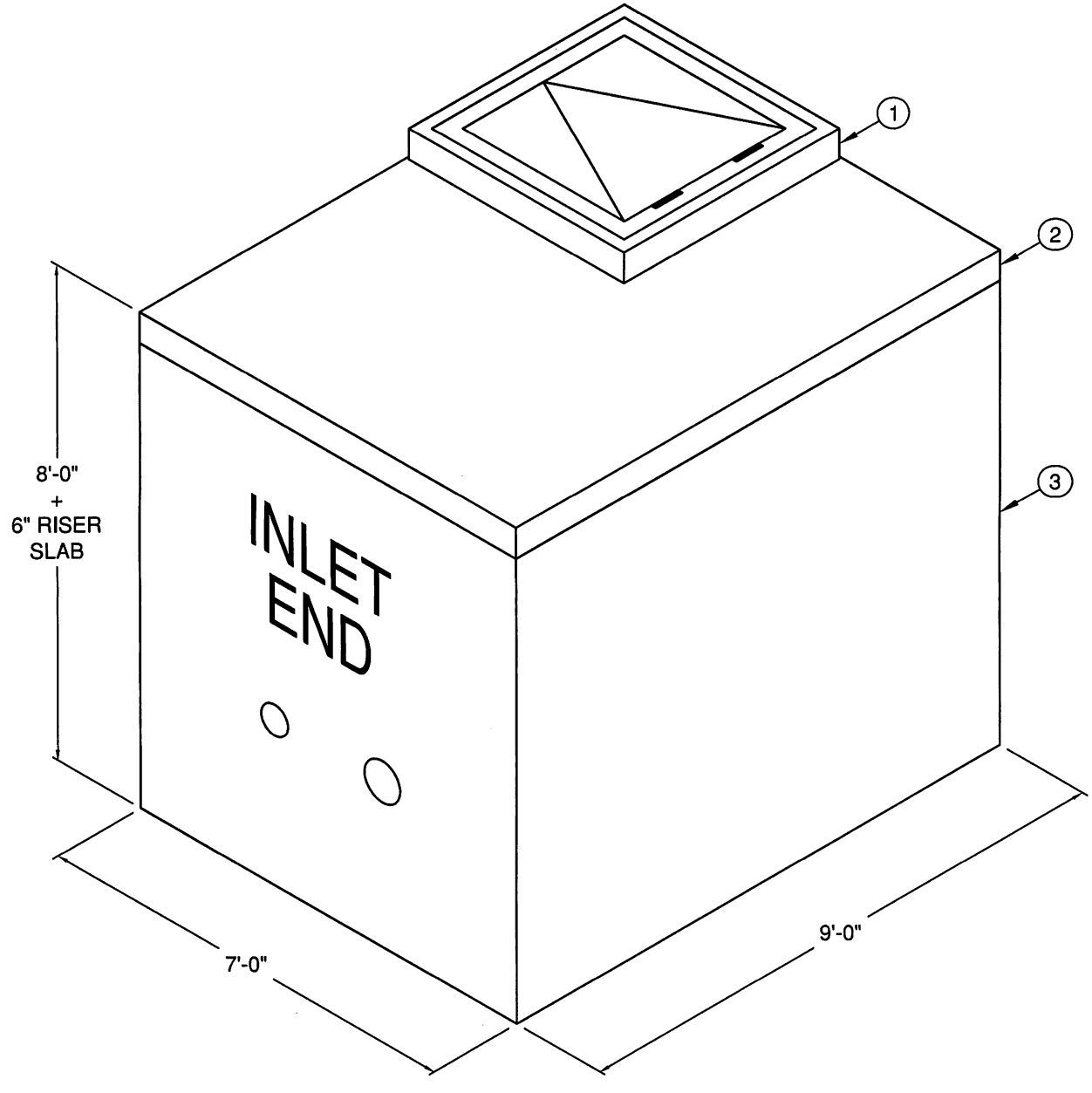
N.T.S.

NOTES:

1. SIZES 8'-0"W x 10'-0"L x H (VARIES)
   SECTION HEIGHTS VARY IN 6" INCREMENTS
2. WEIGHT
   3'-6" TOP OR BOTTOM SECT. 9300 EA.
   RISER = 1650/ VF
3. 8" TOP SLAB THICKNESS SHALL BE USED
   WHEN VAULT IS SUBJECT TO VEHICULAR TRAFFIC
4. MIN. DEAD, LIVE, IMPACT, AND LATERAL LOADS,
   SHALL BE DETERMINED BY "STD SPEC. FOR
   HIGHWAY AND BRIDGES" ADOPTED BY AASHTO.
5. INSTALLATION SHALL BE SUBMITTED TO AND
   APPROVED BY THE THE WATER DEPARTMENT.

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	01/10/2019	ASW

Parts List	
ITEM	NAME
1	101295 - RISER SLAB
2	196956 - SLAB
3	196958 - BASE



CUSTOMER TO PROVIDE
ACCESS LOCATION

A.C. miller
CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA
CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION:
6'-0" X 8'-0" ISO

CUSTOMER:
CENTRAL CLAY PRODUCTS

JOB NAME:
ST. LUKE'S MANOR

THICKNESS:	ROOF:	WALLS:	FLOOR:
	6"	6"	8"

QTY:	CU. YDS	WEIGHT:
1	6.62	28,246 LBS

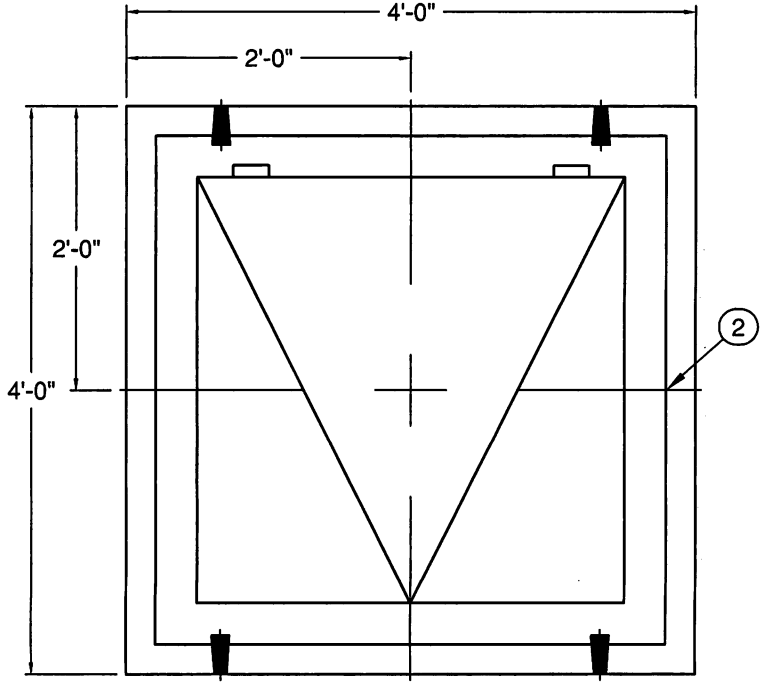
DRAWN BY:	DRAWING DATE:
ASW	01/10/2019

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
195866-1	49220	000

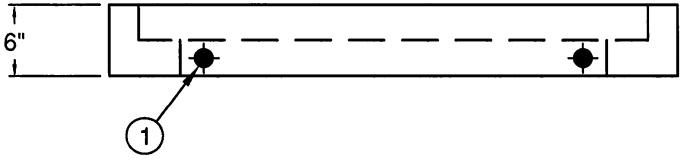
APPROVED FOR PRODUCTION BY: _____ DATE: _____

ANDREW WEILER 1/10/19 19 - 195866 - 1 - 6X8 ISO

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	01/10/2019	ASW



TOP VIEW



SIDE VIEW

Parts List	
ITEM	NAME
1	3/4"Ø THREADED PENNSYLVANIA INSERT (100029)
2	36" X 36" - 300 PSF - SINGLE LEAF - ALUM - SNAP LOCK - DOOR (102132)*
	PIT IS PRE-PIPED

A.C. miller CONCRETE PRODUCTS, INC. www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION: 4'-0" X 4'-0" X 6" SLAB

CUSTOMER: CENTRAL CLAY PRODUCTS

JOB NAME: ST. LUKE'S MANOR

THICKNESS:	ROOF:	WALLS:	FLOOR:
	-	-	-

QTY:	CU. YDS	WEIGHT:
1	0.13	613 LBS

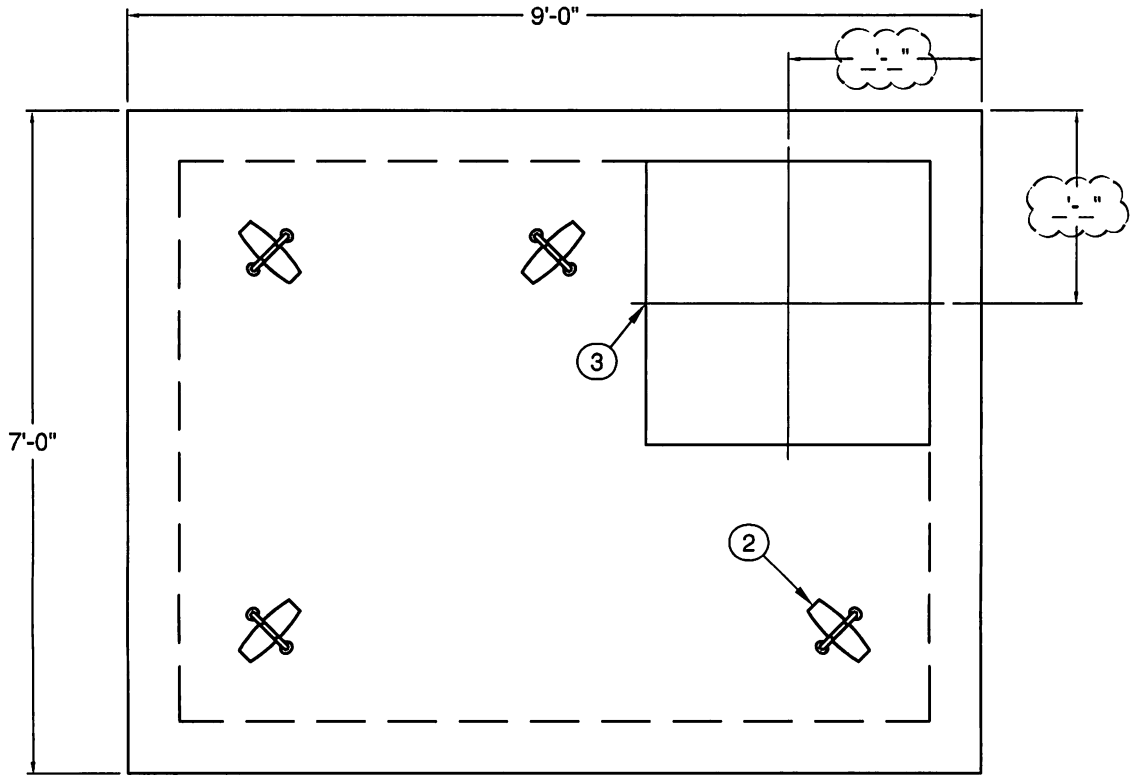
DRAWN BY:	DRAWING DATE:
ASW	01/10/2019

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
101295	49220	001

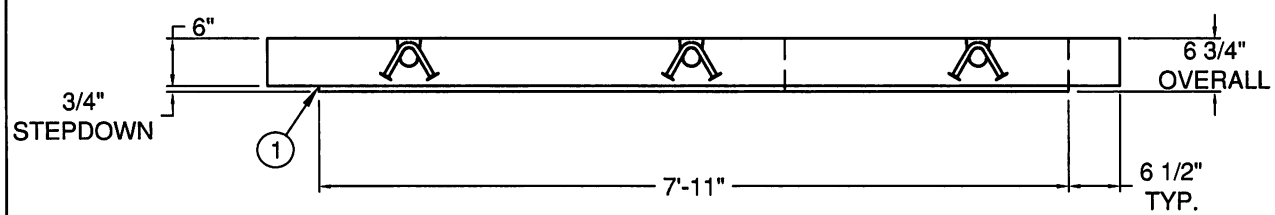
APPROVED FOR PRODUCTION BY: _____ DATE: _____

ANDREW WEILER 1/10/19 19 - 101295 - 4X4X6 SLAB 36X36-DOOR

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	01/10/2019	ASW



TOP VIEW



SIDE VIEW

Parts List	
ITEM	NAME
1	STEPDOWN (TYP.) APPLY JOINT SEALANT BEFORE INSTALLING TO PIECE BELOW
2	(4) UTILITY LIFT ANCHOR .671 X 4.75 (162483)
3	36" X 36" ACCESS OPENING
	PIT IS PRE-PIPED

CUSTOMER TO PROVIDE ACCESS LOCATION

A.C. MILLER CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION:
7'-0" X 9'-0" X 0'-6" SLAB

CUSTOMER:
CENTRAL CLAY PRODUCTS

JOB NAME:
ST. LUKE'S MANOR

THICKNESS:	ROOF:	WALLS:	FLOOR:
	-	-	-

QTY:	CU. YDS	WEIGHT:
1	1.09	4,464 LBS

DRAWN BY:	DRAWING DATE:
ASW	01/10/2019

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
196956	49220	002

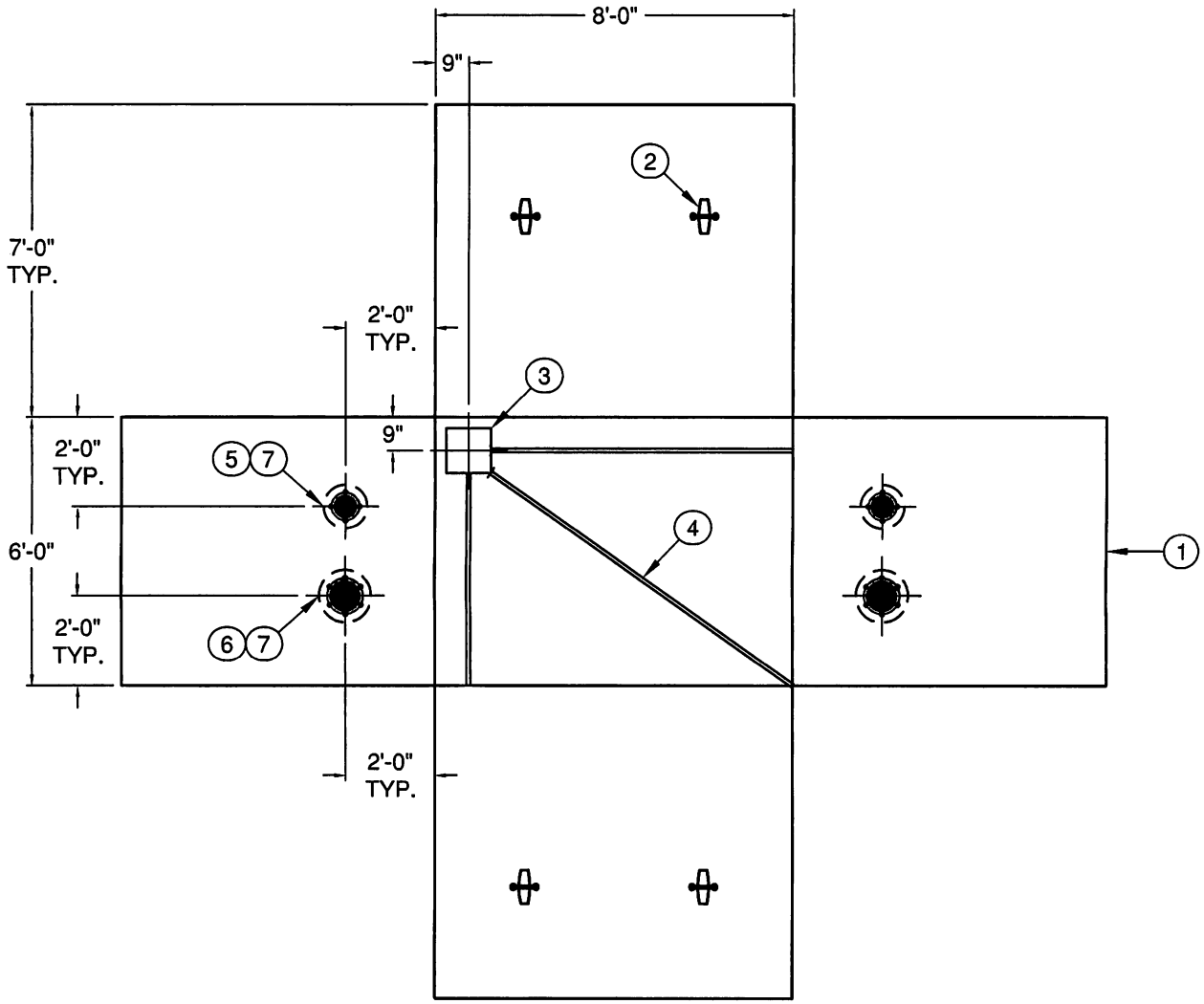
APPROVED FOR PRODUCTION BY: _____ DATE: _____

ANDREW WEILER 1/10/19 19 - 196956 - 7X9X6 SLAB 36X36-ACC

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	01/10/2019	ASW

*** WALLS FOLD UP ***

* ALL DIMENSIONS ARE INSIDE DIMENSIONS *



FOLD-OUT VIEW

Parts List	
ITEM	NAME
1	FLAT SURFACE FOR CONNECTION TO SLAB. (TYP.) APPLY JOINT SEALANT BEFORE INSTALLING SLAB
2	(4) UTILITY LIFT ANCHOR .671 X 4.75 (162483)
3	12" X 12" X 6" DEEP SUMP
4	(3) DRAIN CHANNEL 1" WIDE SLOPED 0 TO 1-1/2" AT SUMP
5	(2) OSL64 OMNI SLEEVE FOR 4"Ø PIPE IN 6" WALL (110719)
6	(2) OSL86 OMNI SLEEVE FOR 6"Ø PIPE IN 6" WALL (103302)
7	PIT IS PRE-PIPED: PIPING WEIGHT = 1,000 LBS PIPING EXTENDS 2'-0" BEYOND PIT

A.C. Miller CONCRETE PRODUCTS, INC. www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION:

6'-0" X 8'-0" X 7'-0" BASE

CUSTOMER: CENTRAL CLAY PRODUCTS

JOB NAME: ST. LUKE'S MANOR

THICKNESS:	ROOF:	WALLS:	FLOOR:
	-	6"	8"

QTY:	CU. YDS	WEIGHT:
1	5.40	22,169 LBS

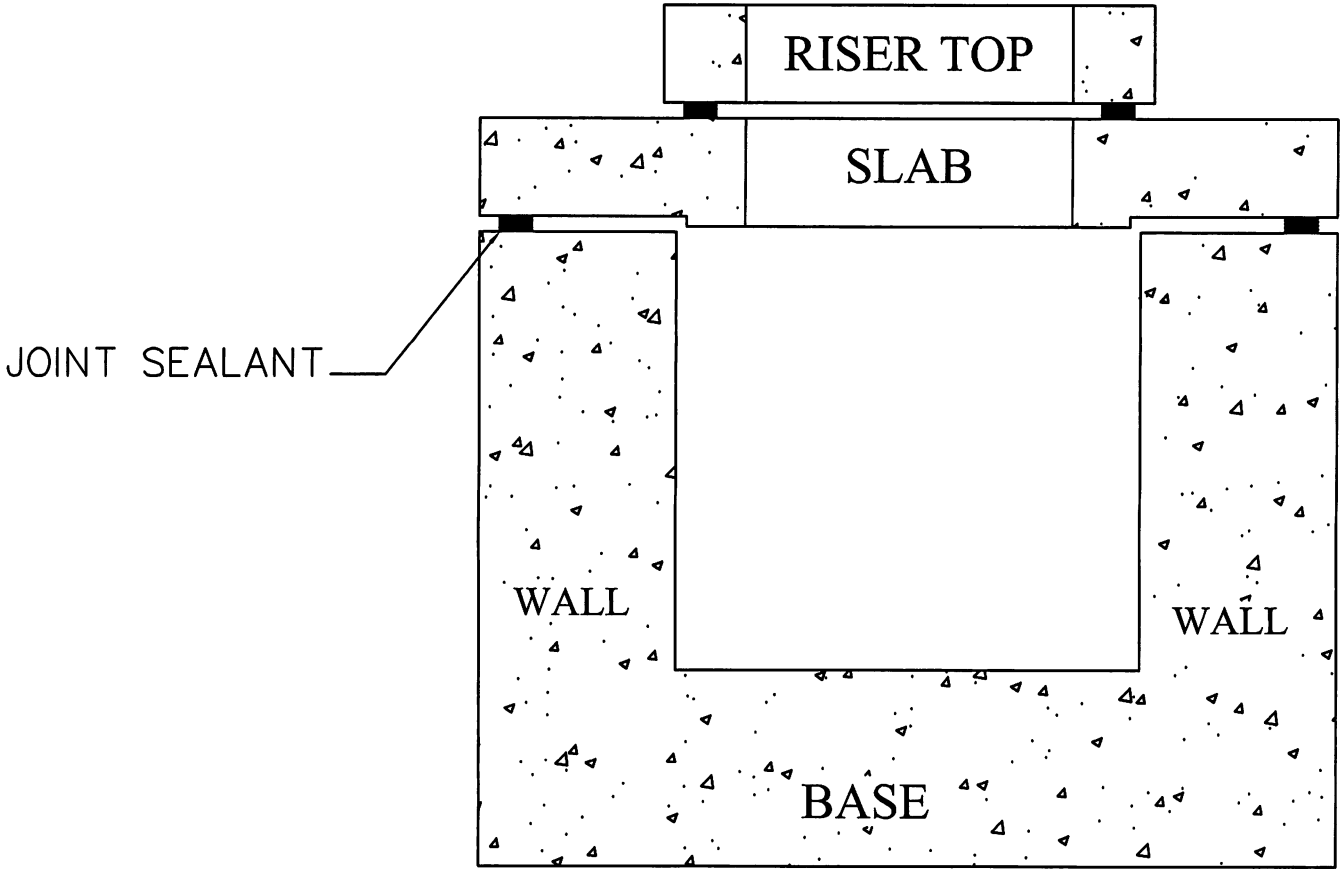
DRAWN BY:	DRAWING DATE:
ASW	01/10/2019

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
196958	49220	003

APPROVED FOR PRODUCTION BY: _____ DATE: _____

ANDREW WEILER 1/10/19 19 - 196958 - 6X8X84 BASE OMNI SLEEVES SPDR DRAINS

CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SIZES AND LOCATIONS OF HOLES, SLEEVES, STEPS, SUMP RECESS, EMBEDMENTS, ETC. THAT ARE SHOWN ON SUBMITTAL DRAWINGS.



STANDARD FORM
SHIPLAP JOINT

REQ'D: 1	SCALE: NONE PURGE

CONCRETE PRODUCTS

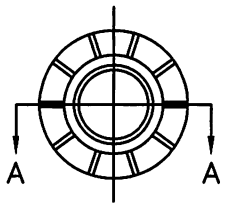
NPCA CERTIFIED PLANT

ITEM: FLAT JOINT	
CUSTOMER:	
DESCRIPTION: FLAT – FLAT – STEPDOWN JOINT	
DATE:	DWN. BY: STD

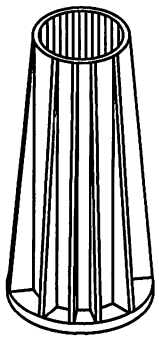
ITEM #: XXXXXX

DESCRIPTION:
INSERTS

Pennsylvania Insert Corp
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com



TOP



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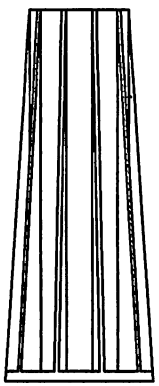
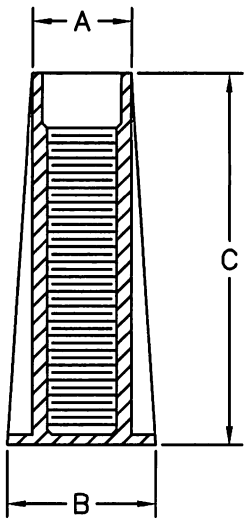


SIDE



SECTION A-A

CUT COST, SAVE TIME AND ELMINATE UNSIGHTLY CORROSION FOREVER WITH THE MOST UNIQUELY ENGINEERED THERMOPLASTIC INSERT ON THE MARKET TODAY.

SAVE TIME

AN EXCLUSIVE "TAP-ON / SLIP-OFF" FEATURE SAVES CONSIDERABLE SET AND STRIPPING TIME.

SAVE MONEY

PENNSYLVANIA INSERT CORP. INSERTS ARE MUCH LESS EXPENSIVE THAN METAL INSERTS. IN ADDITION, THEY REDUCE SET UP COSTS BECAUSE THEY ARE QUICK AND EASY TO POSITION AND ATTACH TO THE FORM.

STOP CORROSION

WHERE APPEARANCE IS IMPORTANT, THESE INSERTS ARE THE ONLY ANSWER. THEY STOP UGLY BLEEDING AND WILL NEVER CORRODE, NOT EVEN IN SEA WATER.

ADDITIONAL FEATURES

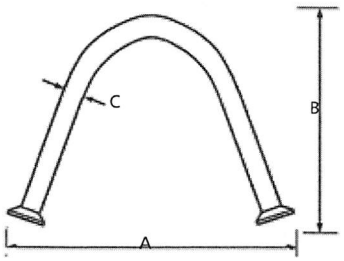
1) LIGHTER WEIGHT (1/16TH THE WEIGHT OF METAL) MAKES STORAGE, HANDLING AND SHIPPING MUCH EASIER AND LESS EXPENSIVE
2) HIGHLY CHEMICAL RESISTANT (COMPLETE CHEMICAL RESISTANCE LIST FURNISHED ON REQUEST)
3) SELF-LUBRICATING FOR EASIER THREADING
4) FATIGUE RESISTANT, NOT AFFECTED BY VIBRATION
5) NON-CONDUCTIVE
6) HIGH MECHANICAL STRENGTH

BOLT DIA.	THREAD N.C.	A	B	C	WORKING LOAD (LBS.)	ULTIMATE STRENGTH
1/4"	20	3/4"	1"	1 1/2"	N/A	N/A
3/8"	16	3/4"	1"	1 1/2"	440	2,200
1/2"	13	3/4"	1 1/4"	2 3/4"	1,260	12,600
5/8"	11	15/16"	1 3/8"	3"	2,020	14,000
3/4"	10	1"	1 1/2"	3 1/4"	3,020	16,796
1"	8	1 5/16"	1 3/4"	3 3/4"	3,792	18,964
1 1/2"	COIL THRD	1 7/8"	2 1/4"	5 1/4"	5,000	24,375

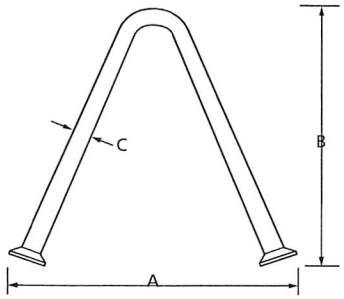
DAYTON® SUPERIOR

P-75 and P-75-H Utility Anchor

The Dayton Superior Utility Anchors are available in three diameters and a series of lengths for specific concrete thickness. The utility anchor can be set in either a 90° or a 45° anchor orientation using the appropriate setting plug.



P-75 Utility Anchor



P-75-H Utility Anchor

P-75 and P-75-H Utility Anchor						
Anchor	Type	Product Code No.	A	B	C	End Shape
P-75	4UA444	121877	5-1/4"	3-1/8"	0.444"	Swift Lift
	5UA444	123442	6"	3-3/4"	0.444"	Swift Lift
	6UA444	121888	7-3/8"	4-3/4"	0.444"	Swift Lift
	5UA671	123441	6 7/16"	3-3/4"	0.671"	Swift Lift
	6UA671	121889	7-3/8"	4-3/4"	0.671"	Swift Lift
	8UA671	121891	9-3/4"	6-3/4"	0.671"	Swift Lift
P-75-H	12UA875	124738	15-7/8"	11"	0.875"	Swift Lift

Anchor	Type	Product Code No.	Minimum Panel Thickness	Safe Working Load Tension 90	Safe Working Load Shear 90	Safe Working Load Tension/Shear 45	Minimum Edge Distance
P-75	4UA444	121877	4"	3,200	5,800	2,260	9"
	5US444	123442	5"	3,860	7,710	2,730	10"
	6UA444	121888	5 5/8"	4,460	9,460	3,150	12"
	5UA671	123441	5"	4,560	8,430	3,220	10"
	6UA671	121880	5 5/8"	7,320	15,780	5,170	12"
	8UA671	121801	7 5/8"	10,830	18,850	7,660	16"
P-75 H	12UA875	124738	12"	24,000	24,000	24,000	30"

To Order:
Specify: (1) quantity, (2) name, (3) product code.

Example:
200, P-75 Utility Anchors, 5UA444.

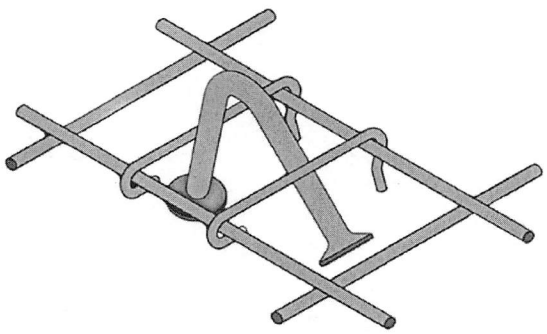
Note:
1) Compressive strength of normal weight concrete to be 4,000 psi at time of initial lift.
2) Safe working loads provide an approximate factor of safety of 4 to 1.
3) Utility anchors to be installed at 90° to surface of the concrete.
4) Shear safe working loads are based on loading in the direction of the top of the precast concrete element.

P-75-C Utility Anchor with Clip

The Dayton Superior Utility Anchor with Clip is designed to allow the Utility Anchor to be secured to the wire mesh cage. This product utilizes the P-75 Utility Anchors with 2 wire clips welded to opposite legs of the anchor. These wire clips are positioned to hold the utility anchor with Void to the wire mesh in the proper position in the wall for lifting your precast product. Both the 5UA and 6UA anchors in 0.444 and 0.671 diameters for 9" wire spacing are in stock. Other anchor and wire spacing are readily available from our Parsons KS plant.

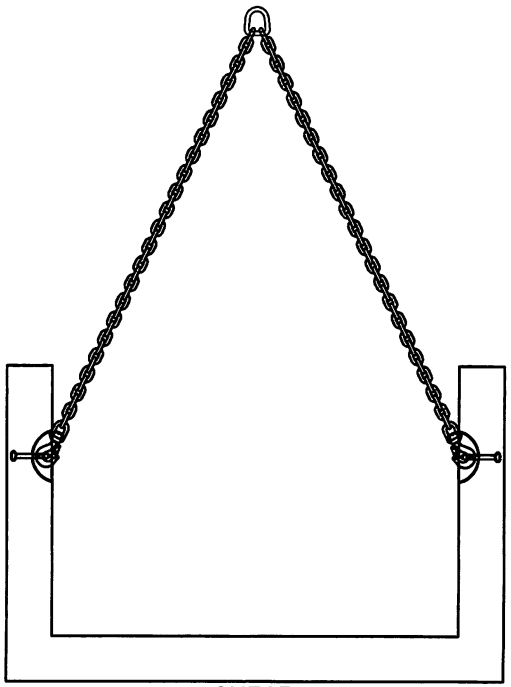
To Order:
Specify: (1) quantity, (2) name, (3) product code (4) anchor size, (5) wire spacing (6) wall thick ness.

Example:
200, P-75-C, #121443, 5UA444anchor, 9" wire spacing, 5" wall.

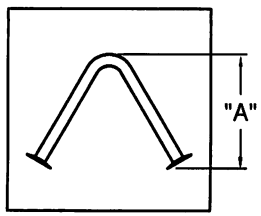


Product Code	Utility Anchor	Wire Clip Lengths	Wall Thickness
123443	5UA444	9"	5"
121890	5UA671	9"	5"
121892	6UA444	9"	6"
121893	6UA671	9"	6"
127446	8UA671	9"	8"

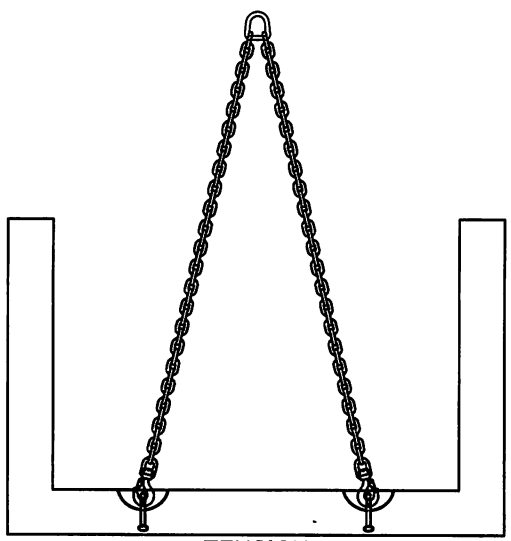
UTILITY ANCHOR DATA				
"A"	ACM PART	TENSION 3 POINT PICK	SHEAR 3 POINT PICK	MIN. EDGE DISTANCE
3 3/4"	162482	13680	25290	11"
4 3/4"	162483	21960	47340	15"
6 3/4"	162484	32490	56550	20"



SHEAR



TENSION



TENSION

INFO PER PATTERSON ALP0912

A.C. Miller CONCRETE PRODUCTS, INC. www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

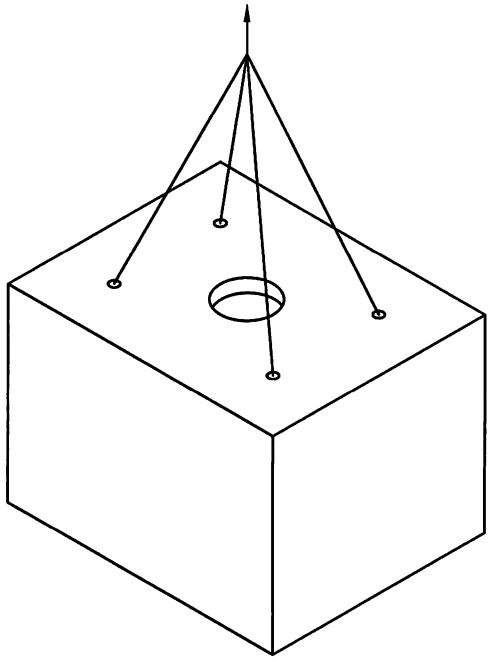
SIZE & DESCRIPTION:

UTILITY ANCHOR CAP

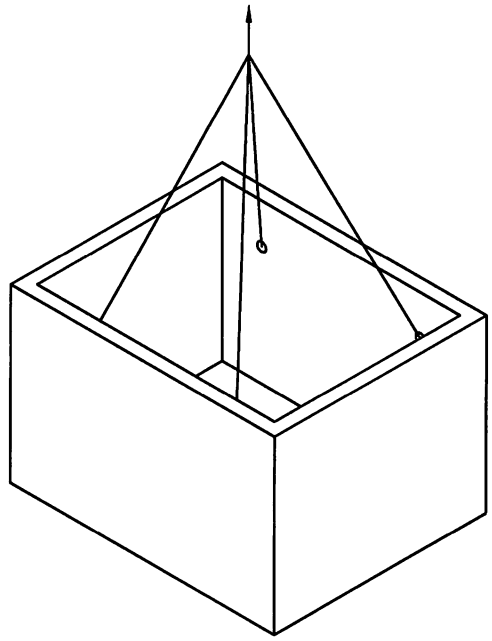
DRAWN BY:	DRAWING DATE:
BTH	4.7.14

APPROVED FOR PRODUCTION BY: _____ DATE: _____

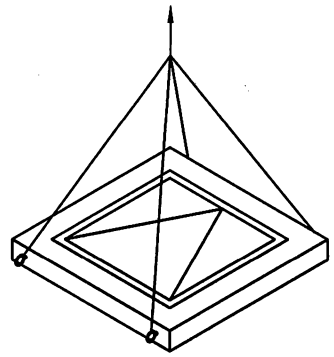
BRYAN HENRY 3/24/14 UTILITY ANCHOR LIFTER



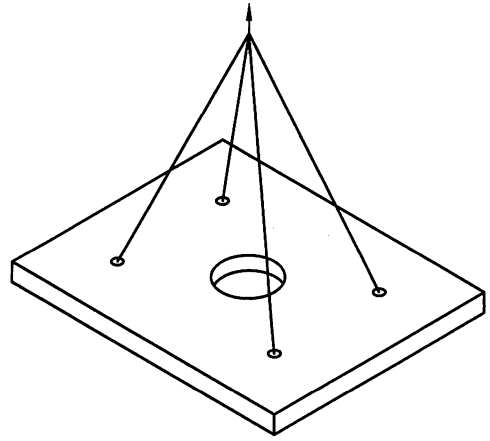
MANHOLE TOP
W/ LIFTERS ON TOP FACE



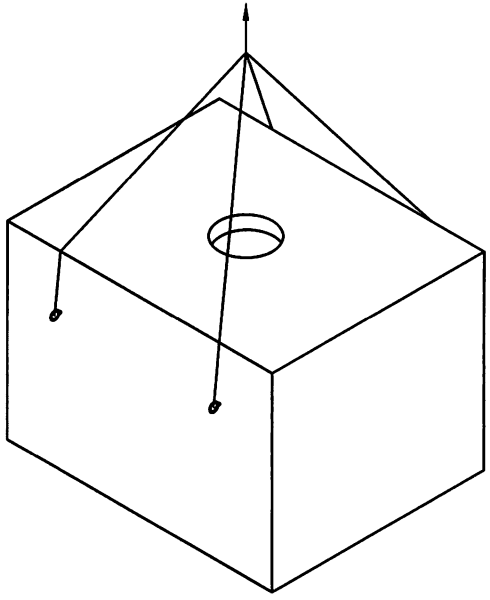
MANHOLE BASE
W/ LIFTERS ON INSIDE OF WALLS



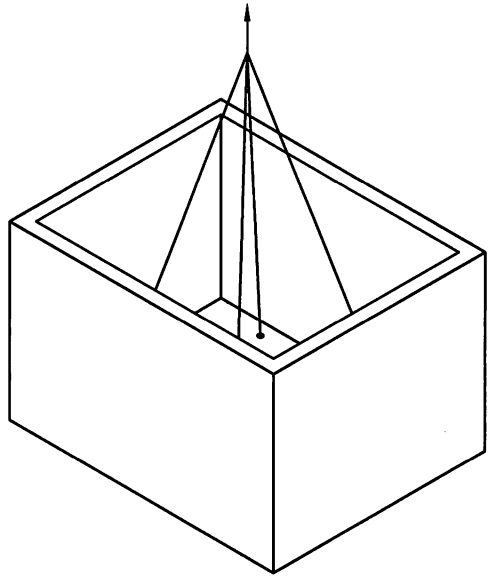
MANHOLE SLAB
W/ LIFTERS ON SIDE FACE



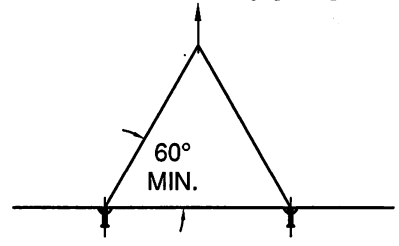
MANHOLE SLAB
W/ LIFTERS ON TOP FACE



MANHOLE TOP
W/ LIFTERS ON OUTSIDE OF WALLS



MANHOLE BASE
W/ LIFTERS ON THE FLOOR



LIFTING

a.c.miller
CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA
CERTIFIED PLANT

SPRING CITY - 610-948-4600

SIZE & DESCRIPTION:

TYPICAL LIFTING ISOMETRICS

DRAWN BY:

DRAWING DATE:

BRYAN HENRY 4/10/15 lifting

ITEM #: 102132

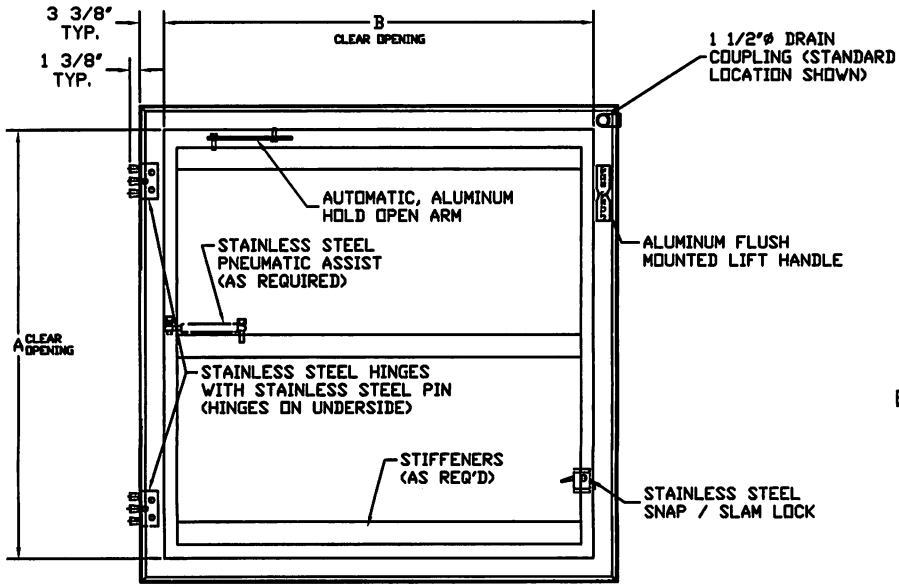
DESCRIPTION:

"JUST SET"

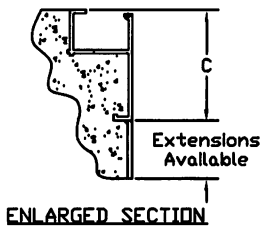
ALUMINUM DOOR, STANDARD DUTY, SINGLE LEAF

Pennsylvania Insert Corp

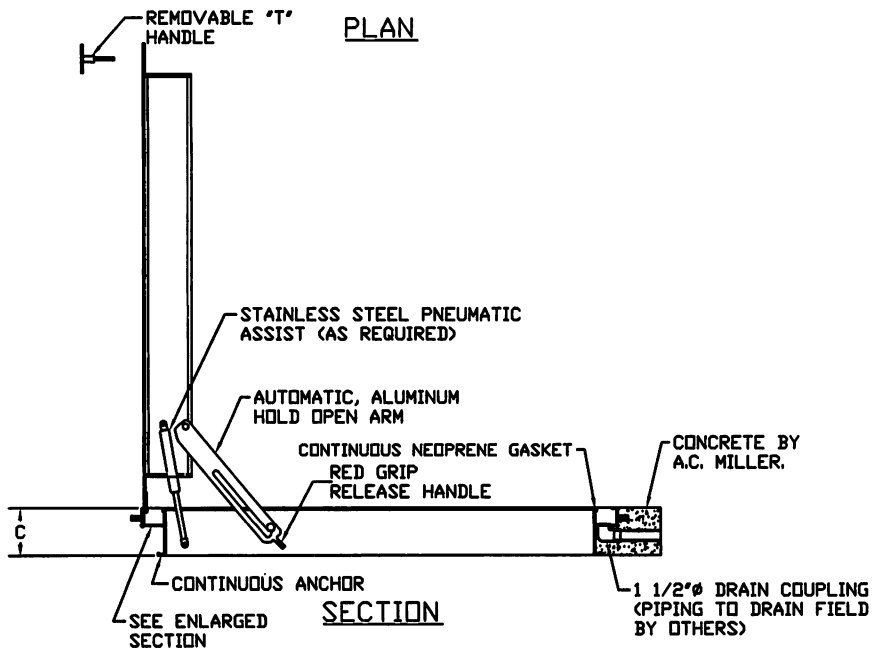
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com



PLAN



ENLARGED SECTION

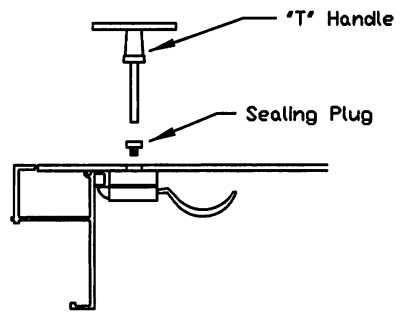


SECTION

- 1/4" Diamond Plate Lid Reinforced for 300 LB/FT² live load
- Drain Trough Frame with Gasket for Water Resistance
- Min. 6" Deep Frame with Extensions Available
- Protective Barrier where Concrete meets Aluminum
- Continuous Anchor to Lock Frame into Concrete
- Type 316 Stainless Steel Pneumatic Assist (*as req'd)
- Stainless Steel, Butt Style, Hinges & Hinge Pin Anchored In Concrete With Metal Inserts.
- All Type 304 Stainless Steel Hardware
- Type 316 Stainless Steel Snap Lock
- 1-1/2"ø Drain Coupling
- Automatic Hold Open Arm, With Red Release Handle
- Flush Mounted Lift Handle

An asterisk (*) next to stock number = stainless steel pneumatic assist as standard

STANDARD DIMENSIONS				OFFICE USE
A	B	C	STOCK #	
36"	36"	6.00"	ATS3636S	



STAINLESS STEEL SNAP/SLAM LOCK

ITEM #: 101291

DESCRIPTION:

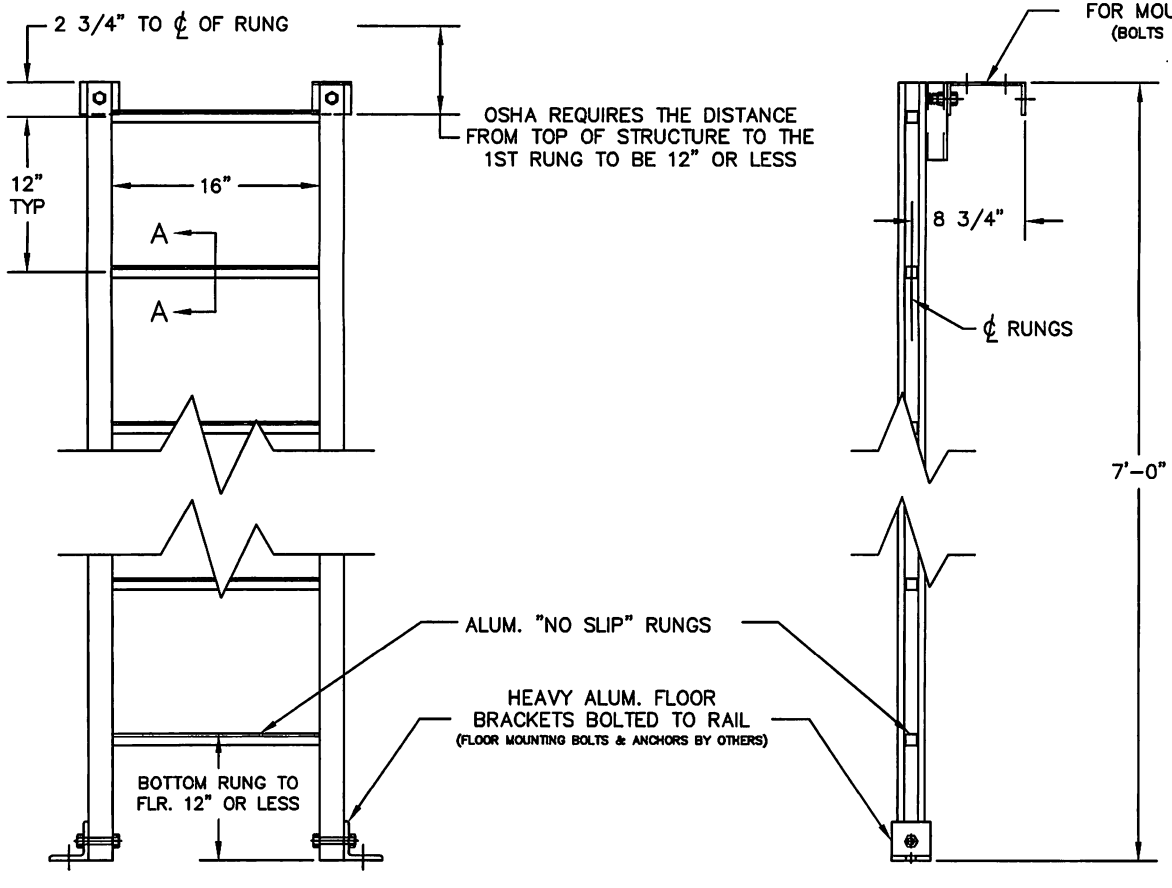
PAI ALUM LADDER

OSHA 1910.27 COMPLIANT

Pennsylvania Insert Corp

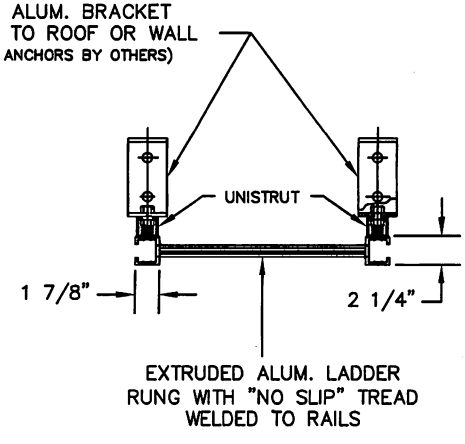
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com

ALL MATERIALS ARE MILL FINISH ALUM. ALLOY 6061-T6
SEE SEPARATE SHEET FOR INSTALLATION INSTRUCTIONS

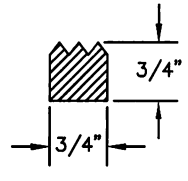


ELEVATION

SIDE ELEVATION



PLAN



SECTION A-A

OPTIONS:
-INTEGRAL LADDER EXTENSION
-BOLT-ON LADDER EXTENSION

NO SCALE

SEE INSTALLATION SHEET FOR INSTRUCTIONS

ITEM #: 100002

DESCRIPTION:

PAI BOLT-ON EXTENSION

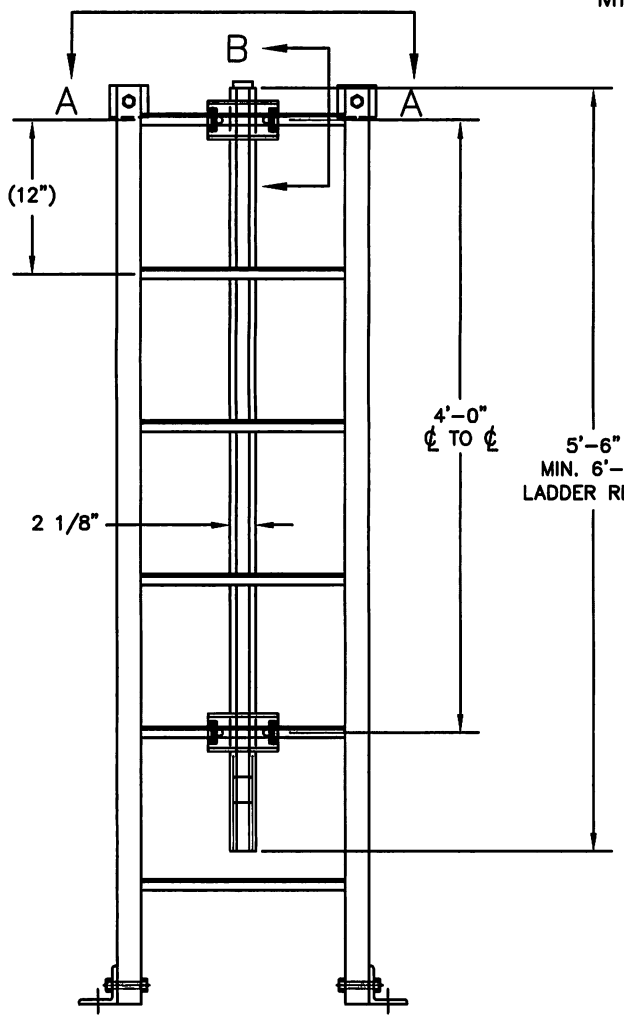
ALUM LADDER EXTENSION

Pennsylvania Insert Corp

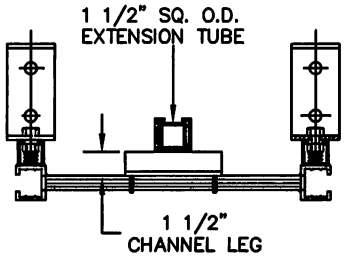
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com

ALL MATERIALS ARE:

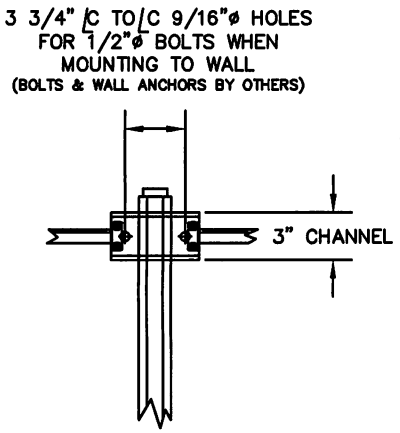
- ALL ALUMINUM CONSTRUCTION
- STAINLESS STEEL HARDWARE
- MINIMUM 6'-0" LADDER REQ'D



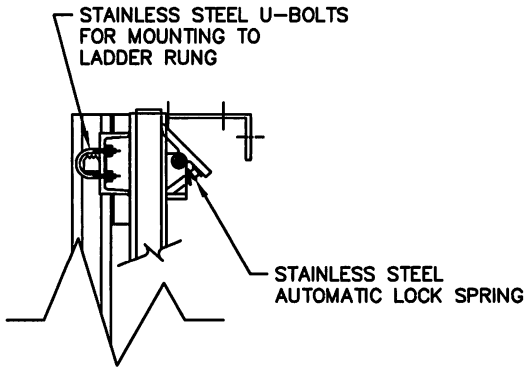
FRONT ELEVATION



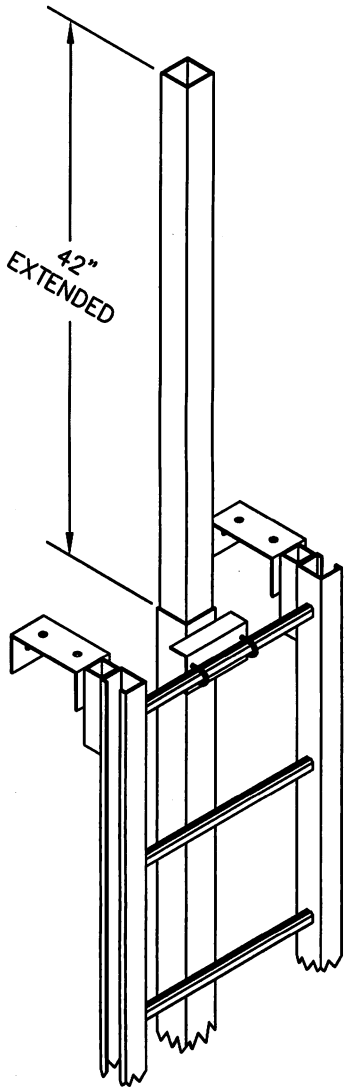
SECTION A–A



REAR ELEVATION



SECTION B–B



INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS

NO SCALE

NOTES:

DESCRIPTION:

LADDER INSTALLATION

OSHA 1910.27 COMPLIANT

Pennsylvania Insert Corp

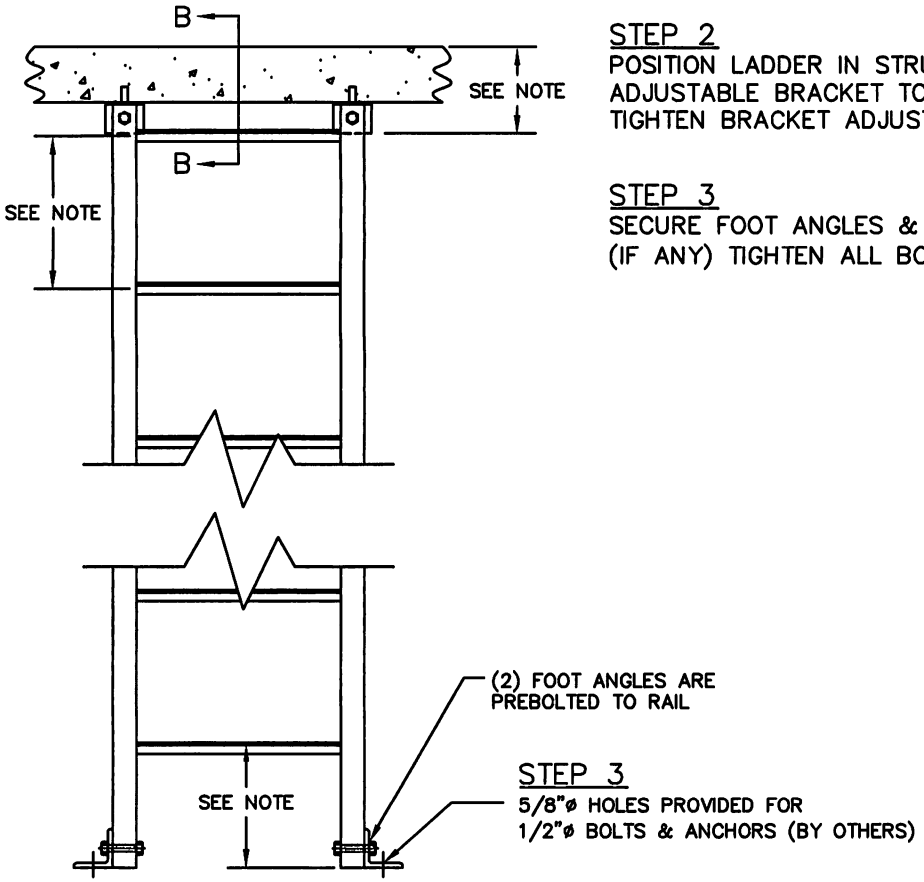
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com

NOTE
OSHA REQUIRES THE DISTANCE FROM TOP OF STRUCTURE TO THE 1ST RUNG TO BE 12" OR LESS

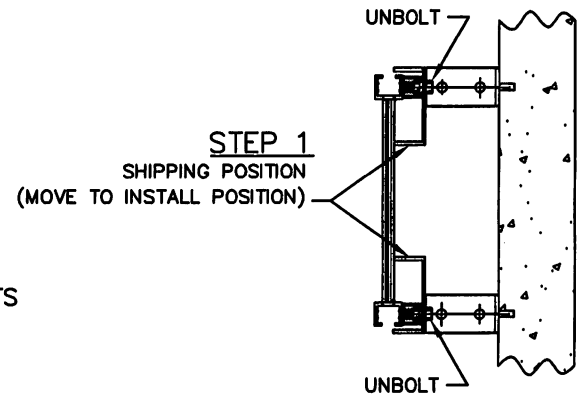
STEP 1
UNBOLT, REPOSITION & REBOLT ADJUSTABLE CHANNEL BRACKETS AS SHOWN. (DO NOT TIGHTEN ALL THE WAY SO THAT THEY CAN BE SLID UP OR DOWN)

STEP 2
POSITION LADDER IN STRUCTURE & SECURE ADJUSTABLE BRACKET TO WALL OR ROOF. TIGHTEN BRACKET ADJUSTING NUT.

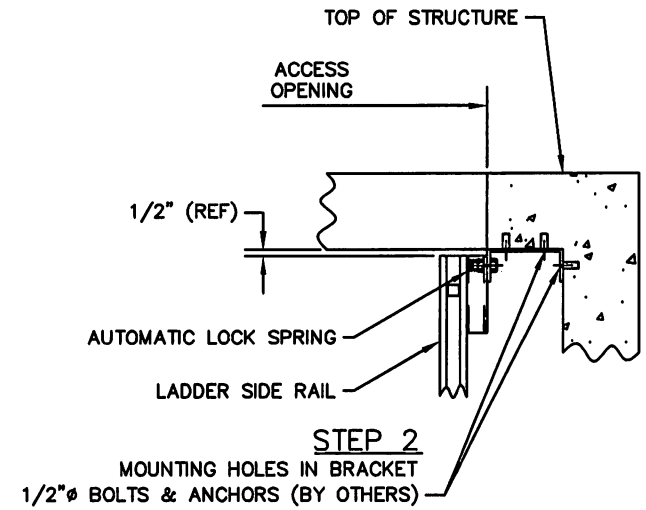
STEP 3
SECURE FOOT ANGLES & ANY MID-BRACKETS (IF ANY) TIGHTEN ALL BOLTS.



ELEVATION



PLAN



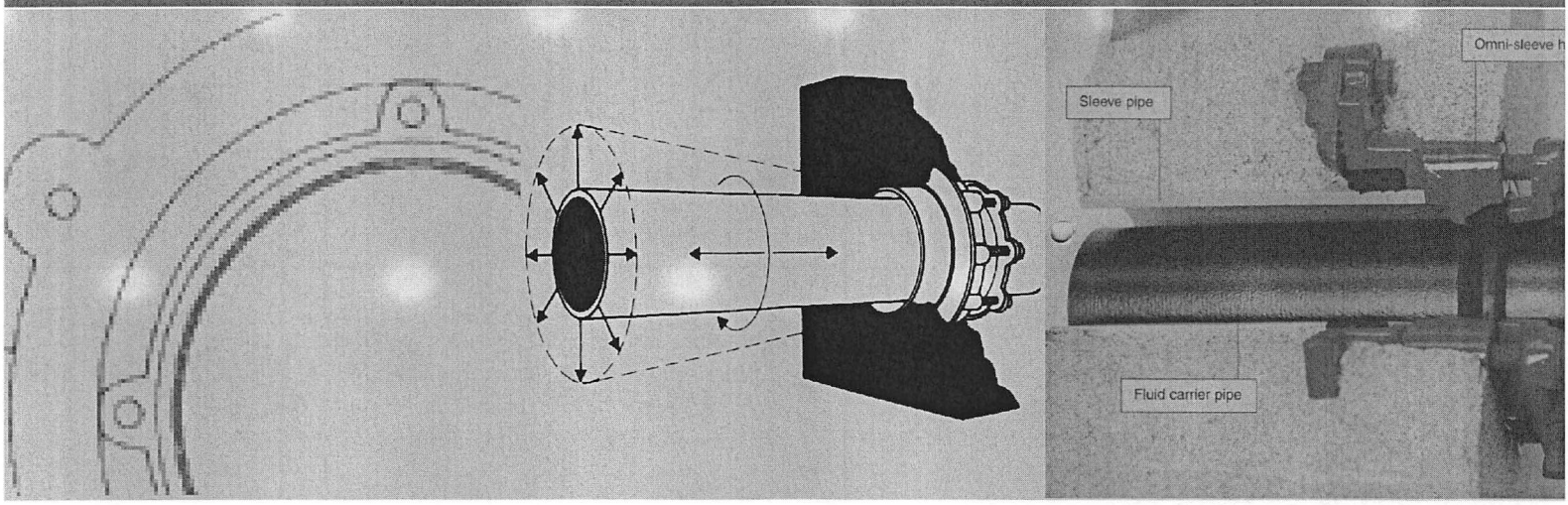
SECTION B-B

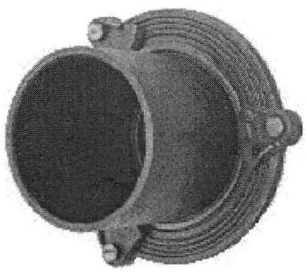
NO SCALE

SIGMA™

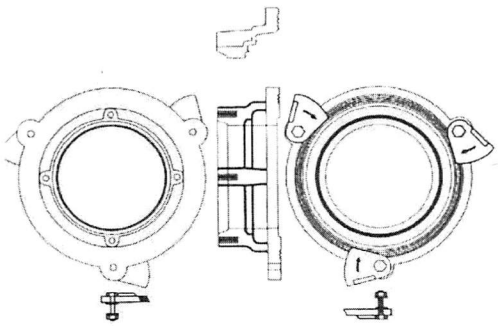
Quality – Service – Commitment – Delivered.

OMNI SLEEVE™ Wall Pipe Penetration Sleeve





OMNI SLEEVE with sleeve pipe as installed



HUB:

Manufactured from Ductile Iron, ASTM A536, in conformance with ANSI/AWWA C110/A21.10, American National Standard for Ductile and Gray Iron Fittings, 3-48" for water and other liquids.

Mechanical Joint sleeve seal is designed, manufactured, and tested in strict accordance with the applicable provisions of ANSI/AWWA C111/A21.11, American National Standard for Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.

Drilling and Tapping conform to ANSI B1.1, Unified Screw Threads, and to B1.2, Screw Thread Gages and Gaging. Threads conform to standards and dimensions of the Coarse Thread Series, Class 2B Limits. OMNI-SLEEVE™ Hub and Sleeve Pipe are assembled and sealed with an exclusive OMNI-SEAL™ gasket.

OMNI-SEAL 'A' GASKET:

Material conforms to the applicable provisions of CSA B 620M90, Mechanical Couplings for Drain, Waste, Vent Pipe, and Sewer Pipe.

SIGMA Corporation

700 Goldman Drive
Cream Ridge, NJ 08514

800 999 2550 p
609 758 1163 f
crm-sales@sigmaco.com

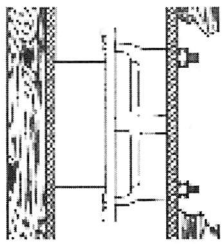
www.sigmaco.com

OMNI SLEEVE™ Wall Pipe Penetration Sleeve

Dimensions in Inches
Weights in Pounds

Dimensional Chart

Carrier Pipe Size	Part No.	Carrier Pipe OD		Sleeve Pipe OD	Waterstop Diameter	Distance Waterstop to Wall	MJ Bolt Circle Diameter	Bolt Holes	
		DI	Steel					No.	Size
3	OSL63	3.96	3.5	6.9	11 3/4	4 3/16	6.19	4	5/8 x 3
4	OSL64	4.8	4.5	6.9	11 3/4	4 3/16	7.5	4	3/4 x 4
6	OSL86	6.9	6.625	9.05	14	4 3/16	9.5	6	3/4 x 4
8	OSL108	9.05	8.625	11.1	16	4 3/16	11.75	6	3/4 x 4
10	OSL1210	11.1	10.75	13.2	18 1/4	4 3/16	14	8	3/4 x 4
12	OSL1412	13.2	12.75	15.3	20 1/4	4 3/16	16.25	8	3/4 x 4
14	OSL1614	15.3	N/A	17.4	22 3/8	4 5/16	18.75	10	3/4 x 5
16	OSL1816	17.4	N/A	19.5	24 1/2	4 5/16	21	12	3/4 x 5
18	OSL2018	19.5	N/A	21.6	26 5/8	4 5/16	23.25	12	3/4 x 5
20	OSL2420	21.6	N/A	25.8	30 3/4	4 5/16	25.5	14	3/4 x 5
24	OSL3024	25.8	N/A	32	37	4 5/16	30	16	3/4 x 5
30	OSL3630	32	N/A	38.3	43 3/8	5 9/16	36.88	20	1 x 6



OMNI SLEEVE installs accurately as it can be secured to the formwork with 2 bolts, which prevents slippage or dislocation during the concrete pour.

ALTERNATIVE GASKETS:

EPDM: (ethylene propylene) suitable for water and wastewater, ozones, and strong oxidizing chemicals. Temperature Range 65-250 degrees Fahrenheit.

CR: (neoprene) suitable for moderate chemicals and acids, oil fats, greases, and many solvents. Temperature Range 65-200 degrees Fahrenheit.

NBR: (Buna-N, Nytril, Hycar) suitable for gasoline, petroleum products, hydrocarbons, acids, animal and vegetable oils. Temperature Range: 65-150 degrees Fahrenheit.

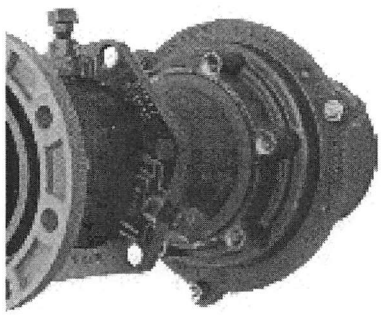
FPM: (Viton) ideal for all aliphatic, aromatic, and halogenated hydrocarbons, acids, animal, and vegetable oils. Temperature Range 50-450 degrees Fahrenheit.

PRESSURE RATING:

Standard mechanical joint pressure pipe seal rated to 350psi.

Suggested Specification

Wall and/or floor pipe penetrations shall be made by a means of a sleeve capable of being bolted directly to the formwork to prevent misalignment. Seal of the annular space between the carrier pipe and the sleeve shall be by means of a confined rubber gasket an capable of withstanding 350psi. Sleeve shall be manufactured from ASTM A536 Ductile Iron with an integrally cast waterstop of 1/2" minimum thickness and 2-1/2" minimum height. Wall sleeves shall be OMNI-SLEEVE™ as manufactured by SIGMA Corporation or prior approved equal.

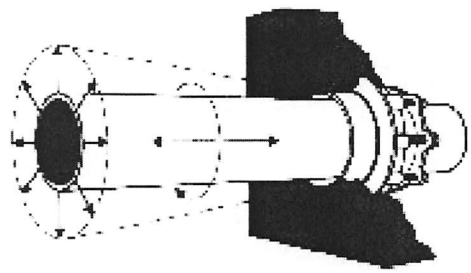


Restraint Option

OMNI-SLEEVE's standard mechanical joint also provides restraint options for your carrier pipe. Shown at left is a typical installation utilizing SIGMA's ONE-LOK Wedge Action Restraint Gland. Using a ONE-LOK or alternatively, using tie-rods from the OMNI-SLEEVE to the next flange will provide additional restraint to the assembly.

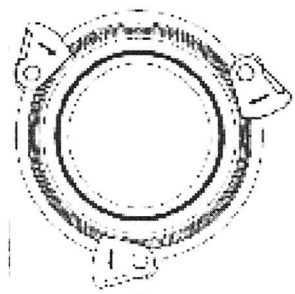
Vibration Absorption

OMNI-SLEEVE's unique design adapts to settling and seismic movement and also allows deflection of the carrier pipe system.



Other Features

- Integrally cast-in waterstop
- Ribbed Anchor Ring to provide more positive seal with concrete
- AWWA/ANSI Standardized Bolt Hole Spacing
- Cam Locks rotate into place to secure the carrier pipe



SIGMA
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Line Card

LOCATIONS

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Fax (609) 758-1158
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Victoriaville, Qc G6P 1B1
Phone (888) 744-6262
Fax (819) 758-1153
jboucher@repco.ca

Concord Supply
2353 Bowman Street
Innisfil, Ontario L9S 3V6
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Fax (705) 436-6338
tanya@concordsupply.ca

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Sauk Village, IL 60411
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5000 Askins Lane
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ontcsr@sigmaco.com

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902 W Main Street
Auburn, WA 98001
Phone (800) 688-6230
Fax (909) 391-2033
ontcsr@sigmaco.com

www.sigmaco.com

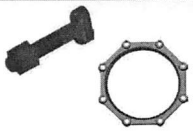
Terms and Conditions of Sales available at our website.

AWWA Ductile Iron Fittings

- 2-64" C153 Ductile Iron Mechanical Joint Fittings
- 2-48" C110 Ductile Iron Mechanical Joint Fittings
- 2-64" C110 Ductile Iron Flanged Fittings
- 3-24" C153 Ductile Iron Push-On Fittings
- 4-24" C110 Ductile Iron Push-On Fittings
- 4-12" Ductile Iron Mechanical Joint Connector
- C116 Fusion Bonded Epoxy Lining Avaiable
- PROTECTO 401® Ceramic Epoxy Lining Available

Visit our website for available special coatings. http://www.sigmaco.com/fittings-coatings-linings/

Mechanical Joint Accessories



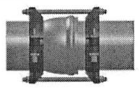
- Prepackaged and Loose Mechanical Joint Accessories
- SIGMASEAL™ Improved Mechanical Joint Gasket
- Snap-On Multi-Purpose Gasket for Ductile Iron or PVC Pressure Pipes
- OMNI-SLEEVE™ Improved Wall Penetration Sleeve
- Specialty Bolts and Nuts for Mechanical Joint Assemblies

ONE-LOK™ Wedge Action Restraints

- 3-48" ONE-LOK D-SLDE Domestic Wedge Restraint for Ductile Iron Pipe
- 3-64" ONE-LOK SLDE Wedge Restraint for Ductile Iron Pipe (Import)
- 4-48" ONE-LOK T-SLDE Tandem Wedge Restraint for High Pressure Ductile Iron Pipe
- 3-36" ONE-LOK D-SLCE Domestic Wedge Restraint for PVC Pipe
- 3-36" ONE-LOK SLCE Wedge Restraint for PVC Pipe (Import)
- 3-36" ONE-LOK SLDEH Wedge Harness Restraint for Ductile Iron Pipe
- 4-12" / 20" ONE-LOK SLDM Wedge Restraint for Oversized Cast Iron Pipe
- 4-36" ONE-LOK SSLD Split Wedge Restraint for Installed Ductile Iron Pipe & Fitting
- 4-36" ONE-LOK SSLDH Split Wedge Harness Restraint for Installed Ductile Iron Pipe
- 4-12" ONE-LOK SLCEH Wedge Harness Restraint for AWWA C900 PVC Pipe

Visit our website for available special coatings.
http://www.sigmaco.com/pipe-restraint-product-coatings-linings/

PV-LOK™ Serration Lock Restraints



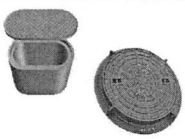
- 4-48" PV-LOK PWM Serrated Restraint for Ductile Iron Fitting & AWWA C900/905 PVC Pipe
- 4-48" PV-LOK PWP Serrated Bell Joint Restraint for AWWA C900/905 PVC Pipe
- 4-12" PV-LOK D-PWP Domestic Serrated Bell Joint Restraint for AWWA C900 PVC Pipe
- 4-48" PV-LOK PWPF Restraint for AWWA C900/905 PVC Pipe & PVC Fitting
- 4-12" PV-LOK PWH Serrated Harness Restraint for AWWA C900 PVC Pipe
- 2-12" PV-LOK PVM Serrated Restraint for Ductile Iron & IPS OD PVC pipe
- 2-12" PV-LOK PVP Serrated Bell Joint Restraint for IPS OD PVC Pipe
- 4-8" PV-LOK PVPF Serrated Restraint for IPS OD PVC Pipe & PVC Fitting
- 4-12" PV-LOK PWP Serrated Bell Joint Restraint for Ductile Iron Pipe

Visit our website for available special coatings.
http://www.sigmaco.com/pipe-restraint-product-coatings-linings/

Flange Adapters

- 3-36" SIGMAFLANGE Flange Adapter Sleeve for PVC and Ductile Iron Pipe
- 2-48" ZIP FLANGE Set Screw Style Flange Adapter

Municipal Construction Castings

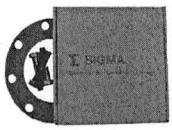


- Manhole Rings and Covers
- Curb and Meter Boxes
- Frames and Grates
- Storm Inlets
- Valve Boxes, Risers, and Extensions

Products for the Ductile Iron Fabricator

- 3-64" High Hub Threaded Flanges
- 3-48" Tapped High Hub Threaded Flanges
- 3-36" Extra Heavy 250lb Drilled Threaded Flanges
- 3-48" Threaded MJ Bell Adapters
- 3-48" MJ x PE Bell adapter
- 3-48" Anchor Flanges
- 3-16" Filler Flanges

Extended Range Products



- Flange-Pak™ Prepackaged Flange Accessory Sets
- Polyethylene Encasement for Ductile Iron Pipe
- Copper Tubing Products
- Tracer Wire & Detectable/Non-Detectable Marking Tape
- Pipe Joint Lubricant & Hydraulic Cement
- Socket Clamps and Tie Rod Accessories
- BoxLok Valve Box Alignment Device
- Cast Iron Companion Flanges

SIGMA™

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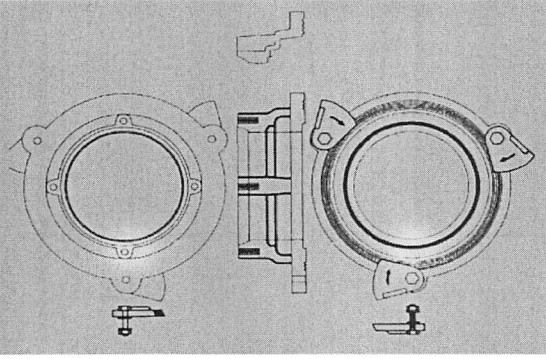
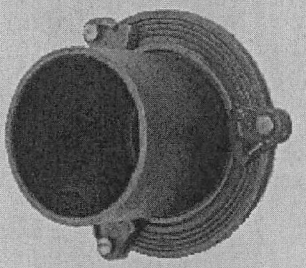
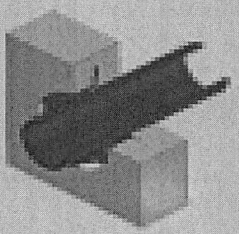
OMNI SLEEVE™ Wall Pipe Penetration Sleeve







PRODUCT SPECIFICATIONS

MATERIAL:

- Mechanical Joint sleeve seal is designed, manufactured, and tested in strict accordance with the applicable provisions of ANSI/AWWA C111/A21.11, American National Standard for Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.
- Drilling and Tapping conform to ANSI B1.1, Unified Screw Threads, and to B1.2, Screw Thread Gages and Gaging. Threads conform to standards and dimensions of the Coarse Thread Series, Class 2B Limits. OMNI-SLEEVE™ Hub and Sleeve Pipe are assembled and sealed with an exclusive OMNI-SEAL™ gasket.
- OMNI-SEAL "A" gasket Material conforms to the applicable provisions of CSA B 620M90, Mechanical Couplings for Drain, Waste, Vent Pipe, and Sewer Pipe.
- Gasket is manufactured of SBR and alternative materials like EPDM, NBR, and CR are available upon request.
- Set screws are manufactured from AISI 4140 steel, heat-treated and zinc-plated.

SIZE RANGE:

- 3 through 30"

DIMENSION:

- Manufactured from Ductile Iron, ASTM A536, in conformance with ANSI/AWWA C110/A21.10, American National Standard for Ductile and Gray Iron Fittings, 3-48" for water and other liquids.

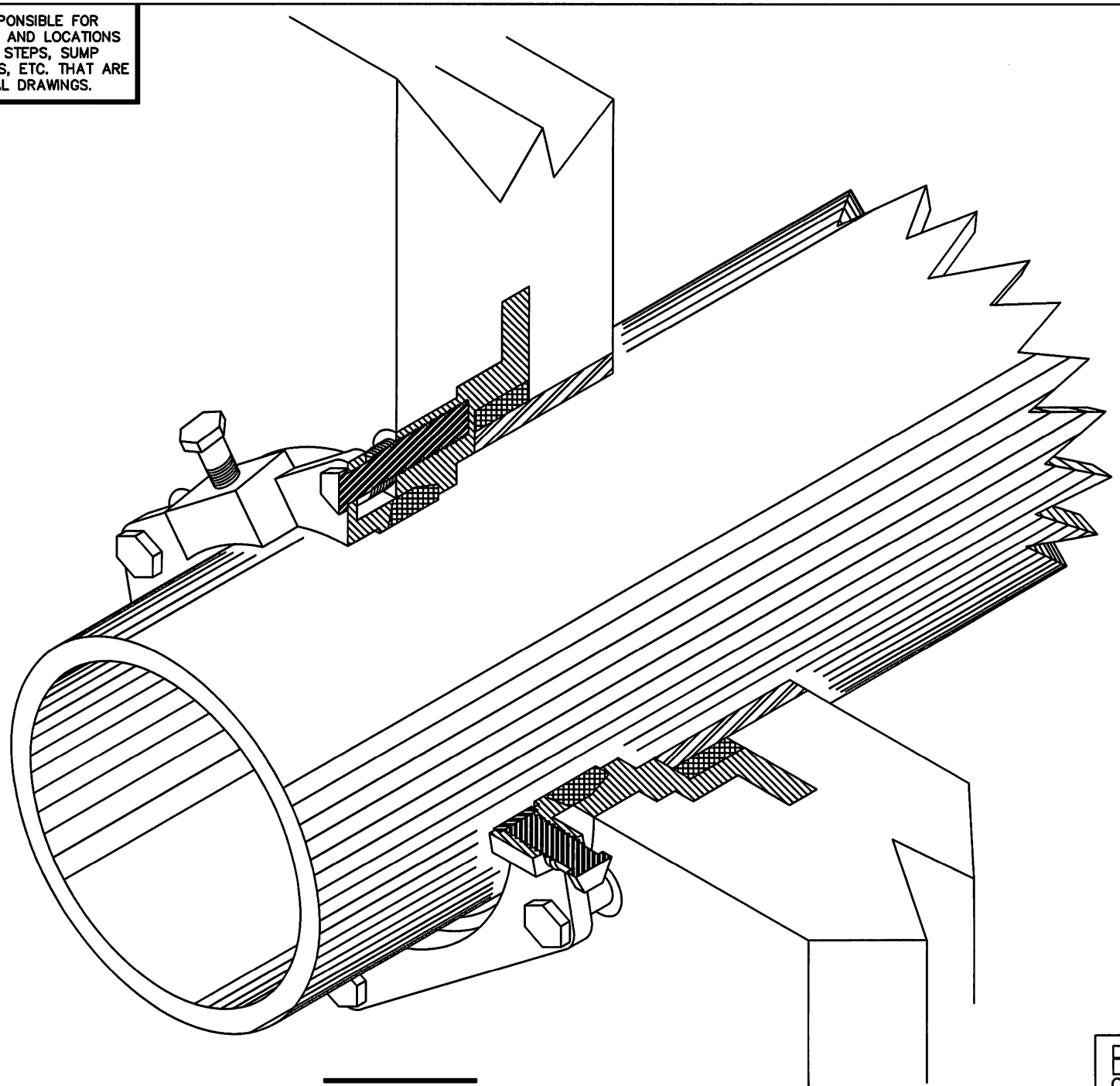
SUGGESTED SPECIFICATION:

- Wall and/or floor pipe penetrations shall be made by a means of a sleeve capable of being bolted directly to the formwork to prevent misalignment. Seal of the annular space between the carrier pipe and the sleeve shall be by means of a confined rubber gasket an capable of withstanding 350psi. Sleeve shall be manufactured from ASTM A536 Ductile Iron with an integrally cast waterstop of 1/2" minimum thickness and 2-1/2" minimum height. Wall sleeves shall be OMNI-SLEEVE™ as manufactured by SIGMA Corporation or prior approved equal.

INSTALLATION:

- In accordance with manufacturer's recommendation and applicable AWWA/ANSI standards.

CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SIZES AND LOCATIONS OF HOLES, SLEEVES, STEPS, SUMP RECESS, EMBEDMENTS, ETC. THAT ARE SHOWN ON SUBMITTAL DRAWINGS.



NPCA CERTIFIED PLANT

ITEM: OMNI SLEEVE

DESCRIPTION: OMNI SLEEVE DETAIL

SCALE: NONE

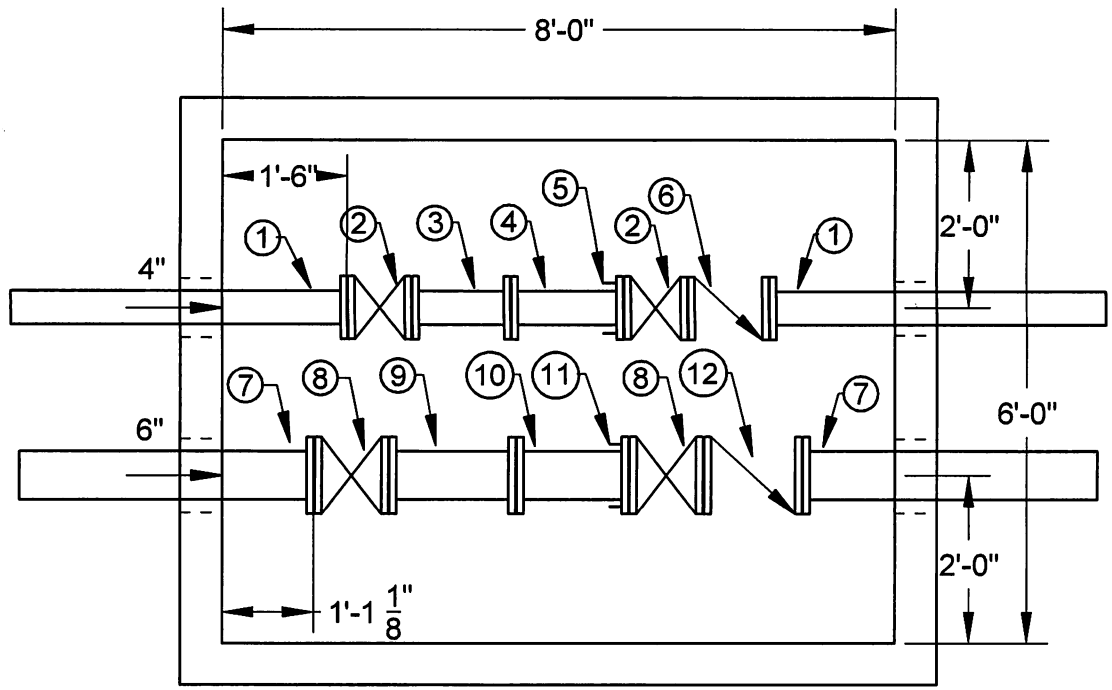
PURGE

E. H. Miller CONCRETE PRODUCTS

DATE:	DWN. BY:
7/22/05	JRH

LEGEND		
ITEM	QTY	NAME
1	2	4" DIP FLGxPE 4'-0"
2	2	4" OS&Y GATE VALVE
3	1	4" METER SPOOL, 1'-2" (**CONTRACTOR TO VERIFY LENGTH)
4	1	4" DIP FLGxPE 1'-3"
5	1	4" FLG COUPLING ADAPTER
6	1	4" LEVER & WEIGHT CHECK VALVE
7	2	6" DIP FLGxPE 3'-6"
8	2	6" OS&Y GATE VALVE
9	1	6" METER SPOOL, 1'-6" (**CONTRACTOR TO VERIFY LENGTH)
10	1	6" DIP FLGxPE 1'-3"
11	1	6" FLG COUPLING ADAPTER
12	1	6" LEVER & WEIGHT CHECK VALVE

6" S-89 PIPE STAND (3 REQ)
4" S-89 PIPE STAND (3 REQ)



PIPE LAYOUT

APPROVED FOR PRODUCTION BY:_____ DATE:_____

REV#	DESCRIPTION	DATE:	BY:

FAB-CRETE, INC.

SIZE & DESCRIPTION:	PIPE SCHEMATIC
CUSTOMER:	CENTRAL CLAY/YANNUZZI, INC.
JOB NAME:	ST. LUKE'S MANOR
WATER AUTHORITY:	HAZLETON
QTY:	
CU. YDS:	
WEIGHT:	1000 LBS
DRAWN BY:	D. EDDINGER
DRAWING DATE:	01/09/18
PART NUMBER:	
SALES ORDER NUMBER:	
SHEET:	004

Standards - Certificate of Compliance

Custom Fab's pipe and fittings are manufactured to the following standards;

The flanged pipe is manufactured with class 53 pipe in accordance with ANSI A21.15/AWWA C115 and drilled to meet ANSI B 16.1 Standard. Heavier classes are available.

The pipe is manufactured in accordance with all applicable requirements of ANSI A21.51 and AWWA C151 Standards.

The pipe groove depth dimensions is manufactured in accordance with all applicable requirements of ANSI/AWWA C606. Rigid groove is standard. Flex groove is available.

The pipe and fitting cement lining is manufactured in accordance with the requirements of ANSI A21.4/AWWA C104. Standard or double thickness as required.

The exterior of the underground pipe will be coated with asphalt tar in accordance with ANSI A21.51/AWWA C151.

I.D. / O.D Bituminous Coating is certified to be in compliance with NSF 61 for potable water. Conforms to ANSI A21.4/AWWA C104.

All flange fittings are manufactured in accordance with ANSI A21.10/AWWA C110 and are drilled to meet ANSI B16.1 Standard.

All flanged fittings and flanged pipe will be coated with a primer if required, compatible with the top coat specified in the contract documents conforms to ANSI A21.4/AWWA C104.

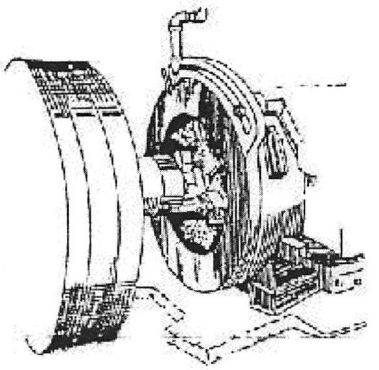
Christopher M. Comins

Christopher M. Comins
President & C.E.O.

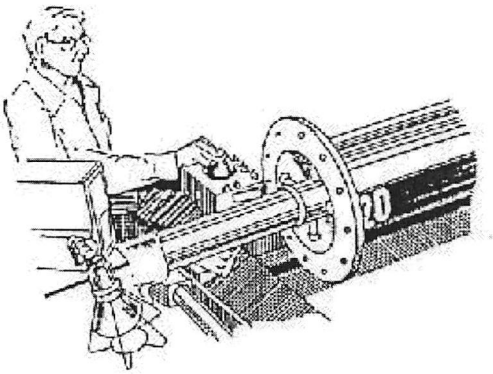
Flange Ductile Iron Pipe - Data

Ductile Iron Pipe is commonly fabricated for use as interior process piping in water and sewage treatment facilities and has been covered by ANSI Standards since 1926. Under direction of committee A/21 of AWWA, this standard is subject to periodic review and is updated to include fabricator practices reflecting current usage in the industry.

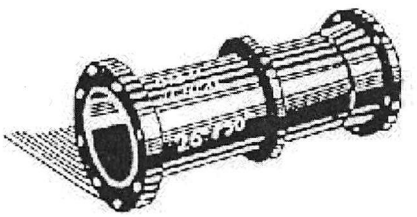
Flanged Ductile Iron Pipe is fabricated by means of threading the pipe and attaching threaded companion flanges in accordance with ANSI/ AWWA C115 / A21.15.



Taper pipe threads in accordance with ANSI B2.1 Table 15.1 and 15.2 of above Standard.

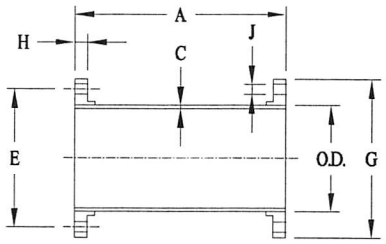


Machine tightened flanges and pipe ends shall be faced after fabrication.

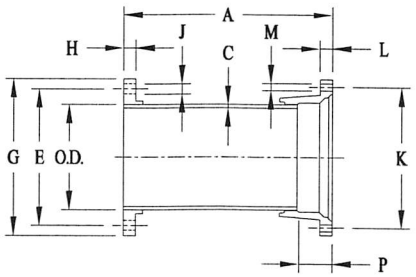


Length, weight and fabrication mark, (if other than flange manufacturer) must appear on each piece of fabricated pipe.

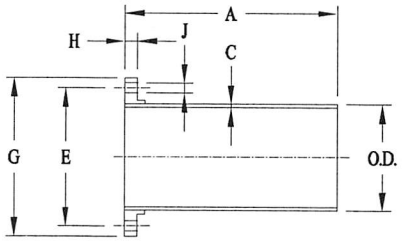
Fabricated Flanged Pipe



FLG X FLG



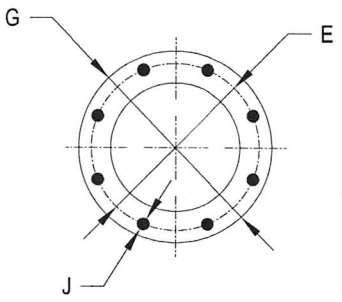
FLG X MJ



FLG X PE

SIZE	A	B	C	O.D.		E	G	H		NO. OF FLG'D BOLT HOLES	J	K		L	
				MIN.	MAX.			MIN.	MAX.			MIN.	MAX.	MIN.	MAX.
3	*	*	0.31	3.90	4.02	6.00	7.50	0.63	0.87	4	0.75	6.13	6.25	0.88	0.94
4	*	*	0.32	4.74	4.86	7.50	9.00	0.82	1.06	8	0.75	7.44	7.56	0.94	1.00
6	A	A	0.34	6.84	6.96	9.50	11.00	0.88	1.12	8	0.875	9.44	9.56	1.00	1.06
8	S	S	0.36	8.99	9.11	11.75	13.50	1.00	1.24	8	0.875	11.69	11.81	1.04	1.12
10	*	*	0.38	11.04	11.16	14.25	16.00	1.07	1.31	12	1.00	13.94	14.06	1.11	1.19
12	*	*	0.40	13.14	13.26	17.00	19.00	1.13	1.37	12	1.00	16.19	16.31	1.17	1.25
14	R	R	0.42	15.22	15.35	18.75	21.00	1.19	1.57	12	1.125	18.69	18.81	1.19	1.31
16	E	E	0.43	17.32	17.45	21.25	23.50	1.25	1.63	16	1.125	20.94	21.06	1.26	1.38
18	Q	Q	0.44	19.42	19.55	22.75	25.00	1.37	1.75	16	1.25	23.19	23.31	1.32	1.44
20	U	U	0.45	21.52	21.65	25.00	27.50	1.50	1.88	20	1.25	25.44	25.56	1.38	1.50
24	I	I	0.47	25.72	25.85	29.50	32.00	1.69	2.07	20	1.375	29.94	30.06	1.50	1.62
30	R	R	0.51	31.94	32.08	36.00	38.75	1.87	2.37	28	1.375	36.82	36.94	1.69	1.81
36	E	E	0.58	38.24	38.38	42.75	46.00	2.13	2.63	32	1.625	43.69	43.81	1.88	2.00
42	D	D	0.65	44.44	44.58	49.50	53.00	2.37	2.87	36	1.625	50.56	50.68	1.88	2.00
48	*	*	0.72	50.74	50.88	56.00	59.50	2.50	3.00	44	1.625	57.44	57.56	1.88	2.00
54	*	*	0.81	57.46	57.60	62.75	62.75	2.75	3.25	44	1.875	N/A	N/A	N/A	N/A

1. Tolerance on length of FLG x FLG pipe shall be ± 0.125"
2. Tolerance on length of FLG x PE shall be 0.25"
3. Above material shall meet all applicable sections of ANSI A21.10, A21.15, A21.51, B2.1, B16.1/AWWA, C110, C115, C150, C151 and all revisions thereto.
4 Flanged Pipe shall be ductile iron pipe with ductile iron flanges threaded on.
5. Linings, if required, shall be in accordance with ANSI A21.4
6. The mechanical joint bell for 30" & 36" sies of ductile iron pipe have thicknesses different from those shown in ANSI A21.11, which are based on gray iron pipe. These reduced thicknesses provide a lighter-weight bell which is compatible with the wall thickness of ductile iron pipe.
7. Submitted material only. Consult an engineer for application.
8. 250 lb. faced and drilled flanges available upon request.



Custom CF Fab

4"-16" R/W VALVE UL/FM
Performance Information

CLOW VALVE COMPANY

MODEL 2638

1. Valve complies with AWWA specs where applicable.
2. Valve complies with Underwriters Laboratory standard UL 262.
3. Valve is rated at 200 psi working pressure.
4. Valve is bubble-tight at all pressures up to full rated pressure (200 psi).
5. Valve is capable of bubble-tight seal at twice the rate pressure (400 psi) for short periods of time.
6. 2" thru 6" valve sizes have been hydrostatically shell tested at five (5) times the rated pressure (1000 psi).
7. 8", 10", 12", 14", and 16" valve sizes have been hydrostatically shell tested at four (4) times the rated pressure (800)psi).
8. Valve has been subjected to torques 150 percent of the designated minimum required torques.
9. Valve has been cycle tested 5,000 times without loss of bubble-tight seal.
10. Rubber to iron bond on wedge is inspected for strength as per ASTM D 429 specification.

For complete data on the tests
Underwriters Laboratories performed
reference UL File EX2697
Project 87NK7353

CLOW AWWA Resilient Wedge Gate Valves Meet or Exceed the Requirements of AWWA Standard C515

Size Range	Water Working Pressure psi	Bubble Tight Test psi	Hydrostatic Shell Test psi
AWWA 4"–48"	250	250	500
ULFM 4"–16"	200	200	400

Available in either non-rising stem, outside screw & yoke.

Available End Connections & Size Range		Figure No.
FLG End (NRS)	4"–48"	F-6102
M.J.	4"–48"(except 21/2")	F-6100
FLG & M.J.	4"–48"	F-6106
Push-on for PVC (SDR)	4"–12"	F-6110
FLG End (OS & Y)	4"–24"	F-6136
M.J. for Tapping	4"–24"	F-6114
Tyton for D.I. & C900 PVC	4"–12" & 16"	F-6112
M.J. Cutting-in	4"–12"	F-6111
Tyton for D.I. X FLG	4"–12"	F-6113

Accessories (Illustrated in the Gate Valve Section)

Indicator Posts
Enclosed Gearing (14"-24")
"T" Handles
Stem Guides
Electric Motor Actuators
2" Sq. Operating Nuts
Handwheels
Extension Stems
Floor Boxes
Chain Wheels

Floorstands (non-rising stem)

NOTE:
It is recommended that valves be installed with stems vertical when used in raw sewage or sludge applications or in water with excessive sediment.

MODEL 2638 AWWA C515 REDUCED WALL DUCTILE IRON

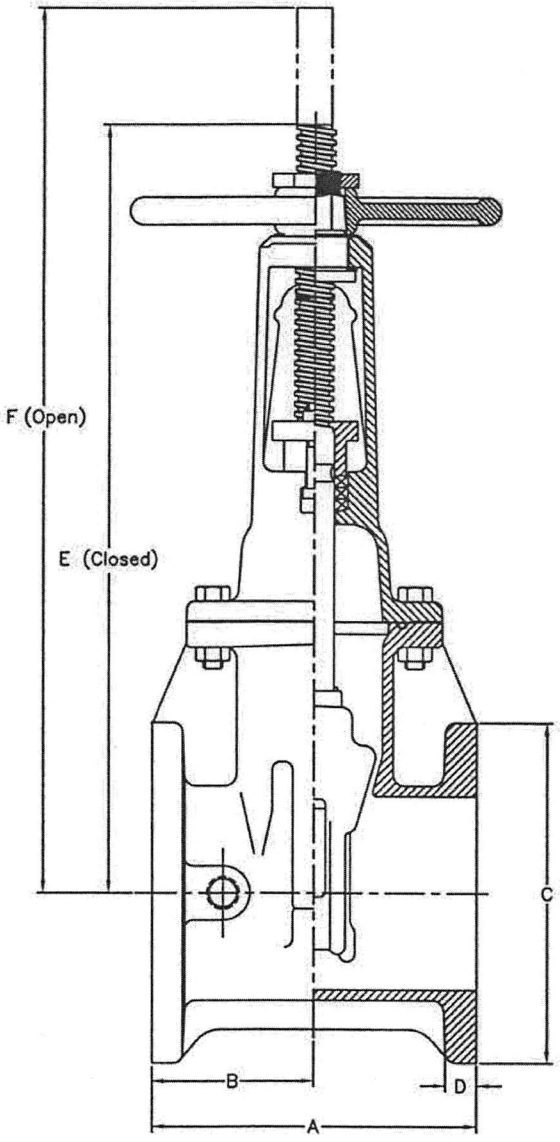
Complies with applicable requirements of AWWA C515

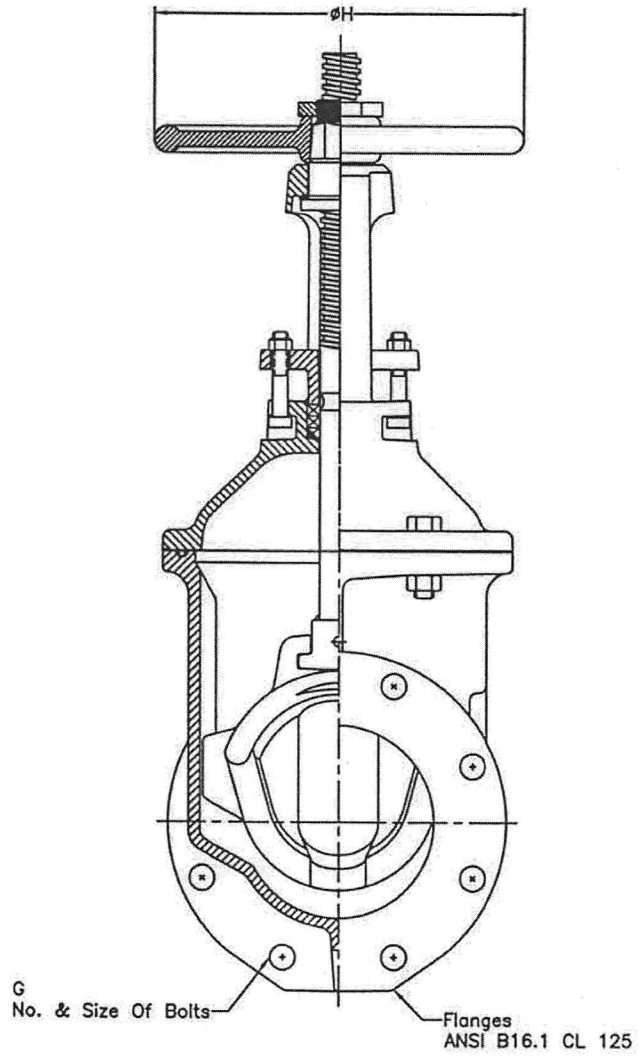
4"-12" R/W VALVE FLANGE ENDS OS&Y GENERAL DIMENSIONS

CLOW VALVE COMPANY

MODEL 2638

F-6136





VALVE SIZE	A	B	C	D	E	F	G	H
4	9	4 1/2	9	15/16	18 1/4	22 3/4	8-5/8	10
6	10 1/2	5 1/4	11	1	23 3/4	30 1/8	8-3/4	12
8	11 1/2	5 3/4	13 1/2	1 1/8	29 1/4	37 3/4	8-3/4	14
10	13	6 1/2	16	1 3/16	35 3/8	45 3/4	12-7/8	18
12	14	7	19	1 1/4	40 5/8	53 1/8	12-7/8	18

ROMAC INDUSTRIES, INC.

STYLE FCA501 FLANGED COUPLING ADAPTER

SUBMITTAL INFORMATION

AWWA C219	Romac 501 couplings meet the specifications set forth in the AWWA Standard C219 coupling spec.
MATERIALS	
Castings	The end ring and flanged body are cast from ductile (nodular) iron, meeting or exceeding ASTM A 536.
Flange	Compatible with ANSI Class 125 and 150 bolt circles.
Gaskets	Gaskets are made from virgin Styrene Butadiene Rubber (SBR) compounded for water and sewer service in accordance with ASTM D 2000 MBA 710. Other compounds available for petroleum, chemical, or high temperature service.
Bolts and Nuts	High strength low alloy steel trackhead and T-head bolt National coarse rolled thread and heavy hex nuts. Steel meets AWWA C111 composition specifications. The 10" size uses electro-galvanized mild steel flange bolts and nuts with a hex head, and ductile iron through bolts. The 12" size uses electro-galvanized mild steel flange bolts and nuts with a hex head, and mild steel through bolts (AWWA C111 composition specifications). All above nuts and bolts are corrosion resistant. Stainless steel bolts and nuts available on request.
Coatings	Shop coat applied to cast parts for corrosion protection in transit. Fusion bonded epoxy, liquid epoxy and other coatings available on request.
PRESSURE	When properly installed on a pipe that is within the correct outside diameter range, the FCA 501 couplings can be used at working pressures up to 260 psi.
ANCHOR PINS	Anchor pins to restrain fitting available as option.
SIZES AND RANGES	See Catalog.

Romac Document Number 20-8-0006 3/10

ROMAC INDUSTRIES, INC.

1-800-426-9341

MADE IN U.S.A.

Style "FCA501" Flanged Coupling Adapter

Material Specifications

Flanged Body: Ductile iron per ASTM A 536, Grade 65-45-12. Flange meets the dimensional requirements of ANSI Class 125 and 150 bolt circles. Yellow shopcoat. Other flange coatings available on request.

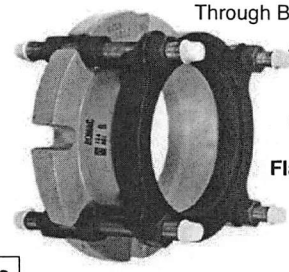
End Ring: Ductile iron per ASTM A 536, Grade 65-45-12. Color coded RED for O.D. and Std. Stl., BLACK for cast iron and YELLOW for A/C.

Gaskets: SBR per ASTM D 2000 MBA 710, compounded for water and sewer service. Flange O-ring gasket is NBR rubber. Other compounds available on request.

Bolts and Nuts: Trackhead bolts, heavy hex nuts, UNC high strength, low alloy, corrosion- resistant steel per AWWA C111. The 10" and 12" flange bolts and nuts are mild steel, electro-galvanized with a hex head. Other materials or special coatings available on request.

Anchor Pins: AISI 12L14 low carbon steel, minimum of 60,000 psi yield strength. The number of pins shown is rated for 200 psi. Stainless steel pins (316 only) are available on request. Stainless steel pins require double the quantity.

Options: For other options and specifications, see page 2-27.
For 14" and above, see FC400 on Page 3-5.



6" FCA501 without Flange Bolts

Meets AWWA C219

NOM. PIPE SIZE	COLOR CODE	GASKET RANGE	APPROXIMATE USE	CATALOG NUMBER	LIST PRICE		ADD ONS			APPROX. WEIGHT (LBS.)
					Complete	Complete w/Anchor Pins [3]	For Type 304 S.S. Bolts & Nuts	For Type 316 S.S. Bolts & Nuts	For Epoxy L & C	
3"	RED	3.00 - 3.29 3.30 - 3.51 3.50 - 4.00	Copper, OD Steel Std. Stl & PVC Std. Stl, CI/DI & PVC	FCA501 - 3.29 FCA501 - 3.51 FCA501 - 4.00	$169.59 ②	$230.00 Pins:1/2"	$15.24	$53.55	$26.85	16 #
4" x 3" Flange	RED	3.80 - 4.05 4.06 - 4.31 4.50 - 4.70 4.50 - 4.81	O.D. Stl. C.I. & O.D. Stl. Riv. Stl. Std. Stl. & PVC Std. Stl., D.I. & PVC	FCA501 - 4.05-3 FCA501 - 4.31-3 FCA501 - 4.70-3 FCA501 - 4.81-3	211.34	NA	48.15	127.20	33.57	19 #
	BLACK	4.80 - 5.00 4.74 - 5.10 5.11 - 5.30	Cast Iron & PVC C.I. & A/C M.E. A/C R.B.	FCA501 - 5.00-3 FCA501 - 5.10-3 FCA501 - 5.30-3						
4"	RED	3.80 - 4.05 4.06 - 4.31 4.50 - 4.70 4.50 - 4.81	O.D. Riv. Stl. Std. Stl. & PVC Std. Stl., D.I. & PVC	FCA501 - 4.05 FCA501 - 4.31 FCA501 - 4.70 FCA501 - 4.81	223.45	286.54 Pins:1/2" ③	39.32	141.49	33.57	18 #
	BLACK	4.80 - 5.00 4.74 - 5.10 5.11 - 5.30	Cast Iron & PVC C.I. & A/C M.E. A/C R.B.	FCA501 - 5.00 FCA501 - 5.10 FCA501 - 5.30						
	YELLOW	5.11 - 5.40	A/C R.B. CL. 200	FCA501 - 5.40						
6"	RED	5.80 - 6.10 6.05 - 6.30 6.55 - 6.76 6.60 - 6.91	O.D. Riv. Stl. Std. Stl. & PVC Std. Stl., D.I. & PVC	FCA501 - 6.10 FCA501 - 6.30 FCA501 - 6.76 FCA501 - 6.91	285.04	354.98 Pins:5/8" ③	70.88	244.65	45.45	28 #
	BLACK	6.90 - 7.10 6.86 - 7.20 7.15 - 7.35	Cast Iron & PVC C.I. & A/C M.E. A/C R.B.	FCA501 - 7.10 FCA501 - 7.20 FCA501 - 7.35						
	YELLOW	7.15 - 7.45	A/C R.B. CL. 200	FCA501 - 7.45						
8"	RED	7.80 - 8.10 8.10 - 8.30 8.30 - 8.55 8.55 - 8.75 8.60 - 9.06	O.D. Riv. Stl. C.I. Soil, PVC Sewer Std. Stl. & PVC Std. Stl., D.I. & PVC	FCA501 - 8.10 FCA501 - 8.30 FCA501 - 8.55 FCA501 - 8.75 FCA501 - 9.06	391.80	455.50 Pins:7/8" ③	70.88	244.65	54.99	34 #
	BLACK	9.05 - 9.30 8.99 - 9.40 9.31 - 9.50	Cast Iron & PVC C.I. & A/C M.E. A/C R.B.	FCA501 - 9.30 FCA501 - 9.40 FCA501 - 9.50						
	YELLOW	9.51 - 9.70	A/C R.B. CL. 200	FCA501 - 9.70						
10"	RED	9.80 - 10.10 A 10.20 - 10.55 A 10.70 - 11.00 A	O.D. C.I. Soil, PVC Sewer Std. Stl. & PVC	FCA501 - 10.10 FCA501 - 10.55 FCA501 - 11.00	709.36	793.30 Pins:7/8" Use 10A for Std. Stl. ③	211.37	506.60	119.92	58#
	BLACK	10.70 - 10.80 B① 10.89 - 11.40 B①	Std. Stl. & PVC Cast Iron & PVC	FCA501 - 10.80 FCA501 - 11.40						
	YELLOW	11.55 - 11.75 B① 11.76 - 12.12 B①	A/C M.E. A/C R.B.	FCA501 - 11.75 FCA501 - 12.12						
12"	RED	11.81 - 12.10 A 12.65 - 12.95 A	O.D. Stl. Std. Stl. & PVC	FCA501 - 12.10 FCA501 - 12.95	784.77	915.25 Pins:7/8" Use 12A for Std. Stl. ③	498.50	949.04	147.26	70 #
	BLACK	12.70 - 12.80 B 13.15 - 13.55 B	Std. Stl. & PVC Cast Iron & PVC	FCA501 - 12.80 FCA501 - 13.55						
	YELLOW	13.85 - 14.10 B 14.05 - 14.40 B	A/C M.E. A/C R.B.	FCA501 - 14.10 FCA501 - 14.40						
16"	RED	16.00	O.D. Stl.	FCA501 - 16.00	1,104.32 ②	NA	131.45	353.36	251.91	137 #
	BLACK	17.40	Ductile Iron & PVC	FCA501 - 17.40						

To Order: Add the letter "P" to end of catalog number for FCA501 with anchor pins and "X" for less flange bolts.

Example: FCA501- 5.00 P or FCA501- 5.00 X

***NOTE:** Harness Lugs used with Romac FCA501s require longer flange and through bolts than what are provided as standard with 3" - 12" FCA501s. 10" FCA501s require special considerations. Contact Romac Engineering for more information.

①CANNOT be used with mating flanges that have threaded bolt holes.

② Less flange bolts/nuts.

③ Submit pressure data when specifying pins. Pin quantity is dependant on pressure. Cannot be used on O.D. steel pipe or non-metallic pipe.

⚠ Flexible couplings do not provide protection against possible pullout of pipe ends in unrestrained conditions.

ROMAC INDUSTRIES, INC.
1-800-426-9341

MADE IN U.S.A.

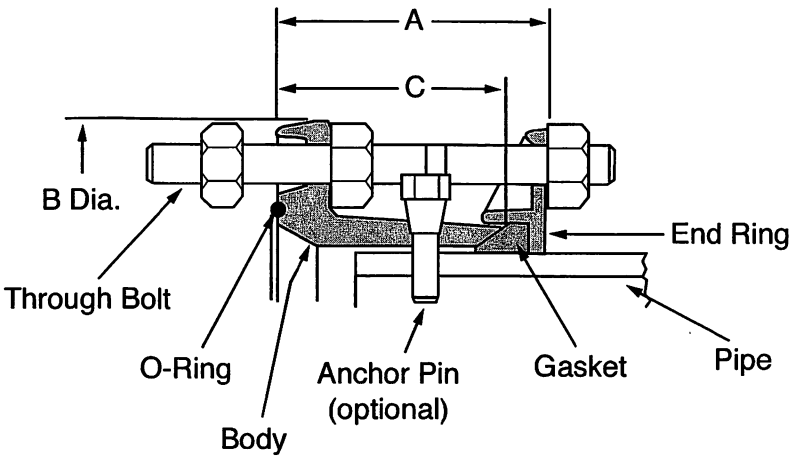
Style "FCA501" Parts List

NOM. PIPE SIZE	FLANGED BODY (with O-Ring)	END RING	COUPLING GASKET	O-RING GASKET	FLANGE BOLTS WTH NUTS				THROUGH BOLTS WITH NUTS			
					NUMBER: SIZE	PRICE EACH			NUMBER: SIZE	PRICE EACH		
						STD.	304 S.S.	316 S.S.		STD.	304 S.S.	316 S.S.
3"	$81.48	$10.34 [1]	$4.57 [1]	$7.49	N/A	N/A	N/A	N/A	4: 5/8" x 7 1/2"	$18.30	$24.43	$32.88
4" x 3"	161.91	14.55 [1]	6.00	7.49	4: 5/8" x3" [2]	3.61	11.25	13.94	4: 5/8" x 3" [2]	3.61	11.25	13.94
4"	115.26	14.55 [1]	6.00 [1]	8.09	4: 5/8" x 3" [2]	3.61	11.25	13.94	4: 5/8" x 7 1/2"	18.30	24.43	32.88
6"	117.50	30.80	8.54 [1]	8.58	4: 3/4" x 3 1/2" [2]	4.74	18.25	18.26	4: 3/4" x 8"	27.31	35.31	47.51
8"	213.03	37.81	12.76 [1]	9.69	4: 3/4" x 3 1/2" [2]	4.74	18.25	18.26	4: 3/4" x 8"	27.31	35.31	47.51
10" A	409.19	48.86	26.49	10.85	6: 7/8" x 4"	8.52	39.69	50.08	6: 5/8" x 7/8 x 9 1/2"	28.95	39.11	61.08
10" B	409.19	48.86	26.49 [1]	10.85	6: 7/8" x 4"	8.52	39.69	50.08	6: 5/8" x 7/8 x 9 1/2"	28.95	39.11	61.08
12" A	437.19	57.63	33.87 [1]	12.18	6: 7/8" x 4"	8.52	39.69	50.08	6: 7/8" x 9"	34.16	97.64	114.73
12" B	437.19	57.63	33.87 [1]	12.18	6: 7/8" x 4"	8.52	39.69	50.08	6: 7/8" x 9"	34.16	97.64	114.73
16"	746.70	166.61	83.13	14.15	N/A	N/A	N/A	N/A	12: 5/8" x 10 1/2" [3]	8.99	20.17	39.89

[1] Parts are interchangeable with 501 couplings.
[2] T-head bolts.
[3] Trackhead bolt for end ring only

Refer to page 2-3 for information on 10" and 12" center rings.
Stainless steel anchor pins available upon request.

NOM. PIPE SIZE	DIMENSIONS		
	A	B Dia.	C
3"	4 1/2"	7 1/2"	3 3/8"
4" x 3"	4 5/8"	9"	4 1/4"
4"	4"	9"	3 1/2"
6"	4 1/8"	11"	3 5/8"
8"	4 1/4"	13 1/2"	3 1/2"
10" A	5 1/2"	16"	4 1/2"
10" B	5 1/2"	16"	4 1/2"
12" A	5 1/4"	19"	4 1/2"
12" B	5 1/2"	19"	4 1/2"
16"	8"	23 1/2"	7"



WARNING: Flexible couplings do not provide protection against possible pullout of pipe ends in unrestrained conditions.

Stainless steel anchor pins available.
Contact factory for price and number required.

CLOW HORIZONTAL SWING CHECK VALVES

CLOW VALVE COMPANY

CLOW AWWA Horizontal Swing Check Valves Meet or Exceed the Requirements of AWWA Standard C508

Size Range	Water working Pressure psi	Hydrostatic Test psi
2"–12"	200	400
14"–30"	150	300

Available End Connections & Size Range		Figure No.
Flanged	2"–24" (Plain)	Style 106
Flanged	14"–30" (Plain)	Style 59-02
Flanged	2"–12" Outside Weight & Lever	Style 106LW
Flanged	14"–30" Outside Weight & Lever	Style 159-02
Flanged	2"–12" Outside Spring & Lever	Style 106SL
Flanged	14"–30" Outside Spring & Lever	Style 259-02
Flanged	4"–12" Cushion Check	Style 206
Flanged	14"–30" Cushion Check	Style 206

Resilient Hinge Check Valve

Flanged	4"–12" Resilient Hinged Check 250 psi Working Pressure 500 psi Hydrostatic Test	Style506

Accessories

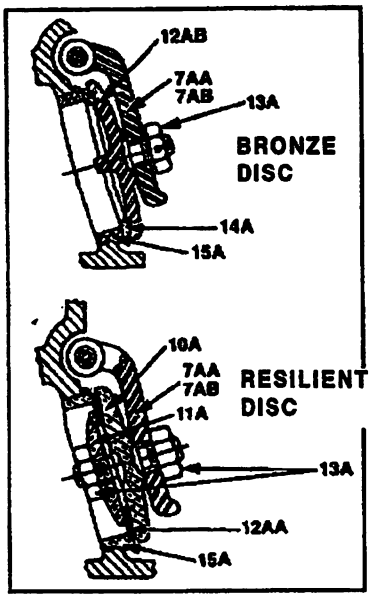
Outside Weight & Lever
Outside Spring & Lever
Tapped Bosses (Drain-Bypass)
Limit Switchest
Rubber Faced Gates

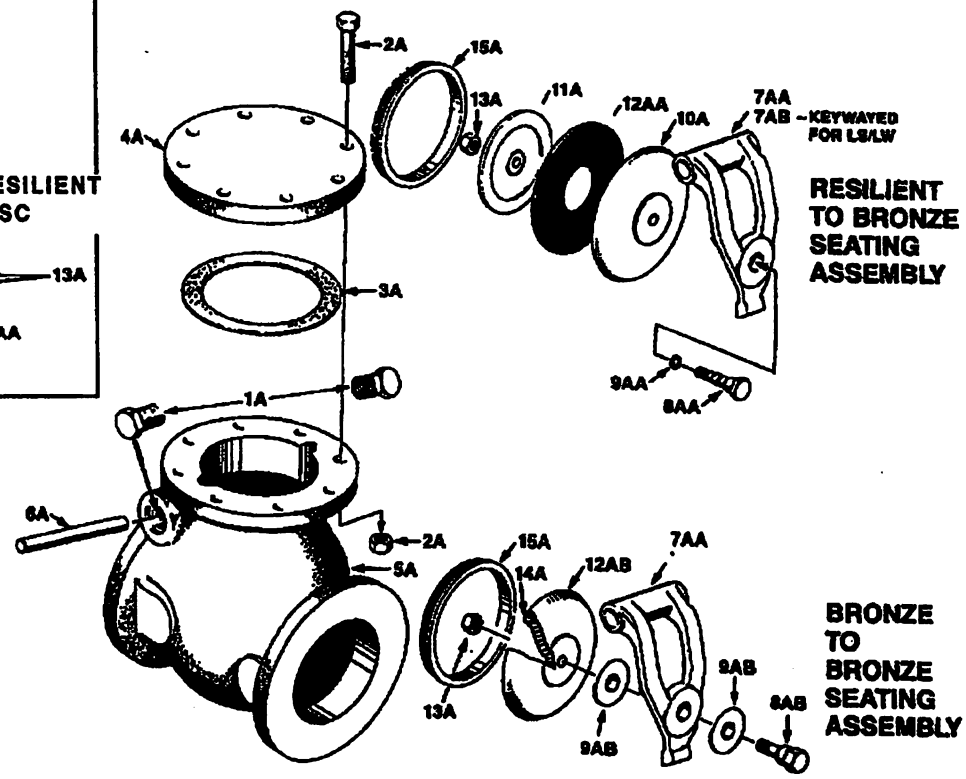
HORIZONTAL SWING CHECK VALVES
2"–12" PLAIN TYPE PARTS LIST

CLOW VALVE COMPANY

Style 106

DISC ARRANGEMENT 2" - 3"



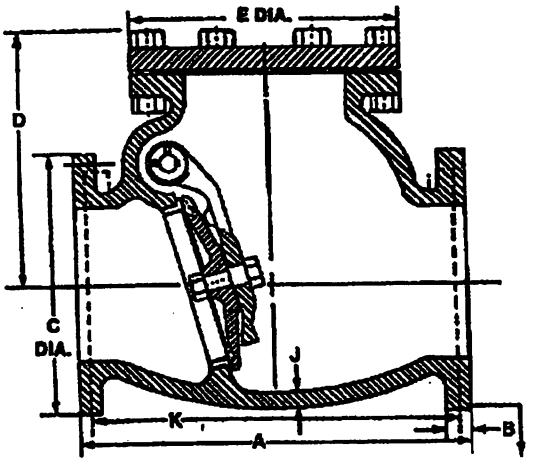


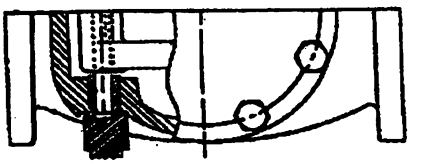
DET.	QTY.	DESCRIPTION	MATERIAL
1A	2	SIDE PLUG	BRONZE
2A		CAP BOLT & NUTS	RUST PROOF STEEL
3A	1	CAP GASKET	
4A	1	CAP	CAST IRON
5A	1	BODY	CAST IRON
6A	1	HINGE PIN	STAINLESS STEEL
7AA	1	HINGE	BRONZE (2"–3") DUCTILE IRON (4"–12")
8AA	1	DISC BOLT (4" – 12")	BRONZE (2"–3") BRONZE (4"–12")
8AB	1	DISC BOLT (4" – 12")	BRONZE (2"–3") BRONZE (4"–12")
9AA	1	DISC BOLT O-RING (10"–12")	SYNTHETIC RUBBER
9AB	2	DISC BOLT WASHER (4"–8")	
10A	1	DISC HOLDER	BRONZE (2"–3" CAST IRON (4"–12")
11A	1	DISC PLATE	BRONZE
12AA	1	DISC	SYNTHETIC RUBBER
12AB	1	DISC	BRONZE (2"–3" CAST IRON (4"–12")
13A	2	DISC NUT	RUST PROOFED STEEL
13A	2	DISC NUT (2"–3")	BRONZE
14A	1	DISC RING (4"–12")	BRONZE
15A	1	SEAT RING	BRONZE

HORIZONTAL SWING CHECK VALVES 2"–12" PLAIN – GENERAL DIMENSIONS

CLOW VALVE COMPANY

Style 106





L—BOLT CIRCLE DIA. END FLANGES
M—NO. OF BOLTS PER FLAT END FLANGES
N—BOLT HOLE DIA.
END FLANGES CONFORM TO ANSI B16.1

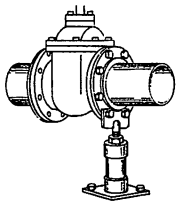
DIMENSIONS - INCHES

VALVE SIZE		2	2½	3	4	6	8	10	12
A	Face to face of flanges	8.00	8.50	9.50	11.50	14.00	19.50	24.50	27.50
B	Thickness of end flange	.65	.72	.78	1.00	1.06	1.25	1.31	1.37
C	Diameter of end flange	6.00	7.00	7.50	9.00	11.00	13.50	16.00	19.00
D	Centerline of port to top of cover	6.00	6.62	7.06	8.31	10.06	12.38	13.93	16.18
E	Diameter of cap	6.00	7.00	7.50	9.00	11.00	13.50	16.75	19.00
F	Length of spring arm	5.00	5.25	6.00	7.75	9.75	14.13	18.00	18.00
G	Centerline of port to spring & lever arm	4.72	4.94	5.34	8.19	9.00	10.18	11.62	13.75
H	Hinge pin diameter	.50	.50	.50	.62	.75	.87	1.00	1.00
J	Wall thickness	.34	.41	.44	.50	.62	.75	.81	.87
L	Bolt circle diameter	4.75	5.50	6.00	7.50	9.50	11.75	14.25	17.00
M	Number of bolts per flange	4	4	4	8	8	8	12	12
N	Bolt hole diameter	.75	.75	.75	.75	.87	.87	1.00	1.00
Q	No. of bolts in cap flange	4	4	4	8	8	8	12	12

CLOW SWING CHECK VALVES
FEATURES AND BENEFITS

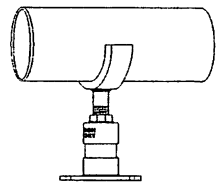
CLOW VALVE COMPANY

- Full/clear port opening in all diameters.
- All working parts can be removed through the top.
- Heavy, solid, bronze (2" - 3" and 14" - 30") and Ductile Iron (4" - 12") hinge gives maximum gate support.
- Cast iron integral stops in body prevent gate sticking in open position.
- Seating surfaces are bronze to bronze 2" - 12" and rubber to bronze on 14" - 30" size.
- Easily converted from plain to outside lever and weight or outside lever and spring.
- Outside lever and weight or outside lever and spring can be mounted on either side of assembly.
- Stainless steel hinge pin operates in bronze support bearings.
- Bosses may be tapped for draining or used for by-pass.



Material Resources, Inc.

STANDON ADJUSTABLE PIPE SUPPORTS



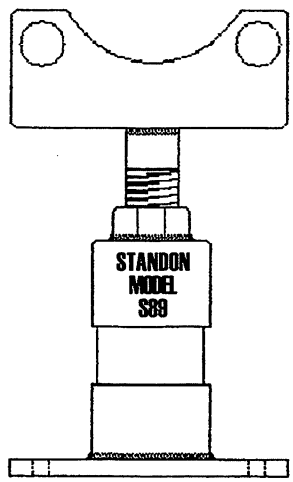
Standon Model S89 Flange Support

US PATENT #5110073

ALL MODELS TESTED TO OVER 10,000 POUNDS - COMPRESSIVE STRENGTH

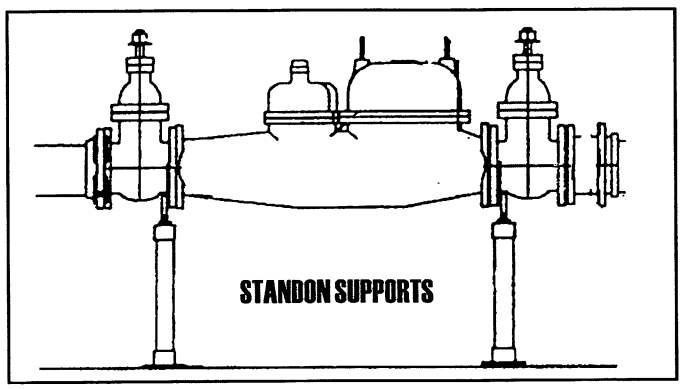
A positively attached support designed to meet all or your flanged piping needs. . .

- Bolts directly to the flange
- Accepts standard IPS pipe - No threading required
- Comes complete with anchorable base plate
- Laser cut steel for guaranteed fit every time
- Available in sizes 2" through 48" - Class 125 flanges
- Galvanized finish for extra protection

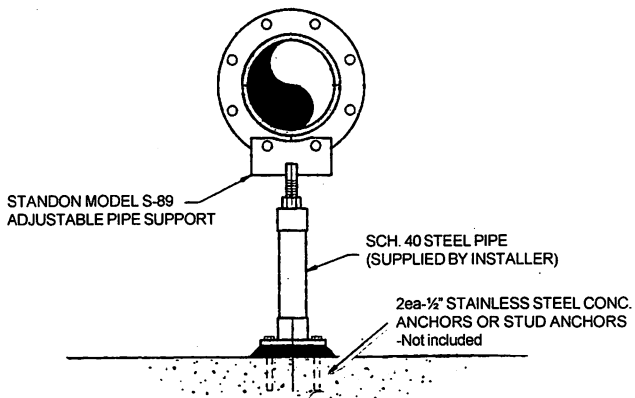


The Standon model S89 comes packaged in an easily inventoried box. All mounting instructions are included.

Excellent for Backflow and Meter Installations!



The Standon Support is ideal for use on backflow devices and large water meters. It is perfect for retrofitting existing installations, replacing ill fitting concrete blocks etc.



CONCREATE FLOOR INSTALLATION

For product availability and ordering information on these and other products offered by Material Resources Inc. please call:

(503) 533-5256 or FAX (503) 533-5501

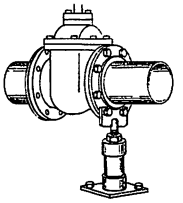
or visit our website at

www.standon.net

MATERIAL RESOURCES, INC.

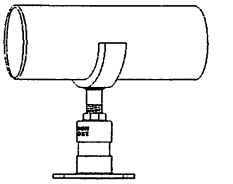
PO Box 247

Forest Grove, Oregon 97116



Material Resources, Inc.

STANDON ADJUSTABLE PIPE SUPPORTS



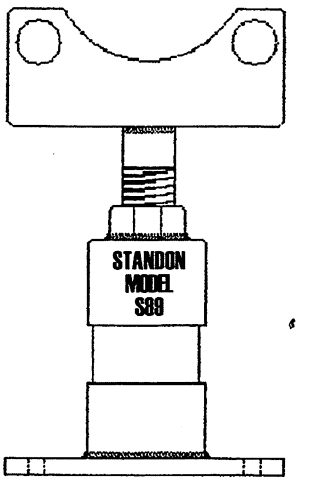
Standon Model S89 flange Support Product Specifacation Sheet

ALL MODELS TESTED TO OVER 10,000 POUNDS - COMPRESSIVE STRENGTH

MATERIAL -

Flange plate:	ASTM A36
Collar / base cups:	ASTM A53 D.O.M. tubing
Thread stud:	ASTM A36, rolled thread, grade ASTM A307
Base plate:	ASTM A36 sheet steel

Optional Material - 100% 304L or 316L Stainless steel



FABRICATION -

All welds:	100% MIG welding, electrode E70XX
Plates:	Laser cut, programmed dimensions, radiused corners

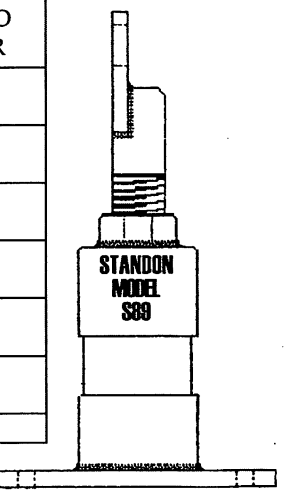
FINISH -

All supports have corrosion resistant, electro-galvanized finish.
Hot dip galvanizing available - specify at time of order.

DIMENSIONS - (note: call manufacturer for 30" through 48" support information)

FLANGE SIZE	HOLE RADIUS	FLG PLATE	THRD STUD	BASE PLATE	EXTENSION PIPE REQ.	MINIMUM DIST. TO FLOOR
2"	2.375"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
2.5"	2.75"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
3"	3.00"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
4"	3.75"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
6"	4.75"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
8"	5.87"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
10"	7.125"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
12"	8.50"	.250"	1" x 6"	4" x 6" x .25"	2" Sch. 40	7"
14"	9.375"	.375"	1.5" x 6"	8" x 8" x .5"	3" Sch. 40	9.5"
16"	9.625"	.375"	1.5" x 6"	8" x 8" x .5"	3" Sch. 40	9.5"
18"	11.375"	.375"	2" x 6"	8" x 8" x .5"	4" Sch. 40	10"
20"	12.50"	.375"	2" x 6"	8" x 8" x .5"	4" Sch. 40	10"
24"	14.75"	.375"	2" x 6"	8" x 8" x .5"	4" Sch. 40	10"

NOTE: 250 Drilling pattern supports available



INSTALLATION -

To insure proper Support performance and stability; After final height adjustment is attained, apply tack welds to both support cups and extension pipe. Use E70XX electrode for welds. The base plate should be anchored to the floor with removable anchor bolts. If re-adjustment is required at a later date, remove anchor bolts and rotate entire lower unit using collar nut. Re-anchor base plate.

For product availability and ordering information on these and other products offered by Material Resources Inc, please call:

(503) 533-5256 or (877) 693-0727

FAX (503) 533-5501

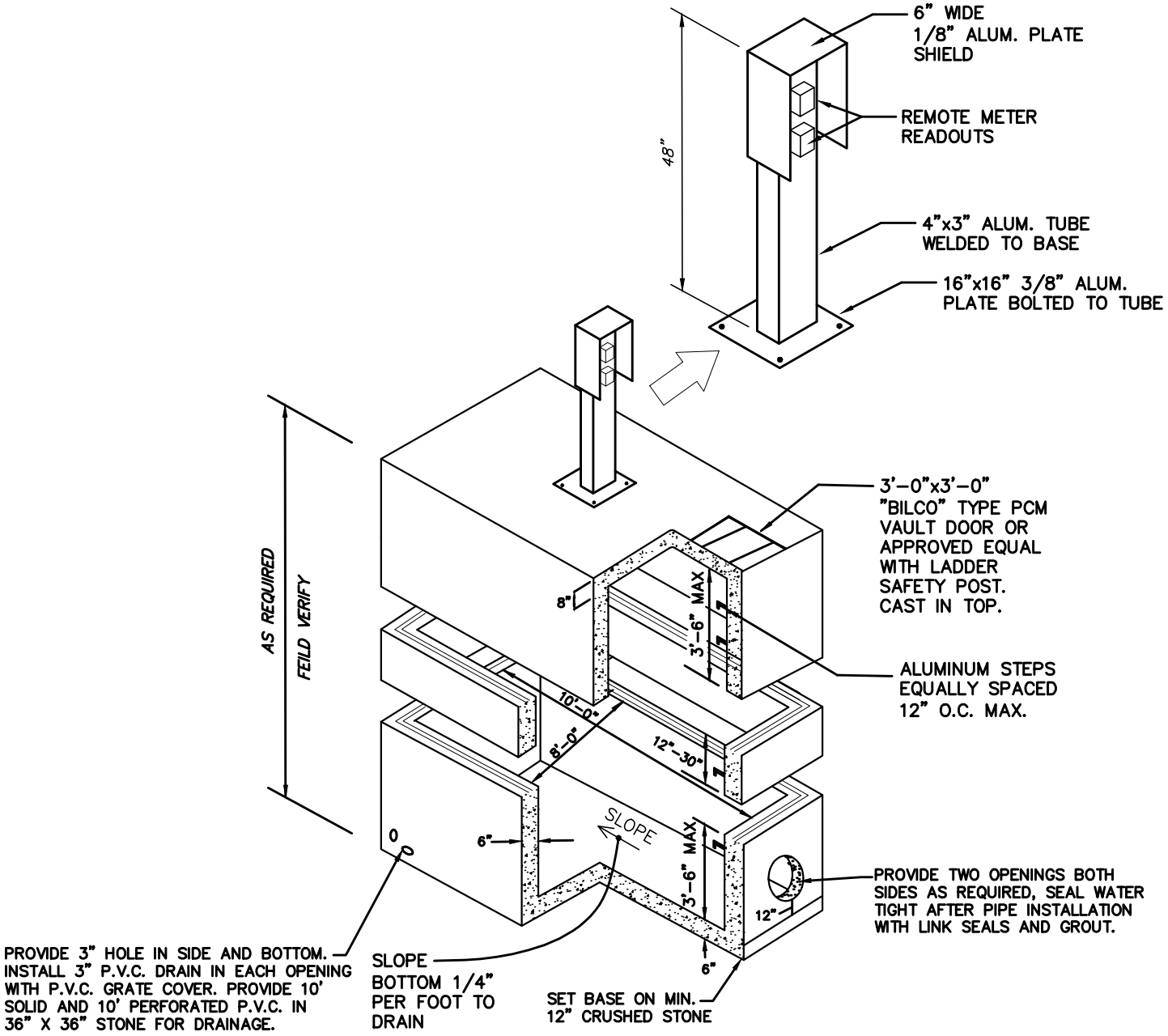
www.standon.net

MATERIAL RESOURCES, INC.

2800 Taylor Way Bldg. 2 C

PO Box 247

Forest Grove, Oregon 97116



TYPICAL PRECAST VAULT- DETAIL

N.T.S.

NOTES:

1. SIZES 8'-0"W x 10'-0"L x H (VARIES)
   SECTION HEIGHTS VARY IN 6" INCREMENTS
2. WEIGHT
   3'-6" TOP OR BOTTOM SECT. 9300 EA.
   RISER = 1650/ VF
3. 8" TOP SLAB THICKNESS SHALL BE USED
   WHEN VAULT IS SUBJECT TO VEHICULAR TRAFFIC
4. MIN. DEAD, LIVE, IMPACT, AND LATERAL LOADS,
   SHALL BE DETERMINED BY "STD SPEC. FOR
   HIGHWAY AND BRIDGES" ADOPTED BY AASHTO.
5. INSTALLATION SHALL BE SUBMITTED TO AND
   APPROVED BY THE THE WATER DEPARTMENT.

VALVE BOX ADAPTOR II

ADAPTOR

OUR VALVE BOX ADAPTOR II PROTECTS THE EPOXY COATING OF THE VALVE. MANUFACTURED FROM RECYCLED "GREEN" RUBBER COMPOUND AND CUSTOM-MOLDED FOR A PRECISE FIT, THE VBA-II WORKS WITH ALL TYPES AND SIZES OF GATE VALVES 2" TO 16" AND CAN BE USED WITH 5 ¼" CAST IRON VALVE BOXES AND 8" C-900 PVC PIPE OR THE EQUIVALENT.

Advantages

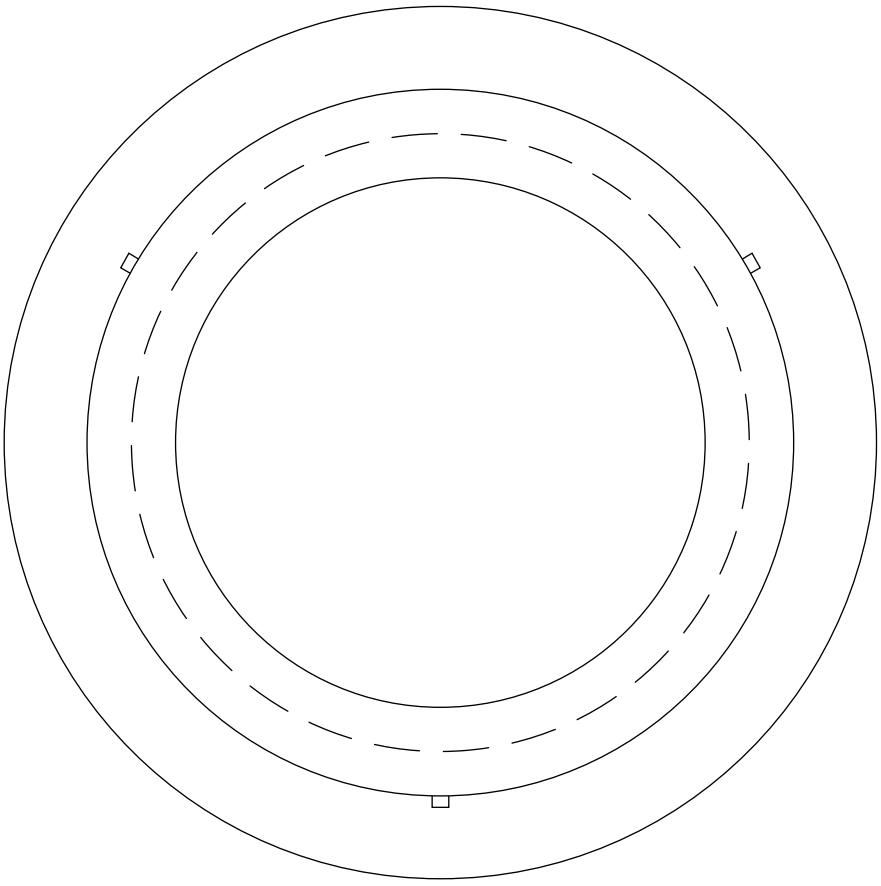
- Eliminates settling and shifting of the valve box over the gate valve
- Allows proper keying of the valve
- Protects epoxy coating on valves
- Centers valve box over operating nut
- Helps prevent back fill from pushing up into the valve box

CALL OR VISIT OUR WEBSITE TO LEARN MORE

2151 South 54th Street, West Allis, WI 53219

office 414.764.6733 • fax 414.764.1494 • adaptorinc.com • American Made

VALVE BOX ADAPTOR II



Installation Guidelines

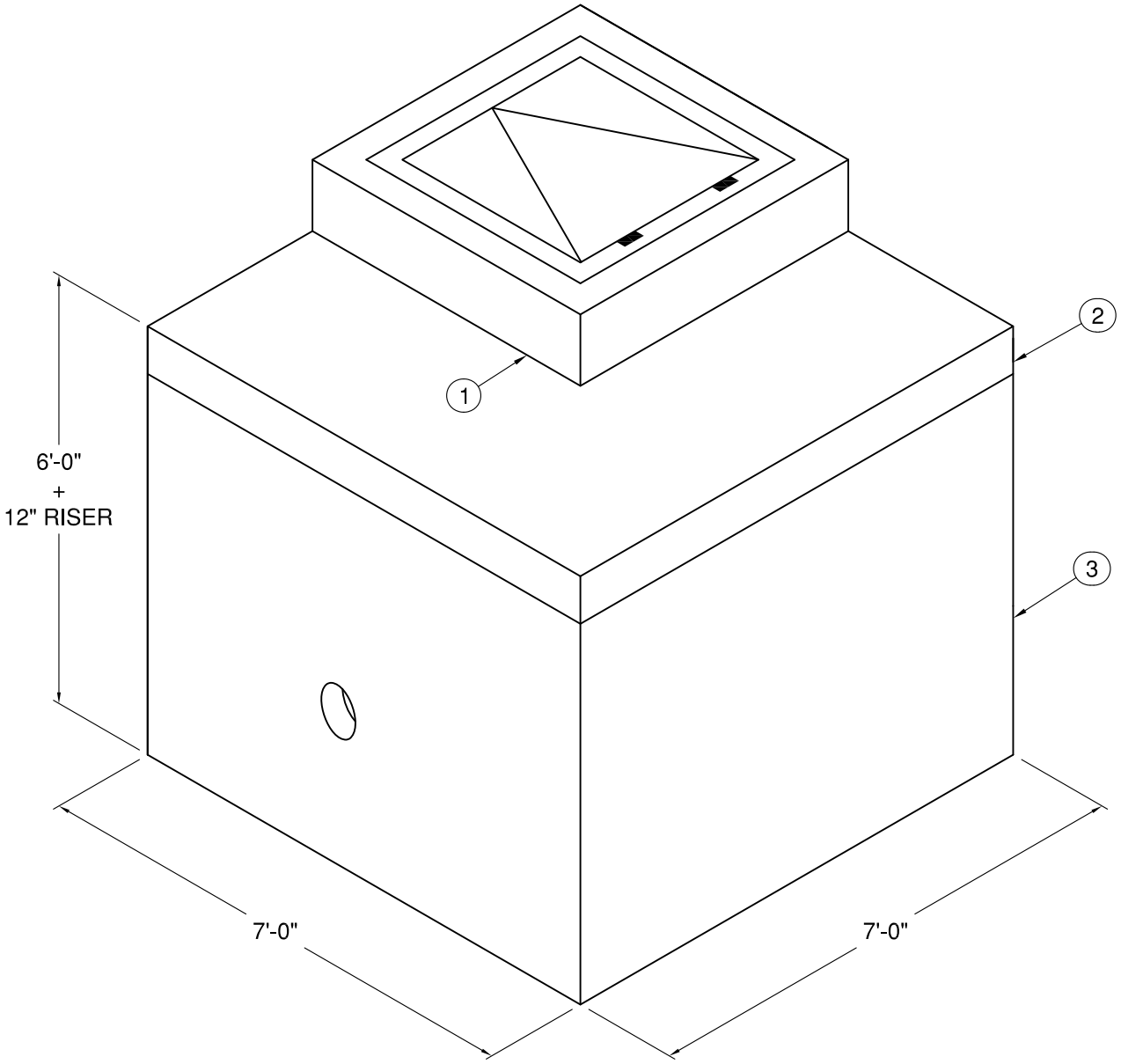
All valve boxes shall be installed upon the valve with the use of a Valve Box Adaptor II as manufactured by Adaptor Inc. or an approved equal. The Valve Box Adaptor II shall be installed in lieu of hardwood blocking and shall be incidental to the valve and box installation.

For proper sizing, please visit our website.

2151 South 54th Street, West Allis, WI 53219 • office 414.764.6733 • fax 414.764.1494 • adaptorinc.com • American Made

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	07/23/2021	JSC
B	REV PER CO	09/13/2021	JSC

Parts List	
ITEM	NAME
1	210402 - RISER
2	210400 - SLAB
3	210401 - BASE



A.C. Miller CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION:

6'-0" X 6'-0" ISO

CUSTOMER: HAZELTON WATER AUTHORITY

JOB NAME: 400 E ARTHUR GARDNER PKW

THICKNESS:	ROOF:	WALLS:	FLOOR:
	6"	6"	6"

QTY:	CU. YDS	WEIGHT:
1	-	18,281 LBS

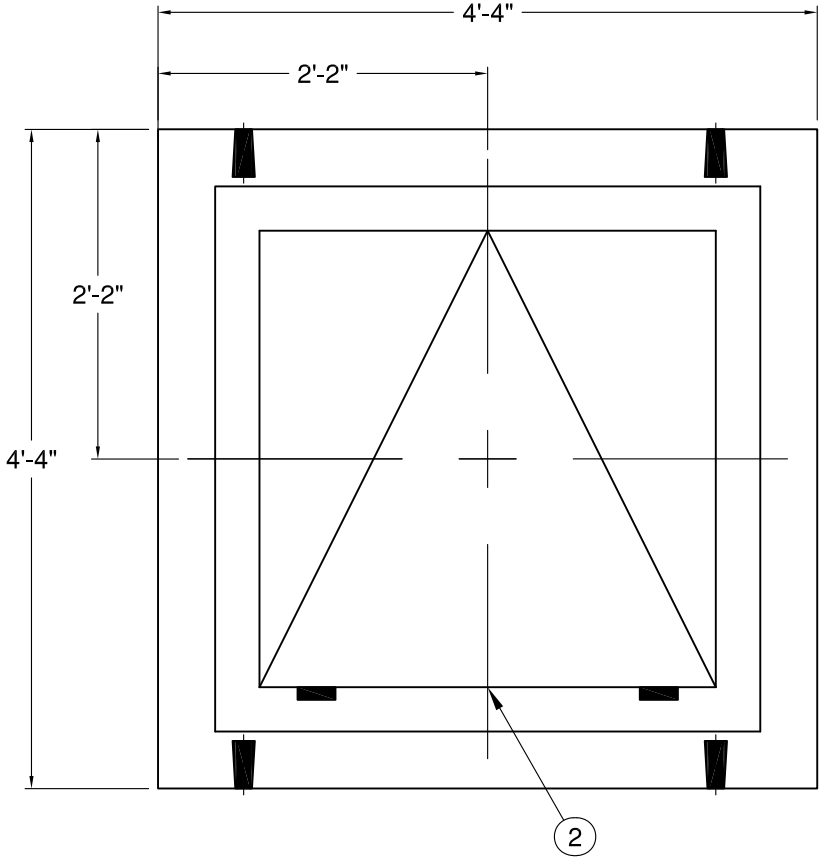
DRAWN BY:	DRAWING DATE:
AI	07/22/2021

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
210309-1	54117	000

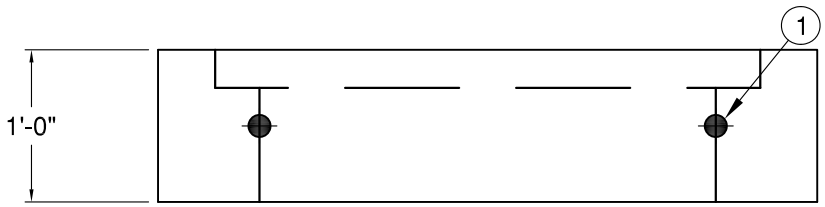
APPROVED FOR PRODUCTION BY: _____ DATE: _____

JEFFREY S. CAVANAUGH 9/13/21 21 - 210309-1 - 6X8 ISO

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	07/22/2021	JSC



TOP VIEW



FRONT VIEW

Parts List	
ITEM	NAME
1	(4) 3/4"Ø THREADED PENNSYLVANIA INSERT(100029)
2	36" X 36" - 300 PSF - SL - ALUM SNAP DRCI (103722)*
	WATERPROOFING EXTERIOR CS-55 (VERTICAL EDGES ONLY)

A.C. miller CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44*	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN: -	

SIZE & DESCRIPTION:
4'-4" X 4'-4" X 12" SLAB

CUSTOMER:
HAZELTON WATER AUTHORITY

JOB NAME:
400 E ARTHUR GARDNER PKWY

THICKNESS:	ROOF:	WALLS:	FLOOR:
	-	-	-

QTY:	CU. YDS	WEIGHT:
1	0.36	1,567 LBS

DRAWN BY:	DRAWING DATE:
AI	07/22/2021

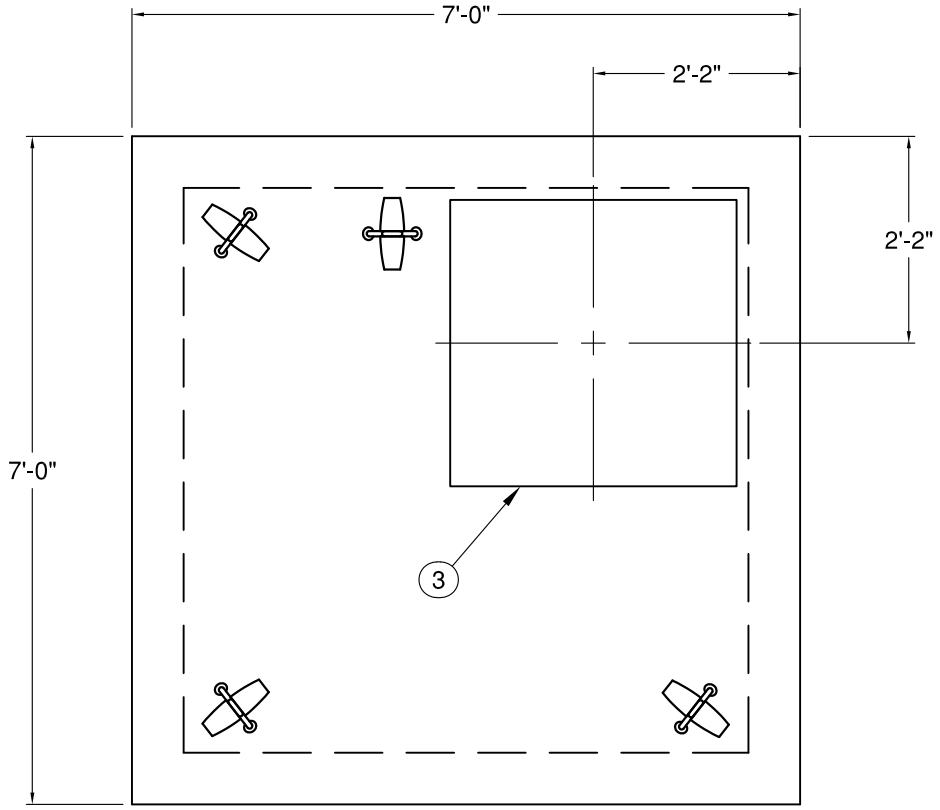
PART NUMBER:	SALES ORDER NUMBER:	SHEET:
210402	54117	001

APPROVED FOR PRODUCTION BY: _____ DATE: _____

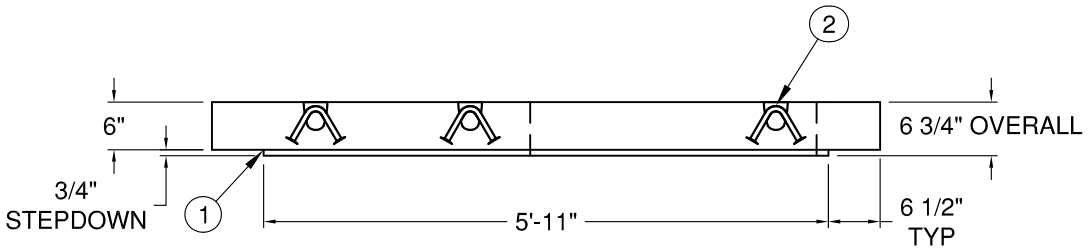
JEFFREY S. CAVANAUGH 7/23/21 21 - 210402 - 4-4X4-4X12 SLAB 36X36 SD SL

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	07/23/2021	JSC
B	REV PER CO	09/13/2021	JSC

Parts List	
ITEM	NAME
1	STEPDOWN (TYP.) APPLY JOINT SEALANT BEFORE INSTALLING TO PIECE BELOW
2	(4) UTILITY LIFT ANCHOR .671 X 4.75 (162483)
3	36" X 36" ACCESS OPENING
	WATERPROOFING EXTERIOR CS-55 (171589)



TOP VIEW



FRONT VIEW

A.C. Miller CONCRETE PRODUCTS, INC. www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION:

7'-0" X 7'-0" X 6" SLAB

CUSTOMER: HAZELTON WATER AUTHORITY

JOB NAME: 400 E ARTHUR GARDNER PKWY

THICKNESS:	ROOF:	WALLS:	FLOOR:
	-	-	-

QTY:	CU. YDS	WEIGHT:
1	1.09	4,664 LBS

DRAWN BY:	DRAWING DATE:
AI	07/22/2021

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
210400	54117	002

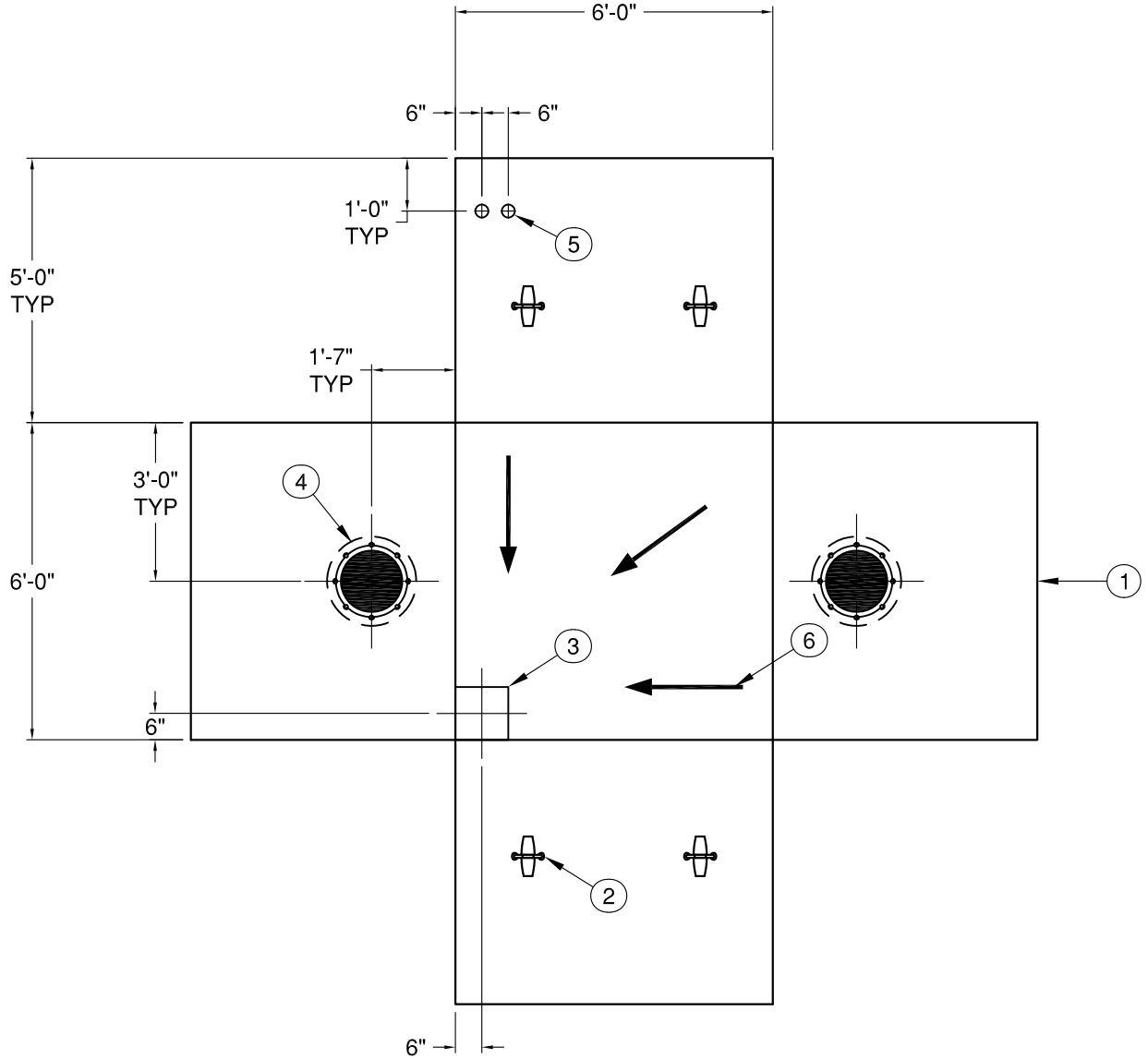
APPROVED FOR PRODUCTION BY: _____ DATE: _____

JEFFREY S. CAVANAUGH 9/13/21 21 - 210400 - 7X9X6 SLAB 36 X 36 ACC

REV	DESCRIPTION	DATE:	BY:
A	FOR APPROVAL	07/23/2021	JSC
B	REV PER CO	09/13/2021	JSC

*** WALLS FOLD UP ***

* ALL DIMENSIONS ARE INSIDE DIMENSIONS *



FOLD-OUT VIEW

Parts List	
ITEM	NAME
1	FLAT SURFACE FOR CONNECTION TO SLAB. (TYP.) APPLY JOINT SEALANT BEFORE INSTALLING SLAB
2	(4) UTILITY LIFT ANCHOR .671 X 4.75 (162483)
3	12" X 12" X 4" DEEP SUMP
4	(2) OSL1412 OMNI SLEEVE FOR 12"Ø PIPE IN 6" WALL (113682)
5	(2) 3"Ø HOLE
6	SLOPED FLOOR TOWARDS SUMP
	WATERPROOFING EXTERIOR CS-55

CUSTOMER TO DIMENSIONS

A.C. MILLER CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

LIVE LOAD: HS20-44	GOVERNING BODY:
EARTH COVER: 0' TO 2'-0"	CONCRETE STRENGTH: 5000 PSI @ 28 DAYS
WATER TABLE: ASSUME @ 3' BELOW GRADE	CONCRETE TYPE: TYPE I SCC CEMENT
LIVE LOAD SURCHARGE: 2'-0"	REINFORCEMENT: GRADE 60 BLACK
REINFORCING DESIGN:	

SIZE & DESCRIPTION:

6'-0" X 6'-0" X 5'-0" BASE

CUSTOMER: HAZELTON WATER AUTHORITY

JOB NAME: 400 E ARTHUR GARDNER PKWY

THICKNESS:	ROOF:	WALLS:	FLOOR:
	-	6"	6"

QTY:	CU. YDS	WEIGHT:
1	3.27	13,426 LBS

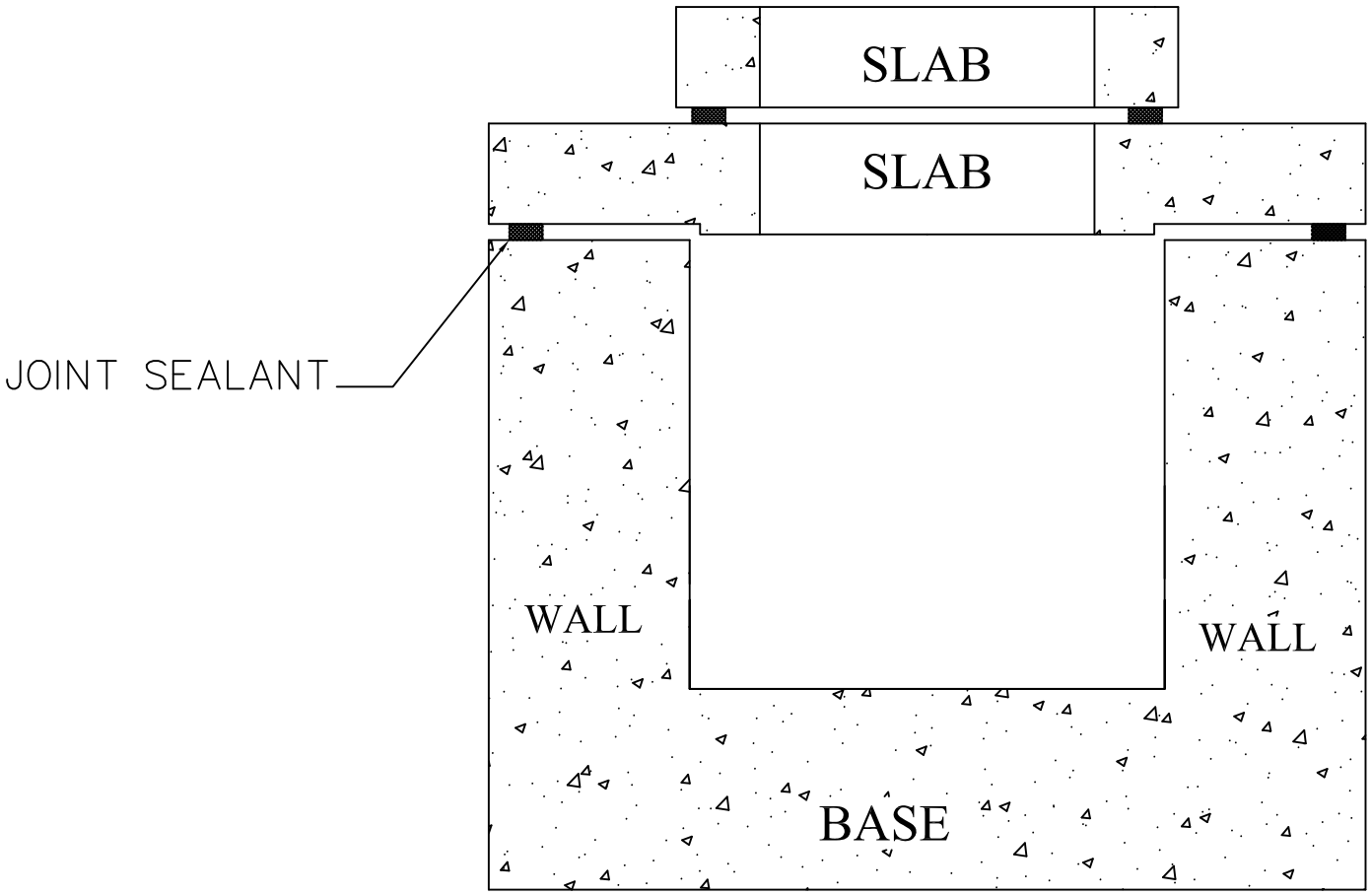
DRAWN BY:	DRAWING DATE:
AI	07/22/2021

PART NUMBER:	SALES ORDER NUMBER:	SHEET:
210401	54117	003

APPROVED FOR PRODUCTION BY: _____ DATE: _____

JEFFREY S. CAVANAUGH 9/13/21 21 - 210401 - 6X8X72 BASE OMNI SLEEVES

CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SIZES AND LOCATIONS OF HOLES, SLEEVES, STEPS, SUMP RECESS, EMBEDMENTS, ETC. THAT ARE SHOWN ON SUBMITTAL DRAWINGS.



STANDARD FORM
STEPDOWN JOINT

REQ'D:	SCALE: NONE
1	PURGE

CONCRETE PRODUCTS

NPCA CERTIFIED PLANT

ITEM: FLAT JOINT	
CUSTOMER:	
DESCRIPTION: FLAT – FLAT – STEPDOWN JOINT	
DATE:	DWN. BY: STD

ConSeal™ Concrete Sealants INC.

CS102

Butyl Rubber Sealant For All Precast Structures; Meets Specs.

APPLICATIONS

For self-sealing joints in: Manholes, Concrete Vaults, Septic Tanks, Concrete Pipe, Box Culverts, Utility Vaults, Burial Vaults, and Vertical Panel Structures.

SEALING PROPERTIES

- Provides permanently flexible watertight joints.
- Low to high temperature workability: 30°F to 120°F (-1°C to 48°C)
- Rugged service temperature: -30°F to +200°F (-34°C to +93°C)
- Excellent chemical and mechanical adhesion to clean, dry surfaces.
- Sealed Joints will not shrink, harden or oxide upon aging.
- No priming normally necessary. When confronted with difficult installation conditions, such as wet concrete or temperatures below 40°F (4°C), priming the concrete will improve the bonding action. Consult Concrete Sealants for the proper primer to meet your application.

HYDROSTATIC STRENGTH

ConSeal CS-102 meets the hydrostatic performance requirement as set forth In ASTM C-990 section 10.1 (Performance requirement: 10psi for 10 minutes in straight alignment – in plant, quality control test for joint materials.)

SPECIFICATIONS

ConSeal CS-102 meets or exceeds the requirements of Federal Specification SS-S-210 (210-A), AASHTO M-198B, and ASTM C-990-91.

P.O. Box 176, New Carlisle OH, 45344 • 937.845.8776 or 800.332.7325
FAX 937-845-3587 • www.conseal.com

ConSeal™ Concrete Sealants INC.

CS102

Butyl Rubber Sealant For All Precast Structures; Meets Specs.

PHYSICAL PROPERTIES

	Spec	Required*	CS 102
Hydrocarbon blend content % by weight	ASTM D4 (mod.)	50% min.	51%
Inert mineral filler % by weight	AASHTO T111	30% min.	35%
Volatile Matter % by weight	ASTM D6	2% max.	1.2
Specific Gravity, 77°F	ASTM D71	1.15-1.50	1.25
Ductility, 77°F	ASTM D113	5.0 min.	10
Penetration, cone 77°F, 150 gm. 5 sec.	ASTM D217	50-100	55-60
Penetration, cone 32°F, 150 gm. 5 sec.	ASTM D217	40 mm	40-65
Flash Point, C.O.C., °F	ASTM D92	350°F min.	450°F
Fire point, C.O.C., °F	ASTM D92	375°F min.	475°F

IMMERSION TESTING

- 30-Day Immersion Testing: No visible deterioration when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% saturated Hydrogen Sulfide. *

- One Year Immersion Testing: No visible deterioration when tested in 5% Formaldehyde, 5% Formic Acid, 5% Sulfuric Acid, 5% Hydrochloric Acid, 5% Sodium Hydroxide, 5% Hydrogen Sulfide and 5% Potassium Hydroxide.

- Requirements of ASTM C-990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

P.O. Box 176, New Carlisle OH, 45344 • 937.845.8776 or 800.332.7325
FAX 937-845-3587 • www.conseal.com

ConSeal™ CS-55

Water Based Acrylic Coating

Water Based Damp Proof Coating for All Concrete Structures

Applications

For use on most concrete structures.

Sealing Properties

- Fast drying concrete damp-proof coating.
- Can be applied effectively with a brush, paint roller or sprayer.
- Soap and water clean up.
- Environmentally responsible.
- Suitable for indoor application without specialized paint areas.
- Nearly three times the coverage of typical tar or asphalt based products (300 - 350 sq. ft. per gallon).
- Smooth, hard, polymer film that protects against water intrusion.
- Wide range of standard colors.
- Custom colors available upon request.
- Recycled Content, % by weight:
  - Post Industrial: 17%

Specifications

ConSeal CS-55 complies with E.P.A. regulation 40CFR261.4 for solid waste management. CS-55 is made with environmentally safe ingredients; disposal of containers does not present environmental problems.

Immersion Testing

One Year Immersion Testing: No visible deterioration when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% Hydrogen Sulfide.

Technical Data

Heavy Metals Testing

Parameter	EPA Limit	CS-55
Arsenic	5ppm	BDL
Barium	100ppm	1.12ppm
Cadmium	1ppm	BDL
Chromium	5ppm	BDL
Lead	5ppm	BDL
Mercury	0.2ppm	BDL
Selenium	1ppm	BDL
Silver	5ppm	BDL

Don't Just Seal It, ConSeal It!

Concrete Sealants, Inc. 9325 State Route 201 ■ Tipp City, OH 45371 ■ **Toll Free** 800.332.7325
P. 937.845.8776 **F.** 937.845.3587 ■ **www.conseal.com**

ISO 9001 Registered

ConSeal™ CS-55

Water Based Acrylic Coating

ConSeal™ Concrete Sealants Inc.

Water Based Damp Proof Coating for Concrete

Technical Data Continued

Scrape Adhesion Performance

Film Millage	Asphalt Coating 0.071”	CS-55 0.0038”
Force	**Result**	**Result**
500g	Passed with minimal damage	Passed with no damage
1000g	Failed 2/3rds of coating scraped off	Passed with no damage
1500g	Failed, complete film removal	Passed with minimal damage
2000g	Failed, complete film removal	Passed with minimal damage
2500g	Failed, complete film removal	Passed with minimal damage

Limited Warranty

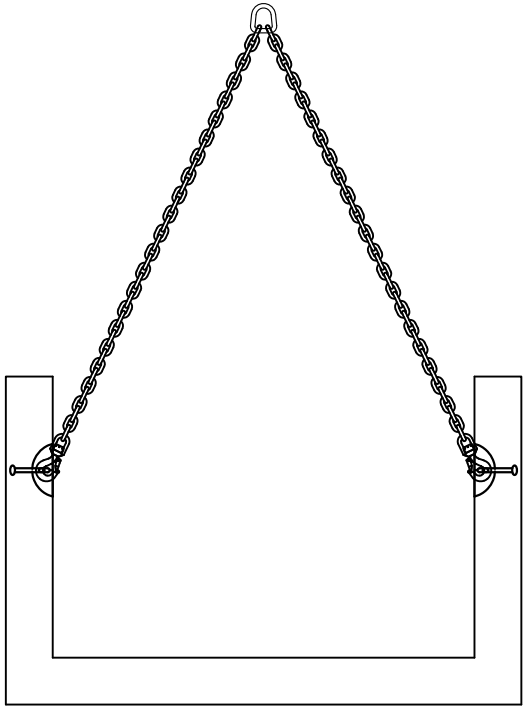
This information is presented in good faith, but we cannot anticipate all conditions under which this information and our products, or the products of other manufactures in combination with our products, may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combinations for their own purposes. It is the **users' responsibility** to satisfy himself as to the suitability and completeness of such information for this own particular use. We sell this product without warranty, and buyers and users assume all responsibility and liability for loss or damage arising from the handling and use of this product, whether used alone or in combination with other products.

Don't Just Seal It, ConSeal It!

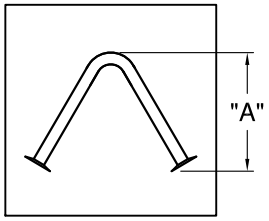
Concrete Sealants, Inc. 9325 State Route 201 ■ Tipp City, OH 45371 ■ **Toll Free** 800.332.7325
P. 937.845.8776 **F.** 937.845.3587 ■ **www.conseal.com**

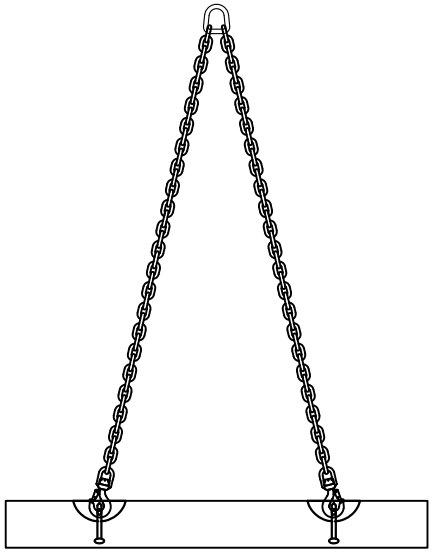
ISO 9001 Registered

UTILITY ANCHOR DATA				
"A"	ACM PART	TENSION 3 POINT PICK	SHEAR 3 POINT PICK	MIN. EDGE DISTANCE
3 3/4"	162482	13680	25290	11"
4 3/4"	162483	21960	47340	15"
6 3/4"	162484	32490	56550	20"

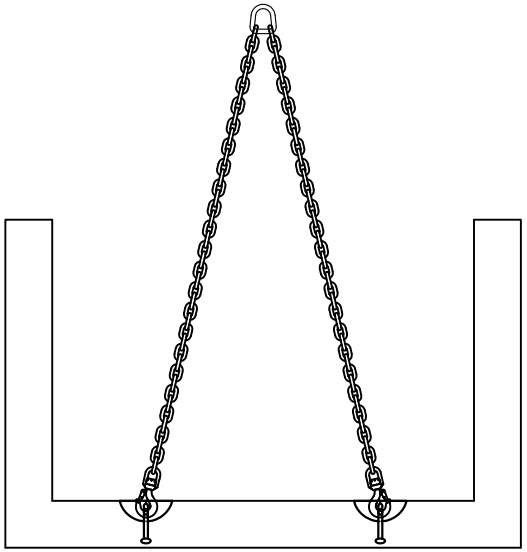


SHEAR





TENSION



TENSION

INFO PER PATTERSON ALP0912

A.C. miller CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA CERTIFIED PLANT

SPRING CITY - 610-948-4600

SIZE & DESCRIPTION:

UTILITY ANCHOR CAP

DRAWN BY:	DRAWING DATE:
BTH	4.7.14

APPROVED FOR PRODUCTION BY: _____ DATE: _____

BRYAN HENRY 3/24/14 UTILITY ANCHOR LIFTER

PLASTIC INSERTS

Plastic inserts are amazingly strong, easy to use, and very inexpensive. Precasters have been using them for over thirty years during which they have built a reputation for durability, reliability, and effectiveness. Plastic inserts won't corrode or leave ugly marks on concrete.

EASY TO USE Pennsylvania Insert's thermoplastic inserts install quickly and easily, especially when used in conjunction with Tap-Ons. Additionally, PA Inserts are made from a self lubricating plastic which makes threading easy.

RELIABLE They have high mechanical strength properties and great chemical resistance. Corrosion is not going to compromise the effectiveness of these inserts.

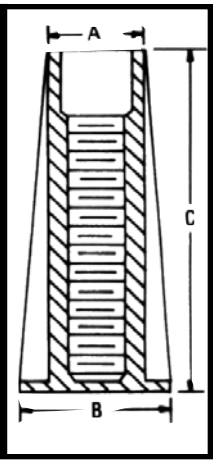
DURABLE Plastic inserts are fatigue resistant and will not be effected by vibration.

MANY SIZES Inserts are available in thread sizes from 1/4" to 1-1/2" and all sizes are stocked for quick shipment.

TEST RESULTS & DIMENSIONS

The following tests were made using a 4000 psi mix.
Inserts have been tested both in tension and in shear.

Part No.	Bolt Dia.	Thread N.C.	A	B	C	Working Load (lbs.)	Ultimate Strength
IN-025	1/4"	20	.35"	.75"	1 1/4"	140	700
IN-038	3/8"	16	5/8"	7/8"	1 1/2"	220	1100
*IN-050	1/2"	13	.70"	1"	2 1/2"	1640	8,200
*IN-050 S	1/2"	13	.70"	1"	1 3/4"	1640	8.200
IN-063	5/8"	11	13/16"	1 5/16"	3"	3360	16,800
IN-075	3/4"	10	15/16"	1 3/8"	3 1/4"	3500	17,600
IN-100	1"	8	1 3/16"	1 13/16"	3 3/4"	3740	18,700
IN-150	1 1/2"	Coil	1 7/8"	2 1/4"	5 1/4	4560	22,800



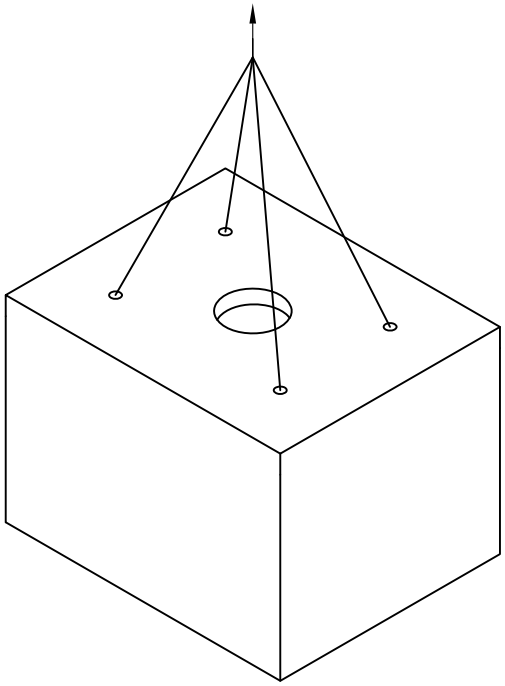
*ALSO AVAILABLE IN REINFORCED GRADES FOR GREATER TORQUE STRENGTH

USEFUL TIPS

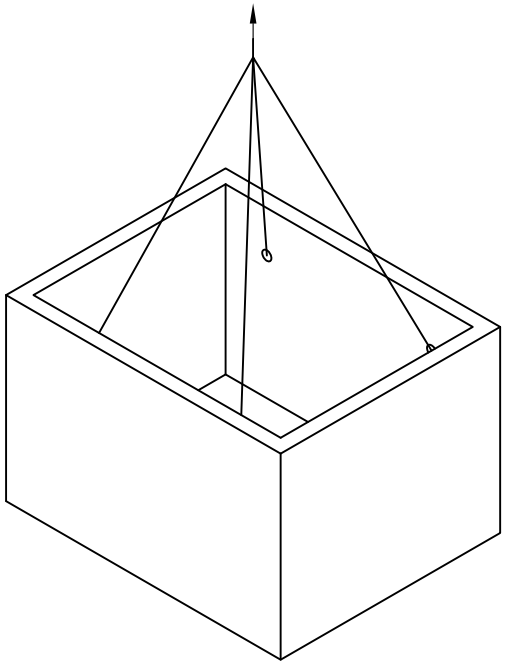
- Bolt must be fully threaded into insert.
- Use high strength bolts for best results.
- Use Tap-Ons or Stick-Ons for installing inserts to save drilling holes in expensive steel forms.

TO ORDER CALL 1-800-220-4857
or sales@pennsylvaniainsert.com

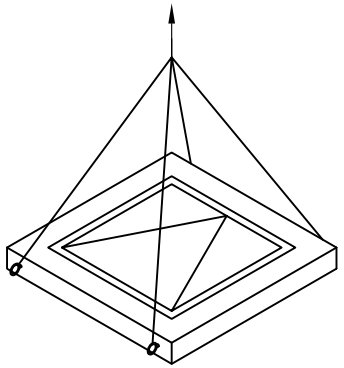
PA Insert Corp. Makes no warranty that the thermoplastic insert described herein is merchantable or fit for any particular purpose, and there are no warranties, express or implied, which extend beyond the description of the thermoplastic insert set forth herein. Please contact PA Insert for information and uses. Not recommended where temperatures exceed 185 degrees F. (this does not apply to steam curing) The purchaser acknowledges that PA Insert Corp. has no control over the installation or use of its products. Accordingly, PA Insert cannot assume responsibility for any damage to any property arising out of the improper use or installation of its products. PA Insert products are intended for use by trained, qualified, and experienced workers only. Misuse or lack of supervision & inspection can result in serious injury or death. All applications should be carefully field tested, safe working loads determined based on conditions, and all safety regulations followed.



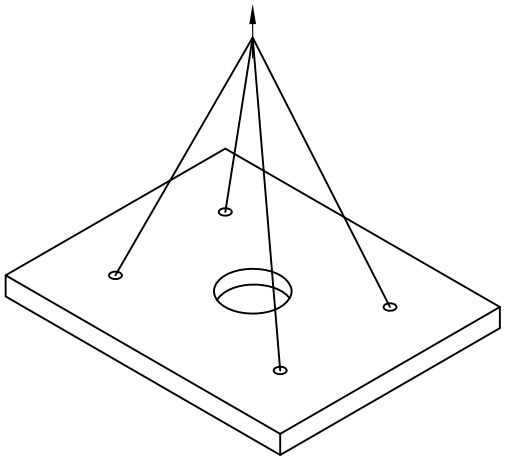
MANHOLE TOP
W/ LIFTERS ON TOP FACE



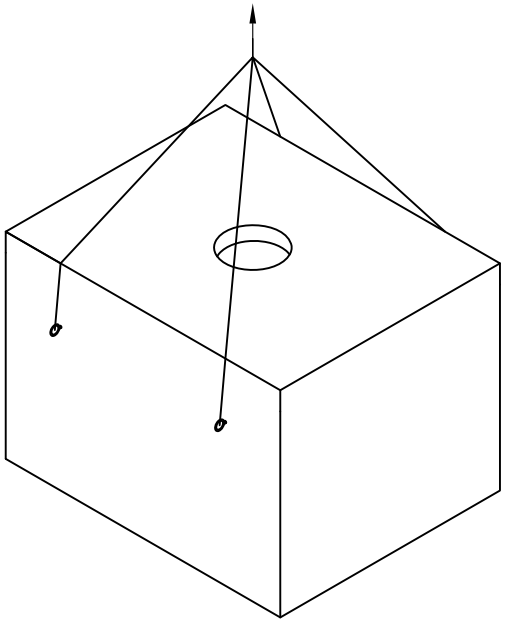
MANHOLE BASE
W/ LIFTERS ON INSIDE OF WALLS



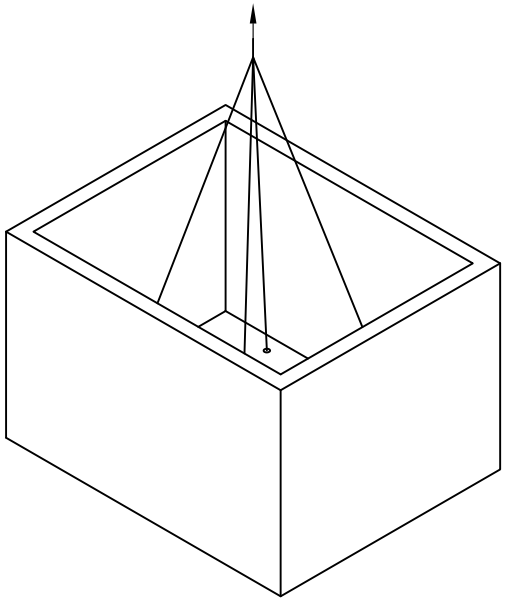
MANHOLE SLAB
W/ LIFTERS ON SIDE FACE



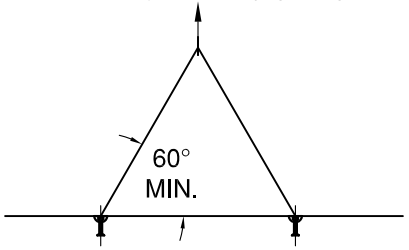
MANHOLE SLAB
W/ LIFTERS ON TOP FACE



MANHOLE TOP
W/ LIFTERS ON OUTSIDE OF WALLS



MANHOLE BASE
W/ LIFTERS ON THE FLOOR



LIFTING

A.C. Miller
CONCRETE PRODUCTS, INC.
www.acmiller.com

NPCA
CERTIFIED PLANT

SPRING CITY - 610-948-4600

SIZE & DESCRIPTION:

TYPICAL LIFTING ISOMETRICS

DRAWN BY:	DRAWING DATE:

BRYAN HENRY 4/10/15 lifting

ITEM #: 103722

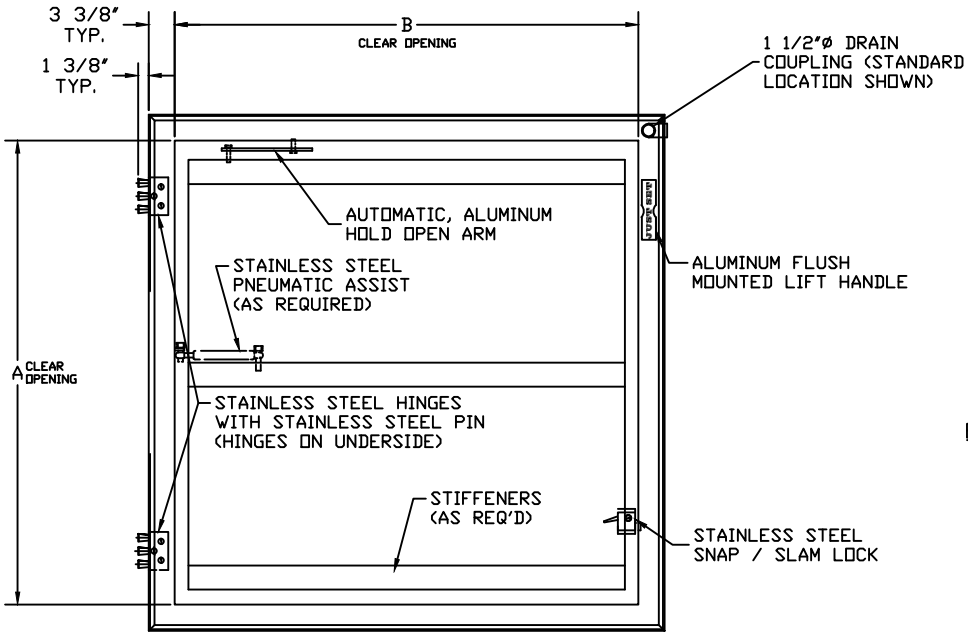
DESCRIPTION:

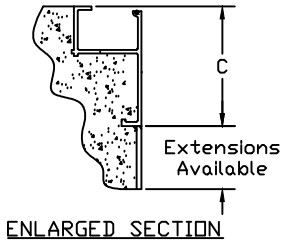
"JUST SET"

ALUMINUM DOOR, STANDARD DUTY, SINGLE LEAF

Pennsylvania Insert Corp

PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com



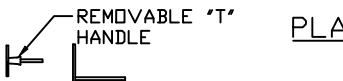


ENLARGED SECTION

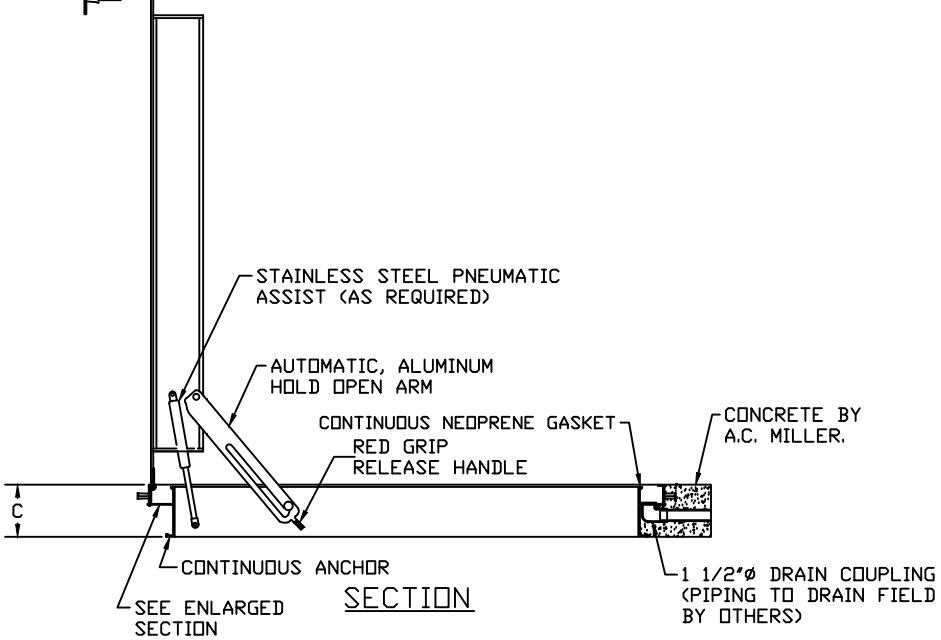
- 1/4" Diamond Plate Lid Reinforced for 300 LB/FT2 live load
- Drain Trough Frame with Gasket for Water Resistance
- Min. 6" Deep Frame with Extensions Available
- Protective Barrier where Concrete meets Aluminum
- Continuous Anchor to Lock Frame into Concrete
- Type 316 Stainless Steel Pneumatic Assist (*as req'd)
- Stainless Steel, Butt Style, Hinges & Hinge Pin Anchored In Concrete With Metal Inserts.
- All Type 304 Stainless Steel Hardware
- Type 316 Stainless Steel Snap Lock
- 1-1/2"ø Drain Coupling
- Automatic Hold Open Arm, With Red Release Handle
- Flush Mounted Lift Handle

An asterisk (*) next to stock number = stainless steel pneumatic assist as standard

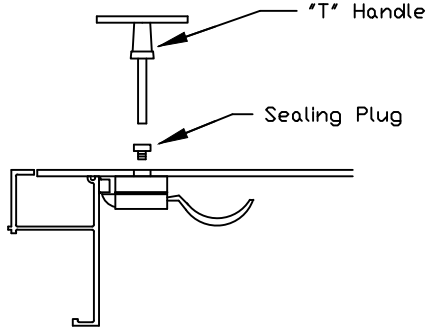
STANDARD DIMENSIONS				OFFICE USE
A	B	C	STOCK #	
36"	36"	12.00"	ATS3636S	



PLAN



SECTION

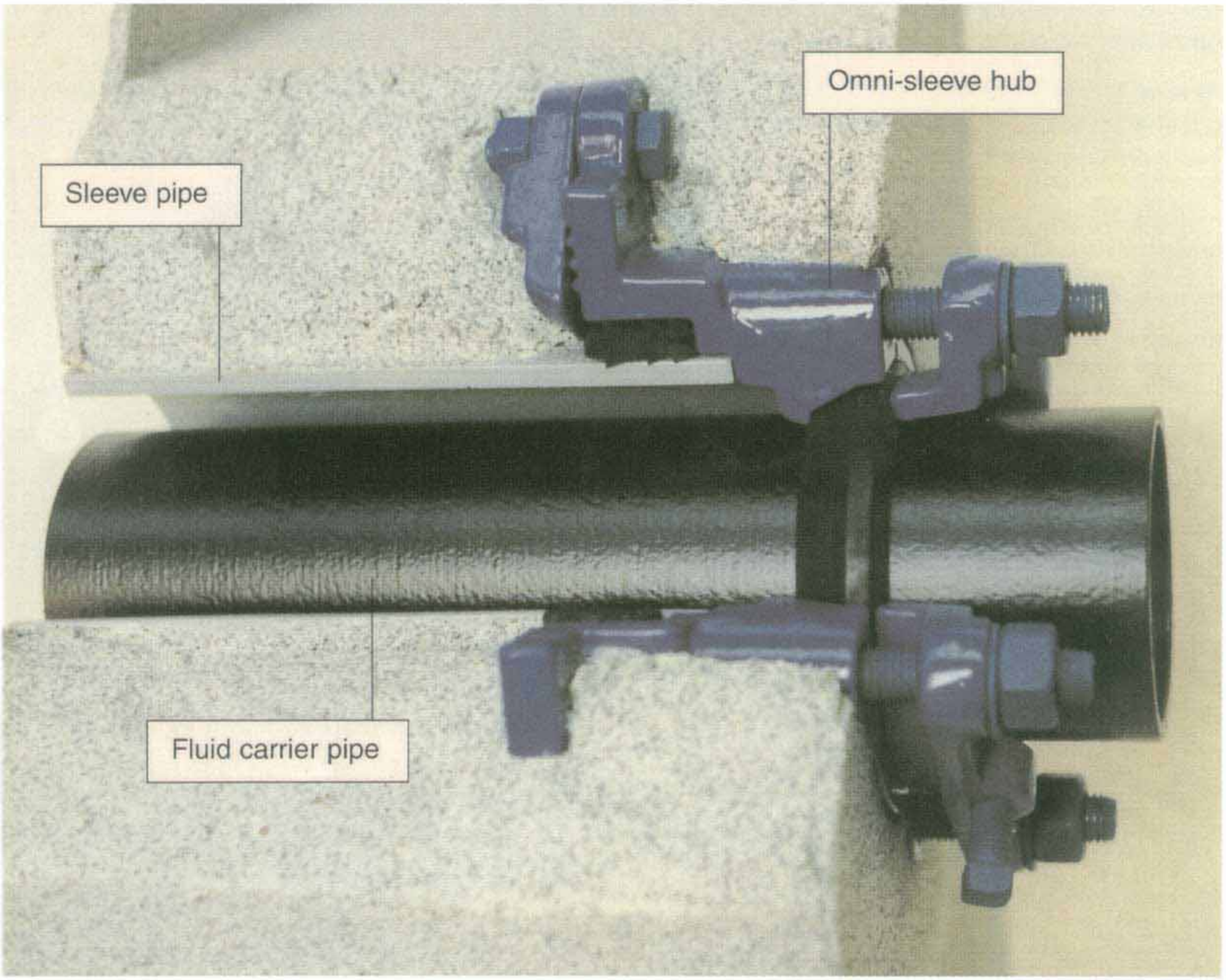


STAINLESS STEEL SNAP/SLAM LOCK

SIGMA

omni ★ sleeve

The BETTER WAY to pass pipe through a Concrete Wall



- Installs easily and Accurately
- Allows for Carrier Pipe Deflection
- Guarantees a Leakproof Seal

} The Most Cost Effective

Hub:

Manufactured from Ductile Iron, ASTM A536, 60,000 psi minimum tensile strength, 42,000 minimum yield strength, 10 percent minimum elongation, in conformance with ANSI/AWWA C110/A21.10, Sec. 1011 American National Standard for Ductile Iron and Gray Iron Fittings, 3 in. through 48 in. for Water and Other Liquids. Mechanical joint sleeve seal is designed manufactured, and tested in strict accordance with the applicable provisions of ANSI/AWWA C111/A21.11, American National Standard for Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings. Drilling and tapping conform to ANSI B1.11960, Unified Screw Threads, and to B1.2-1966, Screw Thread Gages and Gaging. Threads conform to standards and dimensions of the Coarse Thread Series, Class 2B Limits. omni*sleeve hub and sleeve pipe are assembled and sealed with an exclusive ***omni*seal*** gasket.

Sleeve Pipe:

Unless otherwise specified, sleeve pipe will be supplied in Ductile Iron, minimum thickness Class 50, as specified in ANSI/AWWA C151, American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or SandLined Molds for Water and Other. ANSI/AWWA C900 Polyvinyl Chloride (PVC) is also available.

Mechanical Joint Glands:

Manufactured from Ductile Iron in accordance with ASTM A536, Grade 6042-10

*omni*seal* 'A' Gasket:

Material conforms to the applicable provisions of CSA B 620M90, Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe.

Mechanical Joint Gasket:

Unless otherwise specified, omni*sleeve will be supplied with SBR (BUNAS), suitable for water and wastewater and most moderate chemicals. Temperature range: 65° to 212°F.

Available Alternative Gaskets:

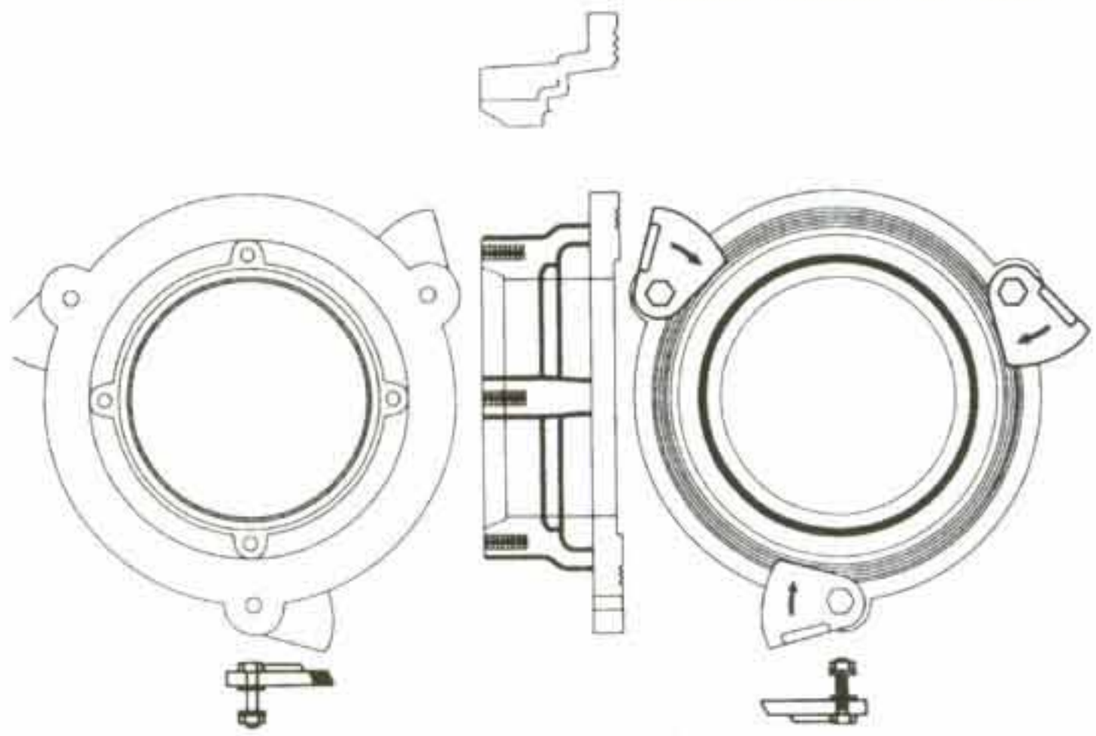
EPDM (Ethylene Propylene) suitable for water and wastewater, ozones, and strong oxidizing chemicals. Temperature range: 65° to 350°F.
CR (Neoprene) suitable for moderate chemicals and acids, oil fats, greases, and many solvents. Temperature range: 65° to 212°F.
NBR (BUNAN, Nytril, Hycar) suitable for gasoline, petroleum products, hydrocarbons, mineral and vegetable oils. Temperature range: 65 ° to 300 °F.
FPM (Viton) ideal for all aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable oils. Temperature range: 50° to 450°F.

Pressure Rating:

Standard mechanical joint pressure pipe seal rated to 350 psi.

Suggested Specification:

Wall and/or floor pipe penetrations shall be made by means of a sleeve capable of being bolted directly to the formwork to prevent misalignment. Seal of the annular space between the carrier pipe and the sleeve shall be by means of a confined rubber gasket and capable of withstanding 350 psi. Sleeve shall be manufactured from Ductile Iron with an integrally cast waterstop of 1/2 " minimum thickness and 21/2" minimum height. Wall sleeves shall be omni*sleeve, or approved equal.



Carrier Pipe Size	Item No.	Carrier/Pipeline O.D.		Sleeve Pipe O.D.	Waterstop Diameter	Distance Waterstop to Wall	Mechanical Joint Bolt Circle Diam.	Bolt Holes	
		Ductile Iron	Steel					No.	Size
3	OSL63	3.96	3.500	6.90	11 3/4	4 3/16	6.19	4	5/8 x 3
4	OSL64	4.80	4.500	6.90	11 3/4	4 3/16	7.50	4	3/4 x 4
6	OSL86	6.90	6.625	9.05	14	4 3/16	9.50	6	3/4 x 4
8	OSL108	9.05	8.625	11.10	16	4 3/16	11.75	6	3/4 x 4
10	OSL1210	11.10	10.750	13.20	18 1/4	4 3/16	14.00	8	3/4 x 4
12	OSL1412	13.20	12.750	15.30	20 1/4	4 3/16	16.25	8	3/4 x 4
14	OSL1614	15.30	N/A	17.40	22 3/8	4 5/16	18.75	10	3/4 x 5
16	OSL1816	17.40	N/A	19.50	24 1/2	4 5/16	21.00	12	3/4 x 5
18	OSL2018	19.50	N/A	21.60	26 5/8	4 5/16	23.25	12	3/4 x 5
20	OSL2420	21.60	N/A	25.80	30 3/4	4 5/16	25.50	14	3/4 x 5
24	OSL3024	25.80	N/A	32.00	37	4 5/16	30.00	16	3/4 x 5
30	OSL3630	32.00	N/A	38.30	43 3/8	4 9/16	36.88	20	1 x 6

omni ★ sleeve

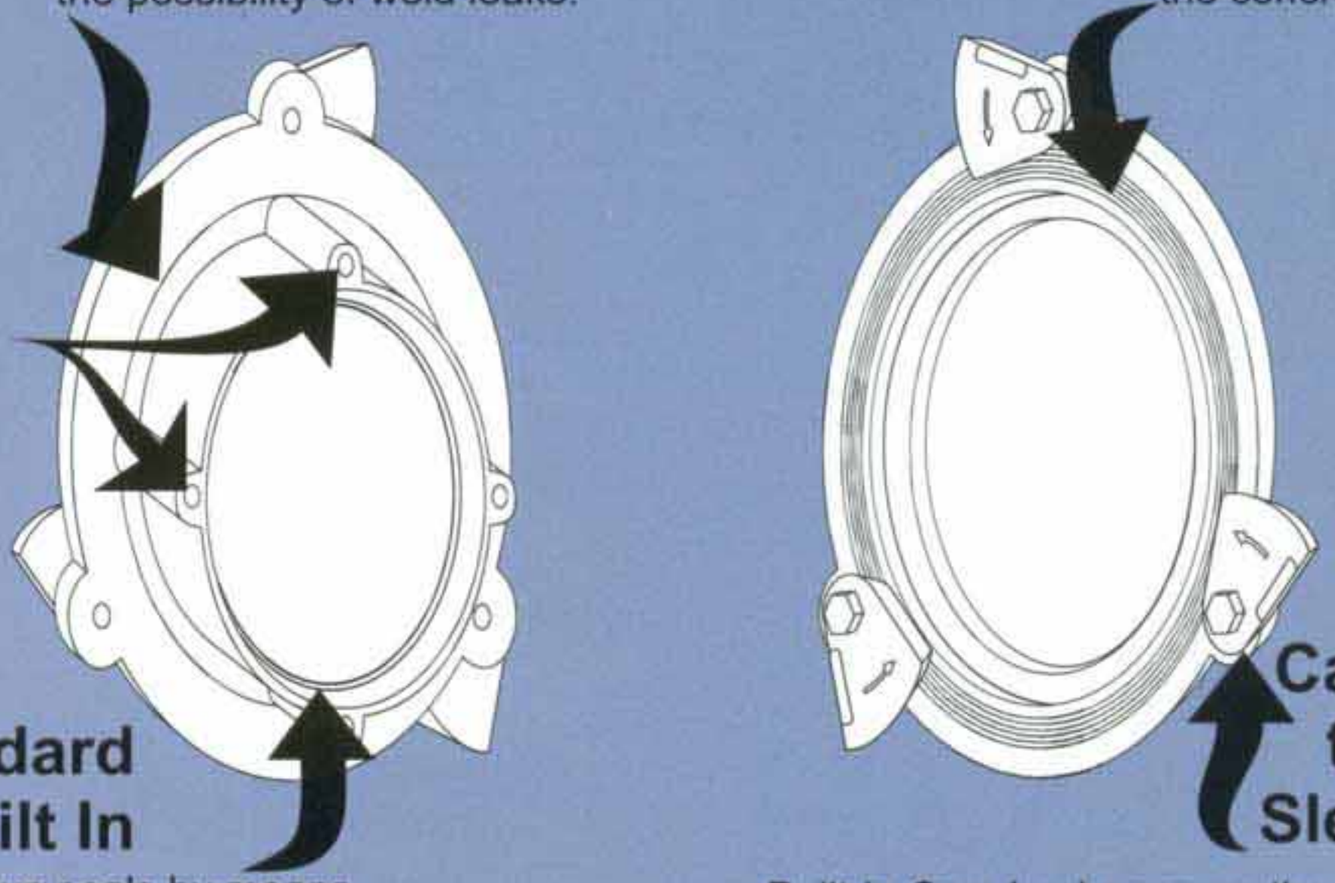
The BETTER WAY to pass pipe through a concrete wall

Cast-in Waterstop

The anchor ring/waterstop is integrally cast as part of the omni★sleeve. This eliminates the possibility of weld leaks.

Ribbed Anchor Ring

The ribbing of the anchor ring surface provides additional surface area for a more positive seal within the concrete wall or floor.



Standardized Bolt Hole Spacing

The bolt hole design conforms to AWWA/ANSI specifications, accepts standard mechanical joint gasket and gland.

Standard Mechanical Joint Built In

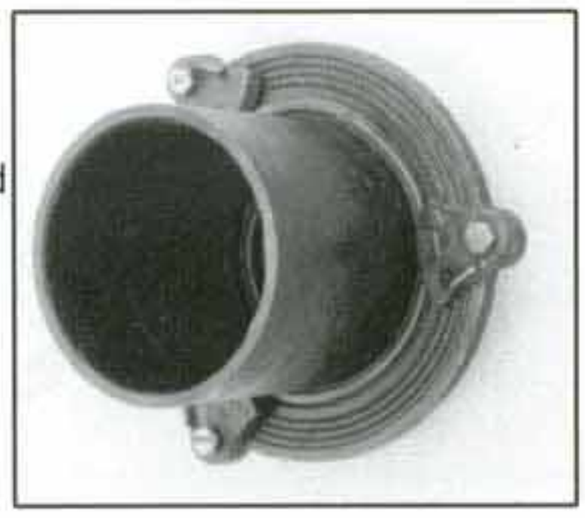
The exposed surface of omni★sleeve seals by means of a standard mechanical joint. This provides a 100% leakproof, rodent-proof, insect-proof barrier between the carrier pipe system and the wall penetration sleeve.

Cam Locks to Secure Sleeve Pipe

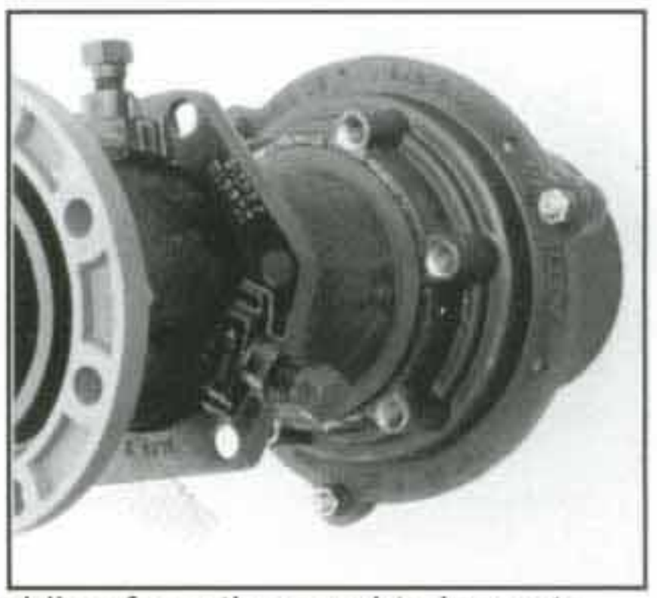
Built-in Cam Locks secure the sleeve pipe and omni★sleeve hub assembly together; the exclusive, custom-designed omni★seal gasket forms a secure seal between the omni★sleeve hub and the sleeve pipe.

Inside the Wall ...

"Inside the wall" view of omni★sleeve, showing exclusive omni★seal gasket and sleeve pipe. Note the anchor ring ribbing, gasket placement and cam locks securing omni★sleeve hub to sleeve pipe.



Restraint Options

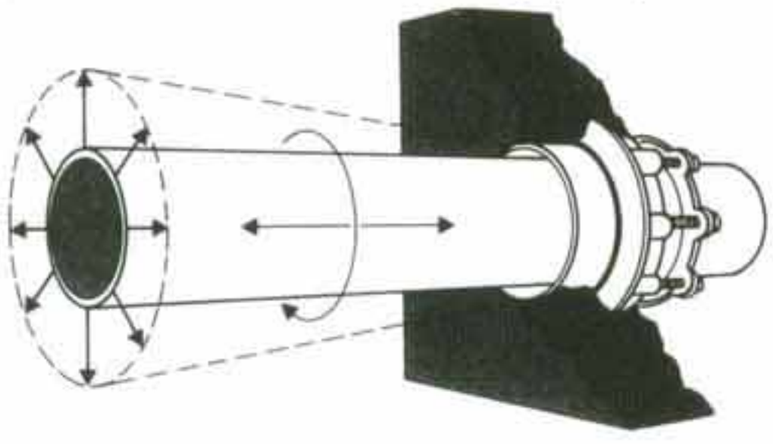


omni★sleeve's standard mechanical joint also provides restraint options for your carrier pipe. Shown here is a typical installation utilizing Sigma's patented One-Lok Pipe Restraint.

Using the One-Lok or tie rodding from the omni★sleeve to your next flange end will also provide additional restraint.

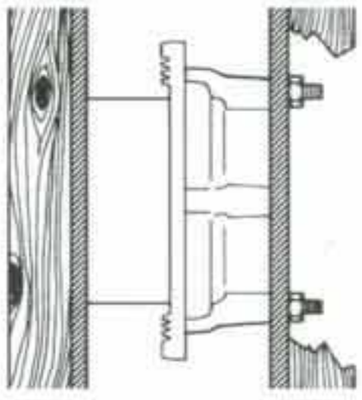
Absorbs Vibration, accommodates deflection

Absorbs vibration, adapts to settling and seismic movement, allows deflection of carrier pipe system

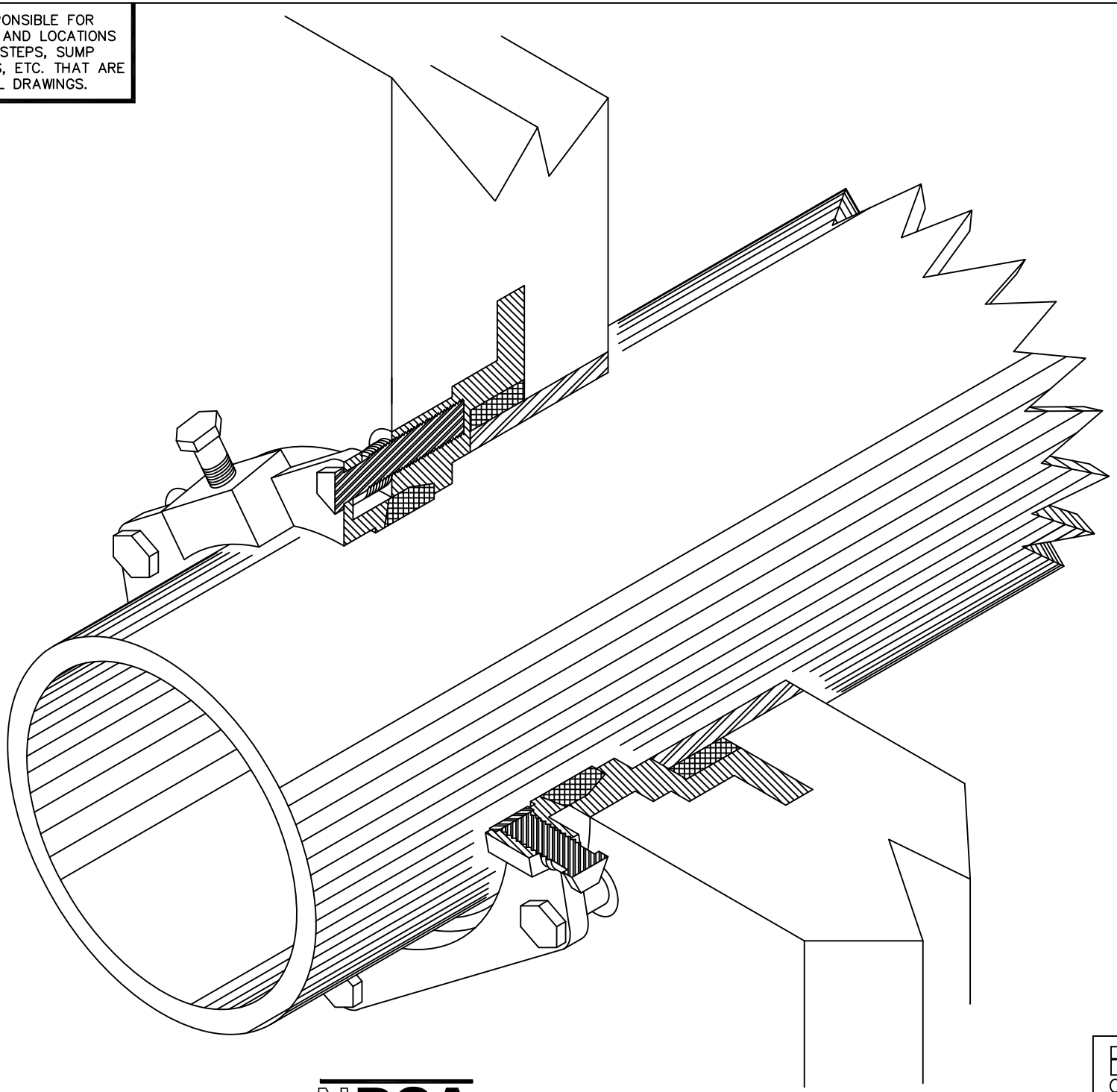


Installs Easily and Accurately

omni★sleeve mounts flush with the finished concrete wall. It is secured directly to formwork with only two bolts. Once bolted to the formwork, omni★sleeve cannot slip or dislocate during the concrete pour.



CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SIZES AND LOCATIONS OF HOLES, SLEEVES, STEPS, SUMP RECESS, EMBEDMENTS, ETC. THAT ARE SHOWN ON SUBMITTAL DRAWINGS.



NPCA CERTIFIED PLANT

ITEM: OMNI SLEEVE

DESCRIPTION: OMNI SLEEVE DETAIL

SCALE: NONE

PURGE

E.C. Miller CONCRETE PRODUCTS

DATE:	DWN. BY:
7/22/05	JRH

ITEM #: 104915

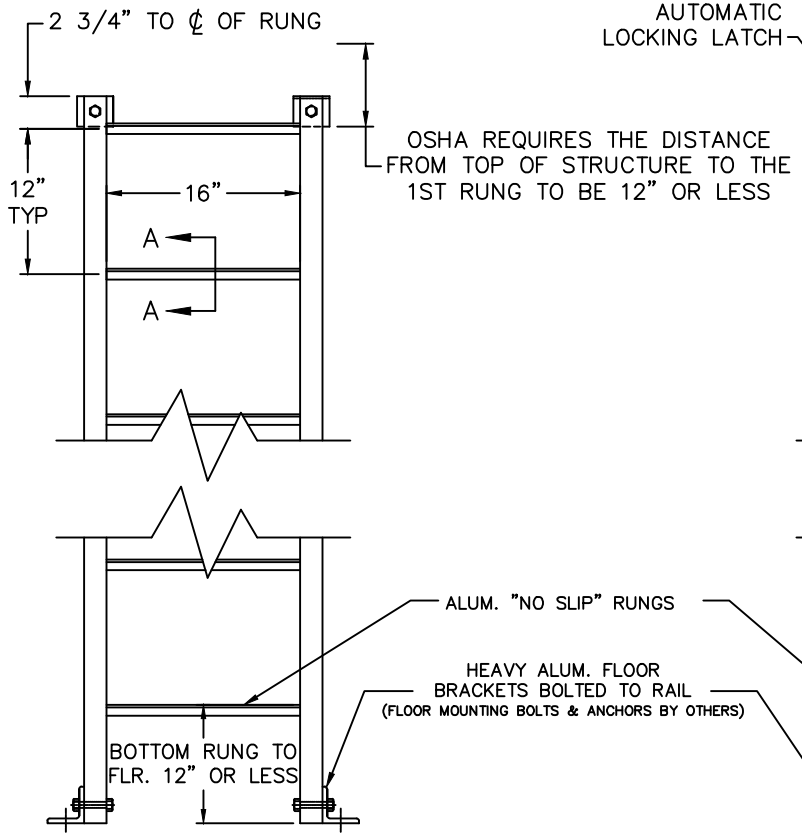
DESCRIPTION:

PAI ALUM LADDER

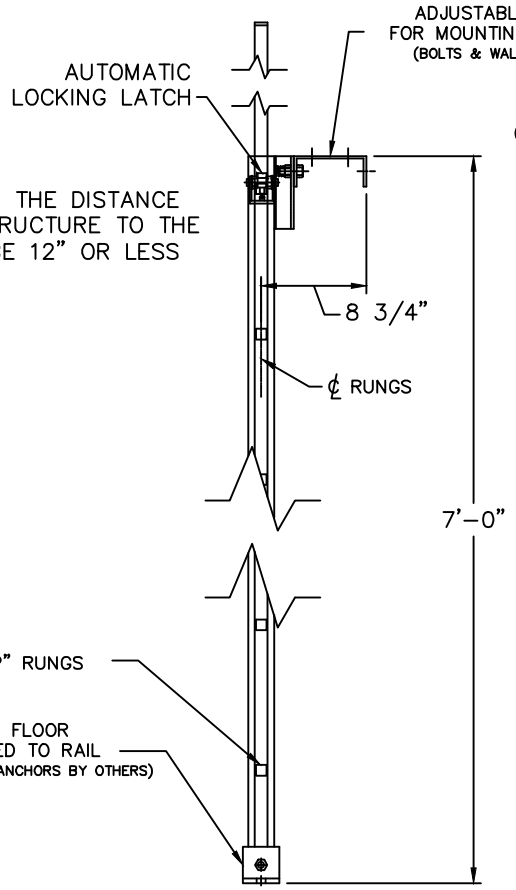
W/ INTEGRAL LADDER EXTENSION
OSHA 1910.27 COMPLIANT

Pennsylvania Insert Corp
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com

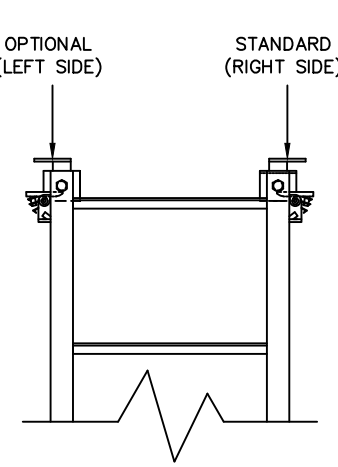
ALL MATERIALS ARE MILL FINISH ALUMINUM ALLOY 6061-T6
SEE SEPARATE SHEET FOR INSTALLATION INSTRUCTIONS
EXTENSIONS FOR 6'-0" MINIMUM LADDER LENGTH



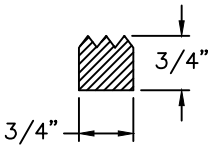
ELEVATION



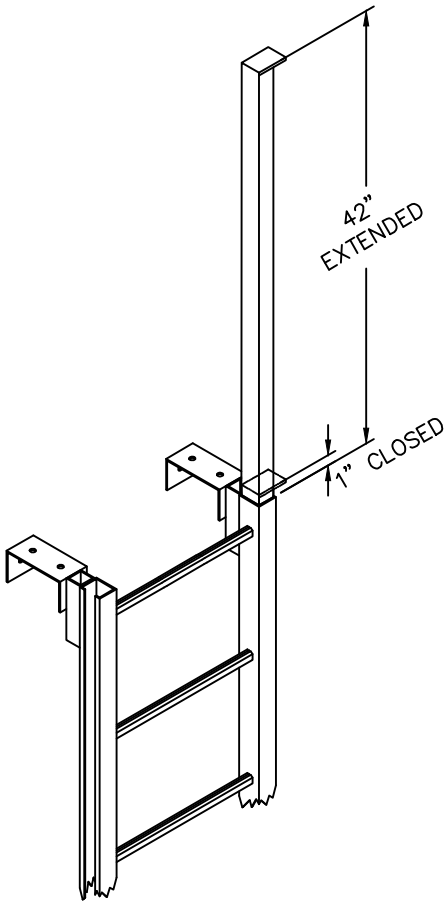
SIDE ELEVATION



ELEVATION



SECTION A-A



LADDER EXTENSION
- [ ] LEFT SIDE
- [X] RIGHT SIDE
- [ ] RIGHT & LEFT SIDE

NO SCALE

SEE INSTALLATION SHEET FOR INSTRUCTIONS

NOTES:

DESCRIPTION:

LADDER INSTALLATION

OSHA 1910.27 COMPLIANT

Pennsylvania Insert Corp

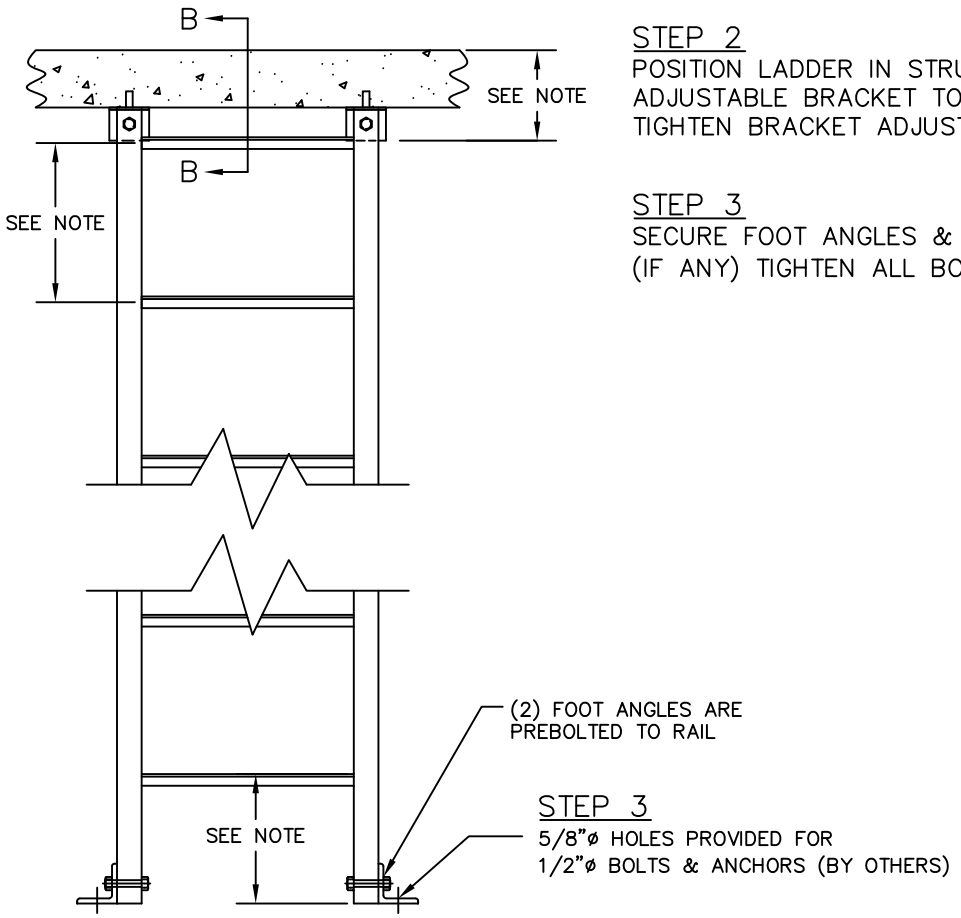
PO Box 199
Spring City PA 19475
Tel: 610-948-9688
Fax: 610-948-9750
email: sales@pennsylvaniainsert.com
Web: www.pennsylvaniainsert.com

NOTE
OSHA REQUIRES THE DISTANCE FROM TOP OF STRUCTURE TO THE 1ST RUNG TO BE 12" OR LESS

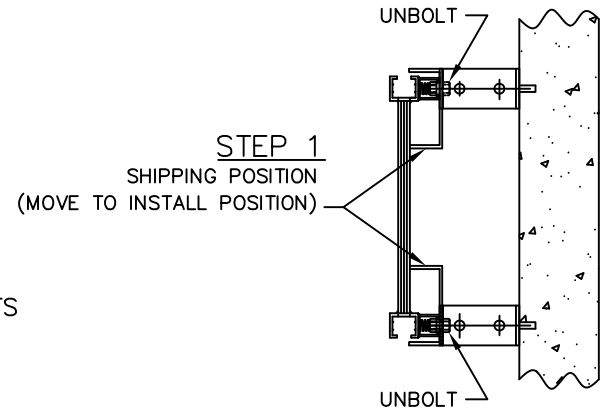
STEP 1
UNBOLT, REPOSITION & REBOLT ADJUSTABLE CHANNEL BRACKETS AS SHOWN. (DO NOT TIGHTEN ALL THE WAY SO THAT THEY CAN BE SLID UP OR DOWN)

STEP 2
POSITION LADDER IN STRUCTURE & SECURE ADJUSTABLE BRACKET TO WALL OR ROOF. TIGHTEN BRACKET ADJUSTING NUT.

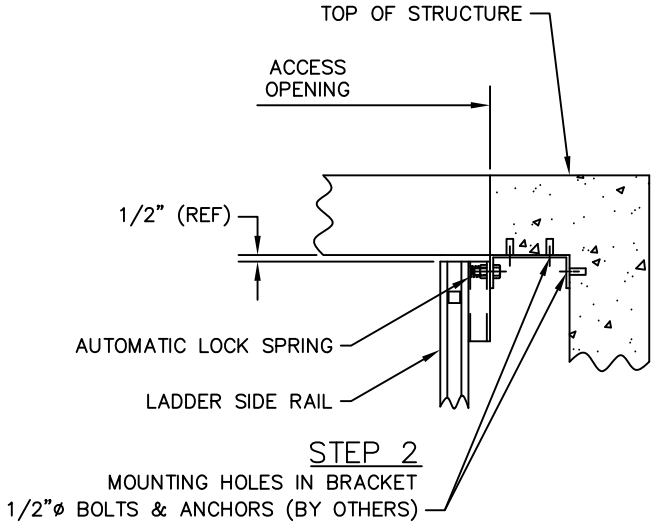
STEP 3
SECURE FOOT ANGLES & ANY MID-BRACKETS (IF ANY) TIGHTEN ALL BOLTS.



ELEVATION



PLAN



SECTION B-B

NO SCALE

CONCRETE PRODUCTS, INC.
31 E. Bridge Street
P.O. Box 199
Spring City, PA 19475

Whom it may concern:

In order to expedite this project, we have enclosed a copy of an in-house design calculation that is similar to the structure you have purchased. This is meant to represent a "better than or equal to" example of the vault(s) we are producing for you. If you require an exact design calculation for this project, please contact your sales representative. Thank you again for your business.

Regards,

A.C. Miller Technical Services

better than or equal to in-house design example GENERIC

Voice: 610.948.4600
Fax: 610.948.9750
www.acmiller.com

NPCA CERTIFIED PLANT

A.C. MILLER CONCRETE PRODUCTS, INC.

www.acmiller.com

Leo T. Middlemiss, PE
Resident Engineer
A.C. Miller Concrete Products
31 E. Bridge St. Spring City, PA 19475
(610) 948 - 4600 ext. 272
fax (610) 948-9750

Proj. No.: 1007
Date: 2/24/10
Sheet 1 of 10
Designed. By: LTM
Reference: ACM07118

Design Calculations for: 6' x 6' x 6' headroom Unpiped Valve Vault

Project: CONYNGHAM TOWNSHIP, PA

Customer: FAB-CRETE, INC.

DESIGN SPECIFICATIONS:

ACI-318-02	"Building Code Requirements for Structural Concrete"
AASHTO	"Standard Specifications for Highway Bridges" 2002
ASTM C858	"Standard Specifications for Underground Precast Concrete Utility Structures"

DESIGN CRITERIA:

Concrete Wt.	Yc=	150	pcf	Earth Cover DEC =	0 to 2 ft.
Soil Wt.	Ys=	120	pcf	Ground Water Table =	0 ft. below gr.
Water Wt.	Yw=	62.4	pcf		

Soil properties used to determine lateral earth pressure:

Angle of Internal Friction:	% =	30 degrees
At Rest Pressure Coefficient:	Ka =	0.33
Equivalent Fluid Weight of Earth:		
a) Above water table=	Ka*Ys =	40 pcf
b) Below water table=	Ka(Ys-Yw)+Yw =	82 pcf

Case 1 Live load = AASHTO (HS-20; HS-25; Pedestrian) = HS-20

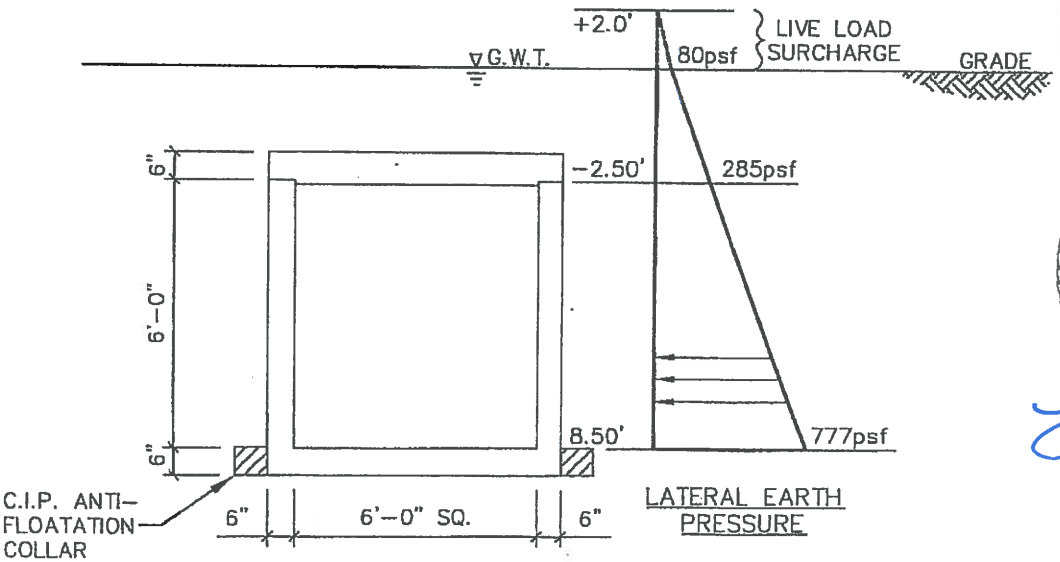
Live load surcharge equivalent to 2'-0" of earth embankment per AASHTO 3.20.3 = 2ft.*(Ka*Ys) = 80 psf

(Effective to 8'-0" below grade)

MATERIAL SPECIFICATIONS:

Concrete shall have a minimum compressive strength at 28 days of f'c = 5000 psi

Steel Reinforcement shall be deformed grade 60 steel conforming to (ASTM A615) with fy = 60000 psi



COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LEO THOMAS MIDDLEMISS, JR.
ENGINEER
031657-E

2-24-10

Properties:

Concrete Wt. **Yc** =	150 pcf		Earth Cover **Dec** =	0 to 2	ft
Soil Wt. **Ys** =	120 pcf		Ground Water Table, **dgw** =	0	ft. below gr.
fc = 5000 psi	**fy** = 60000 psi		Water Weight **yw** =	62.4	pcf

Top Section

Dimensions:

Roof Slab

Inside Length, **Lt** =	6.00	ft
Inside Width, **Wt** =	6.00	ft
Thickness, **Tt** =	6.75	in

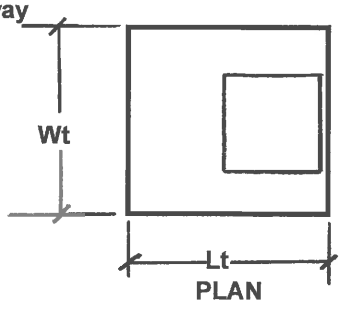
Walls

Thickness, **Tw** =	6	in
Head Room, **HR** =	6.00	ft
Concrete cover, **cc** =	1.50	in

Slab Load Factors: AASHTO **LFdl** = 1.3 **LFll** = 2.17

Design: Lt / Wt = 1.00 if > 1.5 = one-way TWO WAY

Manhole is square, therefore distribute the load 50% each way



Dead Load:

Earth Cover, Dec * ys =	0.24	ksf
Top Slab, Tt* yc =	0.08	ksf
Total dead load, Wdl =	0.32	ksf

Live Load:

Wheel load, **LL** =	16	K
HS-20: 16K; HS-25: 20K		
Impact Factor, **I** =	30%	

Wheel Load Distribution Width: **E** = 4ft. + 0.06 * Wt = 4.36 ft.

Dead Load Moment: **+Mdl** = .5 * ((Wdl) * (Wt+Tw)^2) / 8 =	0.85	ft. - k/ft
Live Load Moment: **+Mll** = .5 * (LL / E) (1+I) (Wt+Tw) / 4 =	3.88	ft. - k/ft
Total Moment: **+MTl** = (+Mdl) + (+Mll) =	4.73	ft. - k/ft

Factored Moment:

+Mut = LFdl * (+Mdl) + LFll * (+Mll) = 9.52 ft. - k/ft

Select Steel:

Rebar Size =	# 6	Area steel, **As** =	0.884 in.^2/ft.
Spacing, **s** =	6 in o.c.		
Cover, **c** =	1.50 in		
'd' min. to ctr. btm. bar: = Tt - cc - 1.5 (bar dia) =	4.13 in		
b =	12 in		

ρ = As / b * 'd'min. =	0.0178	
> **ρ min**. = 200 / fy =	0.0033	**PASS**
< **ρ max**. = 0.75pb = 0.75[0.85(β1)(fc/fy)]*[87/(87+fy)] =	0.0252	**PASS**

a = As * fy / (0.85 * fc * b) = 1.04 in.

Capacity reduction Factor by Code **%** = 90%

%Mn. = % * As * fy ('d'-a/2) / 12 = 14.36 ft. - k/ft > +Mut = 9.52 ft. - k/ft **PASS**

Check Distribution of Flexural Reinforcement (crack control):

Ec = (57000) * (fc)^1/2 =	4031	ksi	**Es** =	29000	ksi
n = Es / Ec =	7.20				
Bar Spacing, **s** =	6	in	**'d'** =	4.13	in
Slab Thickness, **Tt** =	6.75	in	**ρ** =	0.0178	
Total Moment, **+MTl** =	4.73	ft. - k/ft	**ρ*n** =	0.1282	
Area Steel, **As** =	0.884	in.^2/ft.	**b'** =	12	in
k = [(ρ * n)^2 + 2 ρ*n]^1/2 - ρ * n =	0.394				
j = 1- k/3 =	0.869				

Tensile stress in steel:

fs = 12 * (+MTl) / (j * 'd' * As) = 17.9 ksi < 60% * fy = 36 ksi **PASS**

dc = Tt - 'd'min. = 2.62 in

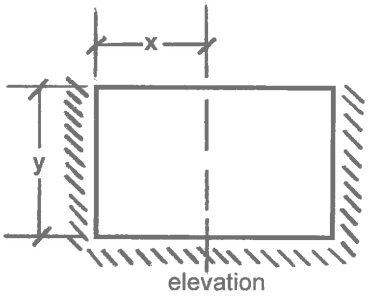
A = 2 * dc * s = 31.4 in^2

z = fs * (dc * A)^1/3 = 77.9 k/in. < **z allow** = 145 k/in. for exterior exposure **PASS**

USE 6 @ 6 IN
Bottom Each way

Sheer and bond OK per AASHTO 3.24.4

Base Walls



AASHTO Load Factor, **LF** =	1.7	
Average External Soil Pressure, **P** =	540	psf
x = Length of Base, Lb / 2 =	3.00	ft.
y =	6.00	ft.
x / y =	0.50	ft.
Thickness Walls, **Tw** =	6	in.
Head Room, **HR** =	6.00	ft.
Concrete cover **cc**=	2.00	in.

(REF: "Moments and Reactions for Rectangular Plates" by Moody, D.O.I. BUREC)

Moment Coefficients:	**-Ch**	**+Ch**	**-Cv**	**+Cv**
	0.0852	0.0438	0.0536	0.0136

Moments:

-Muh = LF * (-Ch) * P * y^2 =	2.82	ft. - k/ft	Cover, **cc** = 2.00 in.
+Muh = LF * (+Ch) * P * y^2 =	1.45	ft. - k/ft	**b** = 12 in
-Muv = LF * (-Cv) * P * y^2 =	1.77	ft. - k/ft	Cap. Red. Fctr. % = 90%
+Muv = LF * (+Cv) * P * y^2 =	0.45	ft. - k/ft	**fy** = 60000 psi

a = As * fy / (0.85 * fc * b) =
%Mn = % * As * fy ('d'-a/2) / 12 =

	USE	**As** in.^2/ft.	**d** in.	**ρ** = As / b*d	**a** in.	**%Mn** ft.-k/ft.		**Mu** ft.-k/ft.	PASS?
-Ash =	5 @ 12	0.307	3.69	0.0069	0.3612	4.85	>	2.82	**PASS**
+Ash =	5 @ 12	0.307	2.31	0.0111	0.3612	2.94	>	1.45	**PASS**
-Asv =	5 @ 12	0.307	3.06	0.0084	0.3612	3.98	>	1.77	**PASS**
+Asv =	5 @ 12	0.307	2.94	0.0087	0.3612	3.81	>	0.45	**PASS**

Check Distribution of Flexural Reinforcement (crack control):

Horizontal:

-Mh = -Muh / LF=	1.66	ft. - k/ft	
Ec = (57000) * (fc)^1/2 =	4031	ksi	**Es** = 29000 ksi
n = Es / Ec =	7.20		
Area Steel, **As** =	0.307	in.^2/ft.	**ρ** = 0.0069
d =	3.69	in.	**ρ * n** = 0.0497
k = [(ρ * n)^2 + 2(ρ * n)]^1/2 - ρ * n =	0.269		**s** = 12 in.
j = 1- k/3 =	0.910		

Tensile stress in steel:

fs = 12 * (-Mh) / (j * d * As) = 19.3 ksi < 60% * fy = 36 ksi **PASS**

dc = Tw - d =	2.31	in.	
A = 2 * dc * s =	55.4	in.^2	
z = fs * (dc * A)^1/3 =	97.2	k/in. < z allow =	145 k/in. for exterior exposure

PASS

Vertical:

-Mv = -Muv / LF=	1.04	ft-k/ft	**ρ =**	0.0084	
Area Steel, **As** =	0.307	in.^2/ft.	**ρ * n =**	0.0605	
d =	3.06	in	**s =**	12	in
k = [(ρ * n)^2 + 2(ρ * n)]^1/2 - ρ * n =	0.293				
j = 1- k/3 =	0.902				

Tensile stress in steel:

fs = 12 * (-Mv) / (j * d * As) =	14.7	ksi	< 60% * fy =	36	ksi	**PASS**

dc = Tw - d =	2.94	in.			
A = 2 * dc * s =	70.6	in.^2			
z = fs * (dc * A)^1/3 =	87.0	k/in.	**< z allow** =	145	k/in. for exterior exposure

PASS

Vertical Shear:

Moody rv =	0.4573		%V =	0.85		
Vuv = LF * (rv) * y * P =	2519	lbs				
%Vc = %V * 2 (fc) ^1/2 b * d =	4414	lbs	**>Vuv** =	2519	lbs	**PASS**

Horizontal Shear:

Moody rh =	0.5365		%V =	0.85	
Vuh = LF * (rh) * y * P =	2955				
%Vc = %V * 2 (fc) ^1/2 b * d =	5323		**>Vuh** =	2955	**PASS**

Base Slab

Concrete Wt. **Yc** = 150 pcf — Earth Cover **Dec** = 0 to 2 ft
Soil Wt. **Ys** = 120 pcf — Ground Water Table, **dgw** = 0 ft. below gr.
fc = 5000 psi — **fy** = 60000 psi — Water Weight **Yw** = 62.4 pcf

Dimensions:

Slab

Inside Length, **Lb** = 6.00 ft
Inside Width, **Wb** = 6.00 ft
Thickness, **Tb** = 6 in
Inside Area, **IA** = 36.00 ft^2
Outside Area, **OA** = 49.00 ft^2

Walls

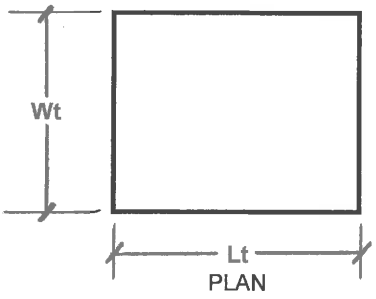
Thickness, **Tw** = 6 in
Head Room, **HR** = 6.00 ft
Concrete cover, **cc** = 1.00 in

Top

Thickness, **Tt** = 6.75 in.

AASHTO Load Factors: **LFdl** = 1.3
LFll = 2.17

Design: Lt / Wt = 1.00 if > 1.5 = one-way — TWO WAY



Dead Load:

Earth Cover, Dec * ys = 0.24 ksf
Top Slab, Tt* yc = 0.08 ksf
Walls: HR * (OA - IA) * Yc /OA = 0.24 ksf
Total dead load, **Wdl** = 0.56 ksf
Ground Water Pressure, **GWP** =
(Tb + Tt + HR + Dec - dgw) * Yw = 0.57 ksf
The larger value governs for Wdl,
Therefore, Wdl = 0.57 ksf (governs)

Live Load:

Wheel load, **LL** = 16 K — No. of Wheels, # n = 2
HS-20: 16K; HS-25: 20K
Wll = n * LL / (OA) = 0.65 ksf

Factored Design Load, **UL** = (LFdl * Wdl + LFll * Wll) = 2.15 ksf

Manhole is square, therefore distribute the load 50% each way

Neglect negative wall moments when determining positive moments in slab: conservative

Moment: **+M** = 0.5 * (Wdl + Wll) * Wb^2) / 8 = 2.75 ft. - k/ft

Factored Moment: **+Mu** = 0.5 * (UL * Wb^2) / 8 = 4.84 ft. - k/ft

Select Steel:

Rebar Size = # 5 — Area steel, **As** = 0.307 in.^2/ft.
Spacing, **s** = 12 in o.c.
Cover, **c** = 1.00 in
'd' to ctr. btm. bar: = Tt - cc - 1.5 * (bar dia) = 4.06 in
b = 12 in

ρ = As / b * 'd'min. = 0.0063
> **ρ min.** = 200 / fy = 0.0033 **PASS**
< **ρ max.** = 0.75pb = 0.75[0.85(β1)(fc/fy)]*[87/(87+fy)] = 0.0252 **PASS**

a = As * fy / (0.85 * fc * b) = 0.36 in.
Capacity reduction Factor by Code **%** = 90%
%Mn. = % * As * fy ('d'-a/2) / 12 = 5.36 ft. - k/ft > +Mu = 4.84 ft. - k/ft **PASS**

Check Distribution of Flexural Reinforcement (crack control):

Ec = (57000) * (fc)^1/2 =	4031	ksi	**Es** =	29000	ksi
n = Es / Ec =	7.20				
Bar Spacing, **s** =	12	in	**'d'** =	4.06	in
Slab Thickness, **Tb** =	6	in	**ρ** =	0.0063	
Total Moment, **+M** =	2.75	ft. - k/ft	**ρ*n** =	0.0454	
Area Steel, **As** =	0.307	in.^2/ft.	**b** =	12	in
k = [(ρ * n)^2 + 2 ρ*n]^1/2 - ρ * n =	0.259				
j = 1- k/3 =	0.914				

Tensile stress in steel:

fs = 12 * (+M) / (j * 'd' * As) = 29.0 ksi < 60% * fy = 36 ksi **PASS**

dc = Tb - 'd' = 1.94 in

A = 2 * dc * **s** = 46.6 in^2

z = fs * (dc * A)^1/3 = 130.2 k/in. < **z allow** = 145 k/in. for exterior exposure **PASS**

USE **5** @ **12** **IN.**
Top Each Way

Shear: %v = 0.85

Vut = 0.5 * UL * Wb/2 = 3225 lbs.

%Vc = %v * 2 (fc^1/2) b * 'd' = 5857 lbs. > Vut 3225 lbs. **PASS**

-Mu = -Muv from base walls (reference previous sheet) = 1.77 ft.-k/ft.

Therefore hook/extend Vertical Outside Face wall reinforcing into top of slab

Adequate by Inspection

USE **5** @ **12** **IN.**
Bottom Each Way

BUOYANCY CALCULATIONS

Sheet: 8
1007

MANHOLE GEOMETRY

INTERIOR DIMENSIONS			EXTERIOR DIMENSIONS + Collar		
WIDTH	LENGTH	HEIGHT	WIDTH	LENGTH	HEIGHT
6'	6'	6.00	8.33	8.33	7.06

WALL THICKNESS'S		
ROOF	WALLS	FLOOR
6.75"	6"	6"

DEDUCTION FOR HOLES /OPENINGS
4.00 CFT
600.00 LBS

SITE GEOMETRY

HEIGHT OF VAULT ABOVE GRADE (H1)	0.00 FT
DEPTH OF COVER TO TOP OF VAULT (H2)	0.33 FT
DEPTH OF WATER TABLE (H3)	0.00 FT
COLLAR THICKNESS = (C1)	**6.00 INCHES**

BUOYANT FORCE

BUOYANT FORCE EQUALS THE WEIGHT OF THE WATER DISPLACED BY THE VAULT
WEIGHT OF WATER 62.4 PCF

BOUYANT FORCE = (OH-H1+H2-H3)(OW)(OL)(62.4 PCF) WHEN (OH-H1+H2-H3) < OH
OTHER WISE
= (OH)(OW)(OL)(62.4 PCF)

BUOYANT FORCE = 30,568.86 LBS

RESISTING FORCES

COLLAR WIDTH **8.00 INCHES**

WEIGHT OF STRUCTURE	19,441.59 LBS
WEIGHT OF EARTH COVER	1,938.55 LBS
WEIGHT OF COLLAR	1,532.67 LBS
WEIGHT OF SOIL ABOVE THE COLLAR	16,896.12 LBS
DEDUCTION FOR HOLES/OPENINGS	-600.00 LBS
TOTAL	39,208.93 LBS

RATIO OF RESISTING TO BUOYANT FORCES

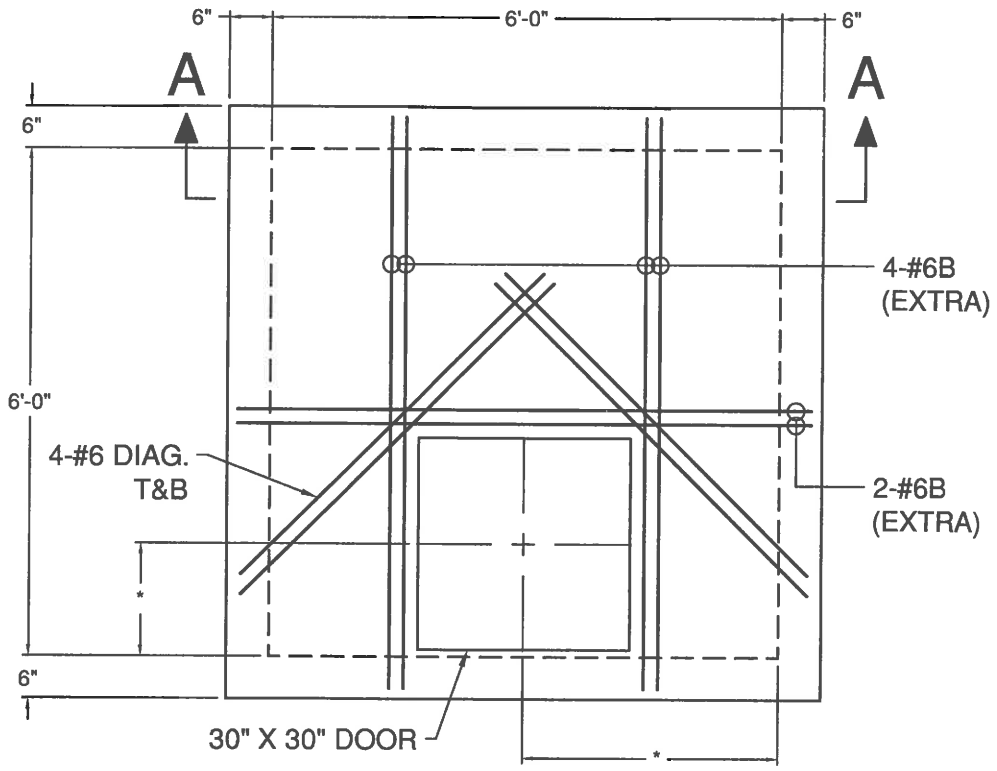
RATIO = RESISTING / BUOYANT = 1.28 > 1.25 **PASS**

Install 8" wide x 6" thick Float Collar

CONCRETE PRODUCTS, INC.
www.acmiller.com

PROJECT No.: 1007
DATE: 2-24-10
SHEET: 9

S-0606072-022010



PLAN - TOP SLAB

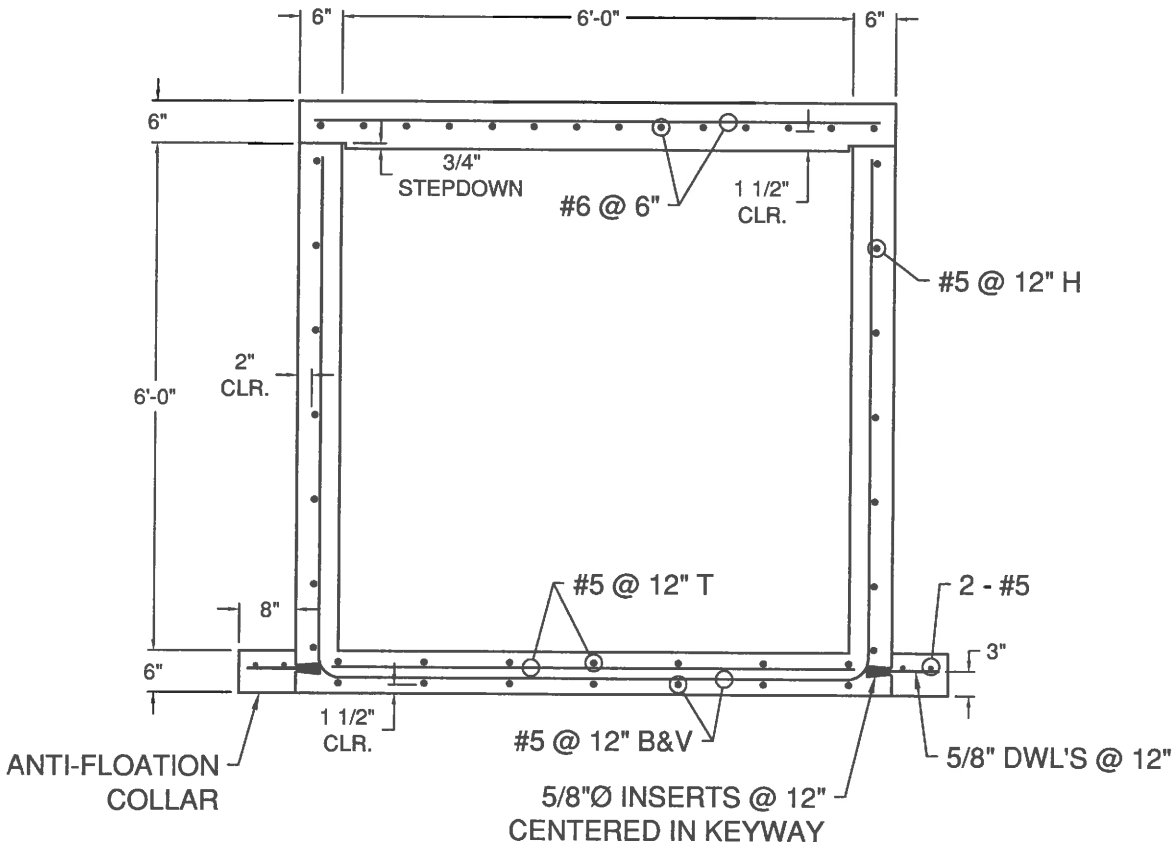
(ADDITIONAL REINFORCING AT OPENING)

NOTES: - * SEE A.C. MILLER CONCRETE PRODUCTS, INC APPROVED SHOP DRAWINGS FOR SIZE, LOCATION & DETAILS OF ALL OPENINGS, SLEEVES, INSERTS, SUMP, ETC., WHERE REQUIRED

A.C. MILLER
CONCRETE PRODUCTS, INC.
www.acmiller.com

PROJECT No.: 1007
DATE: 2-24-10
SHEET: 10

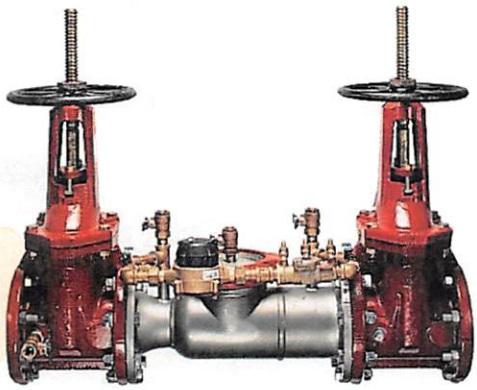
S-0606072-022010



SECTION A-A

NOTES: - PROVIDE 1" OF CONCRETE COVER ON ALL SURFACES UNLESS NOTED
-LAP #5 H BARS IN WALL 2'-6"
- SEE A.C. MILLER CONCRETE PRODUCTS, INC APPROVED SHOP DRAWINGS FOR SIZE, LOCATION & DETAILS OF ALL OPENINGS, SLEEVES, INSERTS, SUMP, ETC., WHERE REQUIRED

GRAINGER



WATTS Double Check Detector Assembly: 774, Stainless Steel, 10 in Size, Flanged, 33 to 110°F

Item **36JD07**

Mfr. Model **774DCDA-OSY-CFM**

Compare

Web Price
$19,439.79 / each

This item requires special shipping, additional charges may apply.

Qty 1

Add to Cart

Ship | Pickup

Ships from supplier. Expected to arrive by end of **Feb, 2024**.

Ship to **18201** | Change

Shipping Weight **1156 lbs**

Ship Availability Terms

Add to List

Product Details

Catalog Page **N/A**

Brand **WATTS**

Body Material **Stainless Steel**

Compliance **ASSE 1048; FM Approved; UL Classified (OSY Only)**

Connection **Flanged**

Features **cu ft m; Detector Assembly with OSY Shutoff; Short Lay Length**

Height **45-3/4 in**

Length **55-1/2 in**

Maximum Pressure **175 psi**

Maximum Temperature **110 °F**

Product Type **Double Check Detector Assembly**

Size **10 in**

Standards **AWWA C510; CSA B64.5**

Temperature Range **33 to 110°F**

Width **19-1/2 in**

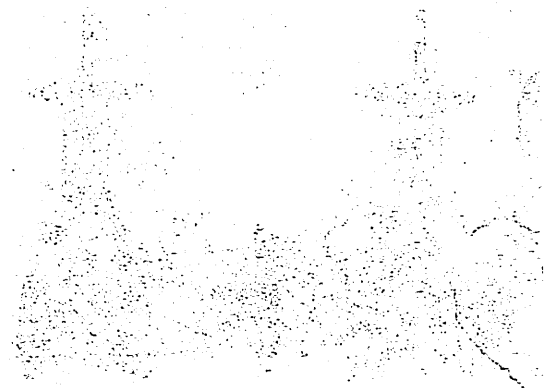
Valve Model Feature **CFM Meter; Outside Stem & Yoke Gate Valve**

Series **774**

Compliance & Restrictions

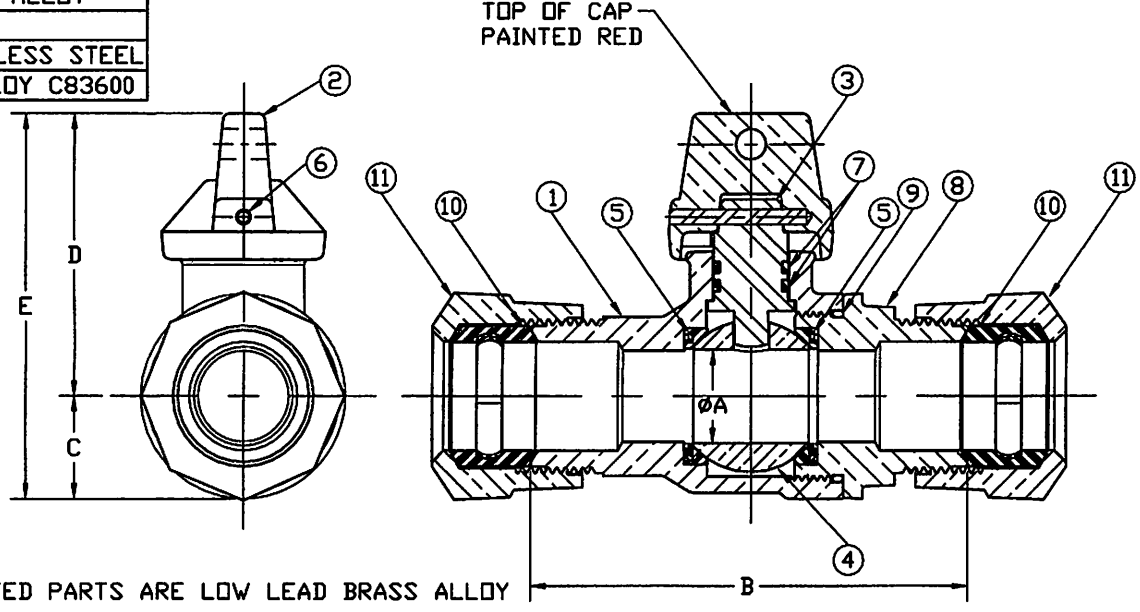
This product is not intended for potable water applications (human consumption - drinking and cooking) and has not been designed to be compliant with the "Safe Drinking Water Act" requirements for low lead in potable water applications. This item is for use only in non-potable (non-human consumption) water applications.

This item is restricted for conveying or dispensing water for potable use (human consumption).



No.	DESCRIPTION	MATERIAL DESCRIPTION
1	BODY	CAST LOW LEAD BRASS ALLOY
2	CAP	CAST BRASS ASTM B62 ALLOY C83600
3	STEM	LOW LEAD BRASS ALLOY
4	BALL	LOW LEAD BRASS ALLOY
5	GASKET	ASTM D2000 (NITRILE)
6	SOLID PIN	AISI 303 STAINLESS STEEL
7	O-RING	ASTM D2000 (EP)
8	END PIECE	CAST LOW LEAD BRASS ALLOY
9	O-RING	ASTM D2000 (EP)
10	CTS GASKET SUB	ASTM D2000(SBR)&410 STAINLESS STEEL
11	CONNX NUT	CAST BRASS ASTM B62 ALLOY C83600

SIZE	øA	B	C	D	E
3/4"	.75	3.59	.84	2.12	2.96
1"	1.00	5.03	1.15	2.32	3.47
1 1/2"	1.50	5.06	1.50	3.37	4.87
2"	2.00	5.52	1.82	3.92	5.74



NOTE: ALL WETTED PARTS ARE LOW LEAD BRASS ALLOY

FILEPATH: PROD-ENG\MUELLER\ASYSUBMITTALS\B25209N

REV	ECR	DESCRIPTION	DATE	BY	CHKR

PER EST NO: DXXXX EST FIN WT = 0.0000 lbs

DRFTR	RWB	7/30/14
CHKR		
ENGR		
MGR		
	BY	DATE
STK No:		
MAT'L:		

Mueller Co.

UNLESS OTHERWISE NOTED
SURFACE PREPARATION:
BREAK CORNER(S) ----- .000
SURFACE FINISH --XXX RMS
TOLERANCE(S):
LINEAR ---------- ± .000
ANGULAR --------- ± 0°00'

THIRD ANGLE PROJECTION

REF. No.

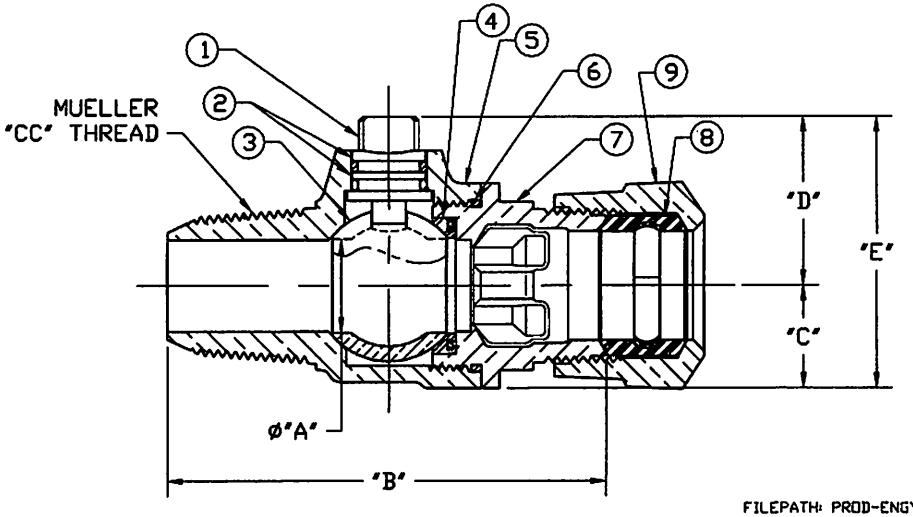
SCALE FULL

DESCR. INLINE 360° TURN BALL CURB VALVE LLB (110CTS x 110CTS)

DWG NUMBER B25209N

DWG NUMBER B25209N 44²-MRKTG

No.	DESCRIPTION	MATERIAL
1	STEM	LOW LEAD BRASS ALLOY
2	O-RING	EPDM D2000
3	BALL	LOW LEAD BRASS ALLOY
4	GASKET - SEAL	NITRILE D2000
5	BODY	CAST LOW LEAD BRASS ALLOY
6	O-RING	EPDM D2000
7	END PIECE	CAST LOW LEAD BRASS ALLOY
8	CTS GSKT SUB	SBR D2000 - GSKT 410ss - BAND
9	CONNX NUT	CAST BRASS ASTM B62 ALLOY C83600



SIZE	øA	B	C	D	E
3/4	.750	3.621	.840	1.363	2.203
3/4x1	.750	3.855	.840	1.390	2.230
1	1.000	4.648	1.150	1.564	2.714
1x1-1/4	1.000	4.413	1.150	1.564	2.714
1-1/2	1.500	5.157	1.500	2.120	3.620
1-1/2x2	1.500	5.133	1.500	2.235	3.735
2	2.000	5.612	1.820	2.443	4.263

NOTE: ALL WETTED PARTS ARE LOW LEAD BRASS ALLOY

FILEPATH: PROD-ENG\MUELLER\ASYSUBMITTALS\B25008N

REV	ECR	DESCRIPTION	DATE	BY	CHKR

PER EST NO: DXXXX EST FIN WT = 0.0000 lbs

DRFTR	JGarvin	12/19/08
CHKR		
ENGR		
MGR		
	BY	DATE

STK No:

MAT'L:

DESCR. BALL CORPORATION VALVE
LOW LEAD BRASS("CC" x 110 CTS)

Mueller Co.

UNLESS OTHERWISE NOTED
SURFACE PREPARATION:
BREAK CORNER(S) ---- .000
SURFACE FINISH -- XX RMS
TOLERANCE(S):
LINEAR ---------- ± .000
ANGULAR --------- ± 0°00'

THIRD ANGLE PROJECTION

REF. No.

SCALE NONE

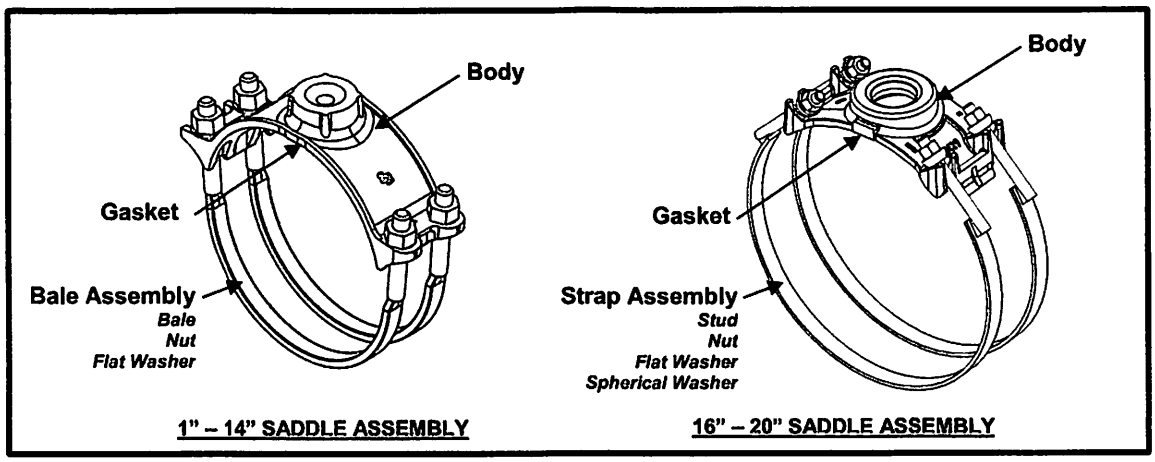
DWG NUMBER B25008N

DWG NUMBER B25008N

44²-MRKTG

Smith-Blair
a xylem brand

SPECIFICATION
SERVICE SADDLE DOUBLE BALE
MODEL 314



APPLICATIONS

- **Typical Uses**
  - Tapping branch connections on new or existing pipe
  - Installing vacuum valves, pitot tubes, relief valves, or other miscellaneous service equipment
  - Installing pipe supports, hangers, or sign mounting brackets
- **Standard Pipe Size(s)**
  - 1.25" to 20" nominal
- **Standard Taps**
  - NPT: 3/4", 1", 1-1/4", 1-1/2", 2", 3" and 4"

  See Smith-Blair catalog for available pipe diameter and tap size combinations as some combinations are not available
- **Type of Pipe**
  - Carbon Steel, Stainless Steel, Cast Iron
- **Working Pressure / Test Pressure**
  - 150 PSI / 300 PSI

MATERIALS

- **Body** *(Small (ST) and Large (LT) Tap sizes 1/2" – 2-1/2")*
  - Cast using Ductile Iron 65-45-12 per ASTM A536
  - Flexi-Coat® fusion bonded epoxy finish
- **Body** *(Extra-Large (XLT) Tap sizes 3" and 4")*
  - Cast using Ductile Iron 65-45-12 per ASTM A536
  - Flexi-Coat® fusion bonded epoxy finish
- **Gasket**
  - Nitrile (Buna-N) per ASTM D2000
  - Compounded to resist oil, natural gas, acids, alkalies, most (aliphatic) hydrocarbon fluids, and many other chemicals
  - Temperature range: -20°F to +180°F

- **Bale Assembly** *(used only on 1.25" - ~14" nominal pipe size saddles with 1/2" thru 4"tap sizes)*
  - **Bale**
    - High Strength Low Alloy (HSLA) Steel
    - FE/Zn coated per ASTM F1941-10
    - Size: 1.25" – 3" nominal pipe size(s) = 1/2"-13UNC with rolled threads
      4" – 14" nominal pipe size(s) = 5/8"-11UNC with rolled threads
      Extra-Large (XLT) Taps > 14.73" O.D. = 5/8"-11UNC with rolled threads
  - **Nut**
    - Carbon Steel per ASTM A307
    - FE/Zn coated per ASTM F1941-10
    - Size: 1.25" – 3" nominal pipe size(s) = 1/2"-13UNC Heavy Hex Semi-Finished
      4" – 14" nominal pipe size(s) = 5/8"-11UNC Heavy Hex Semi-Finished
      Extra-Large (XLT) Taps > 14.73" O.D. = 5/8"-11UNC Heavy Hex Semi-Finished
  - **Flat Washer**
    - Carbon Steel per ASTM F844
    - FE/Zn coated per ASTM F1941-10
    - Size: 1.25" – 3" nominal pipe size(s) = 1/2" Type A Plain
      4" – 14" nominal pipe size(s) = 5/8" Type A Plain
      Extra-Large (XLT) Taps > 14.73" O.D. = 5/8" Type A Plain
- **Strap Assembly** *(used only on 16" - 18" nominal pipe size saddles with 1/2" thru 2-1/2" tap sizes)*
  - **Strap**
    - Carbon Steel per ASTM A36
    - Flexi-Coat® fusion bonded epoxy finish
    - Formed using 0.25" x 1.25" flat bar
  - **Stud**
    - HSLA Steel
    - Flexi-Coat® fusion bonded epoxy finish (threads free from epoxy coating)
    - 5/8"-11UNC, Stud welded to Strap; with rolled threads
  - **Welding**
    - Welds accomplished using qualified welders
    - GMAW weld process utilized
  - **Nut**
    - Carbon Steel per ASTM A307
    - 5/8"-11UNC Heavy Hex Semi-Finished
    - FE/Zn coated per ASTM F1941-10
  - **Flat Washer**
    - Carbon Steel per ASTM F844
    - 5/8" Type A Plain
    - FE/Zn coated per ASTM F1941-10
  - **Spherical Washer** *(used only on 16" – 20" nominal pipe size saddles)*
    - Cast using Ductile Iron 65-45-12 per ASTM A536
    - Flexi-Coat® fusion bonded epoxy finish

- **Strap Assembly** *(used only on 14" - 18" nominal pipe size saddles with 3" and 4" tap sizes)*
  - **Strap**
    - Carbon Steel per ASTM A36
    - Flexi-Coat® fusion bonded epoxy finish
    - Formed using 0.25" x 1.75" flat bar
  - **Stud**
    - HSLA Steel
    - Flexi-Coat® fusion bonded epoxy finish (threads free from epoxy coating)
    - 3/4"-10UNC, Stud welded to Strap; with rolled threads
  - **Welding**
    - Welds accomplished using qualified welders
    - GMAW weld process utilized
  - **Nut**
    - Carbon Steel per ASTM A307
    - 3/4"-10UNC Heavy Hex Semi-Finished
    - FE/Zn coated per ASTM F1941-10
  - **Flat Washer**
    - Carbon Steel per ASTM F844
    - 3/4" Type A Plain
    - FE/Zn coated per ASTM F1941-10
    - Utilized to preserve corrosion resistance of epoxy coated surfaces and increase bearing surface
  - **Spherical Washer**
    - Cast using Ductile Iron 65-45-12 per ASTM A536
    - Flexi-Coat® fusion bonded epoxy finish

OPTIONS

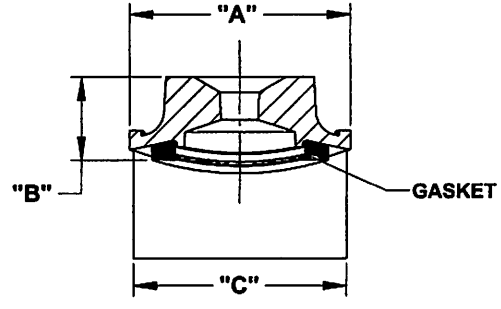
- Type 304 or 316 Stainless Steel bale assembly with fluoropolymer coated nuts *(spherical washers remain D.I. if applicable)*
- Type 304 or 316 Stainless Steel strap assembly with fluoropolymer coated nuts *(spherical washers remain D.I.)*
- Electro-galvanized strap assembly
- Alternative gasket material (e.g. Viton, EPDM, etc.)
- Anode connector

LISTINGS/STANDARDS

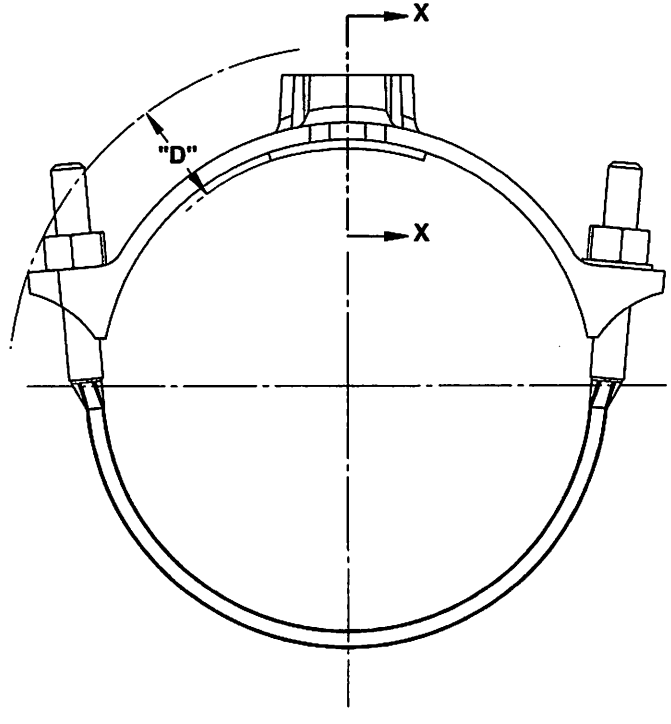
- Marked in accordance with DOT CFR 49-192.63(a)(2)

NOTES

- These product specifications were correct at the time of publication and are subject to change without notice
- Xylem, Smith-Blair, SB stylized, and Flexi-Coat are registered trademarks of Xylem, Inc., or one of its subsidiaries
- See the Smith-Blair website for part numbers and ordering information
- See the Smith-Blair website for warranty information
- See the Smith-Blair website for corrosion notice
- The working pressure of a Saddle decreases as pipe diameter increases (regardless of manufacturer). For a particular installation, the allowable working pressure will be determined by the **pipe size**, type of pipe, type of saddle, type and extent of damage, service conditions, environmental conditions, and installation workmanship



SECTION X-X



NOMINAL SIZE	APPROX. WT. (LB)	TAP CODE	A	B	C	D	SOCKET SIZE
1.25 - 2.50	3	ST	3.40	1.35	2.88	1.53	7/8"
	-	LT	-	-	-	-	
3	4	ST	3.40	1.40	3.00	1.70	
	5	LT	4.40	1.40	3.60	1.65	
4	6	ST	3.70	1.40	3.50	1.60	1-1/16"
	6	LT	5.50	1.75	3.65	1.75	
5	6	ST	3.70	1.40	3.60	1.75	
	9	LT	5.50	1.75	3.65	1.70	
6	7	ST	3.75	1.40	3.60	1.75	
	7	LT	5.50	1.75	3.65	1.78	
	13	XLT	6.05	1.93	4.20	1.83	
8	8	ST	3.75	1.40	3.60	1.87	
	11	LT	5.50	1.75	3.65	1.90	
	15	XLT	6.05	1.85	4.10	1.90	
10	10	ST	3.75	1.40	3.60	1.90	
	11	LT	5.50	1.75	3.60	1.90	
	14	XLT	7.20	2.00	4.20	1.85	
12	14	ST	3.75	1.45	3.60	2.00	
	15	LT	5.50	1.75	3.60	1.95	
	18	XLT	7.20	2.00	4.20	1.85	
14	18	ST	4.45	1.40	2.85	1.90	
	18	LT	4.45	1.40	3.60	1.90	
	28	XLT	7.20	2.00	4.20	1.85	1-1/4"
15-16	19	ST	4.45	1.80	5.00	2.15	1-1/16"
	19	LT	4.45	1.80	5.00	2.15	
	29	XLT	6.90	1.95	7.35	2.30	1-1/4"

NOTES:

1. SEE SMITH-BLAIR CATALOG FOR AVAILABLE PIPE DIAMETER AND TAP SIZE COMBINATIONS AS SOME COMBINATIONS ARE NOT AVAILABLE
2. 9.05" SADDLE SHOWN OTHER SIZES SIMILAR
3. ABBREVIATIONS:
   ST = SMALL TAP SIZES 5/8" THRU 1-1/2"
   LT = LARGE TAP SIZES 2" THRU 2-1/2"
   XLT = EXTRA-LARGE TAP SIZES 3" AND 4"

TOLERANCES U.N.O.
.XX= ±.03
.XXX= ±.015
FRACTIONS=
ANGLES=±1°
MACH. FIN=
ALL DIMENSIONS ARE IN INCHES.

NOTES:
REMOVE BURRS AND SHARP EDGES
DO NOT SCALE DWG.

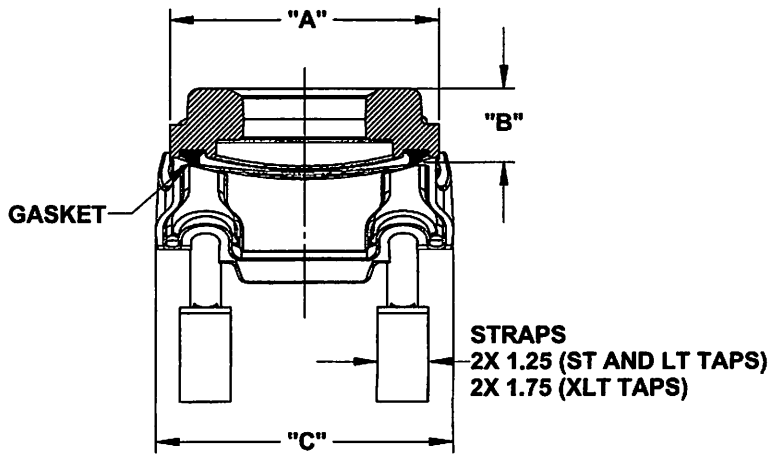
SCALE: N/A

APP'D | DATE
CK'D | DATE
DRN: CHD | DATE: 7/1/15

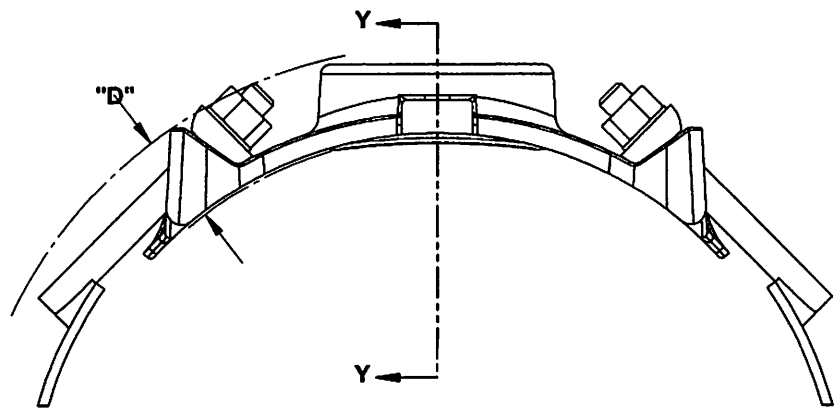
TITLE
SPECIFICATION
SERVICE SADDLE DOUBLE BALE
MODEL 314

SMITH-BLAIR
TEXARKANA, ARKANSAS

P/N: N/A
DWG. NO.: SPEC_314.DRW
SHEET: 4 of 5
REV.: 7/19/18



SECTION Y-Y



NOMINAL SIZE	APPROX. WT. (LB)	TAP CODE	A	B	C	D	SOCKET SIZE
18	20	ST	4.45	1.85	4.95	2.15	1-1/16"
	20	LT	6.90	1.85	7.25	2.15	
	30	XLT	3.90	1.85	7.25	2.15	1-1/4"
20	20	ST	4.45	1.85	5.00	2.30	1-1/16"
	20	LT	4.46	1.90	5.00	2.10	
	-	XLT	-	-	-	-	-

NOTES:

1. SEE SMITH-BLAIR CATALOG FOR AVAILABLE PIPE DIAMETER AND TAP SIZE COMBINATIONS AS SOME COMBINATIONS ARE NOT AVAILABLE
2. 19.50" XLT SADDLE SHOWN OTHER SIZES SIMILAR
3. ABREVIATIONS:
   ST = SMALL TAP SIZES 5/8" THRU 1-1/2"
   LT = LARGE TAP SIZES 2" THRU 2-1/2"
   XLT = EXTRA-LARGE TAP SIZES 3" AND 4"

TOLERANCES U.N.O.
.XX= ±.03
.XXX= ±.015
FRACTIONS=
ANGLES=±1°
MACH. FIN=
ALL DIMENSIONS ARE IN INCHES.

NOTES:
REMOVE BURRS AND SHARP EDGES
DO NOT SCALE DWG.

SCALE: N/A

APP'D		DATE	
CK'D		DATE	
DRN	CHD	DATE	7/1/15

TITLE

SPECIFICATION

SERVICE SADDLE DOUBLE BALE
MODEL 314

SMITH-BLAIR
TEXARKANA, ARKANSAS

P/N N/A

DWG. NO. SPEC_314.DRW

SHEET 5 of 5

REV. 7/19/18

Bison Curb Boxes

HEAVY DUTY BLOW MOLDED PLASTIC

- Cast Iron Rim and Lid suitable
- Cast Iron rim permanately bonded to ABS top section
- Thick-Walled ABS Plastic
- Significantly lighter than cast iron
- 2.5" Inside Diameter
- White interior increases visibility
- Screw type Adjustment

LIGHTWEIGHT

- Weighs less than 25% of an all cast iron curb box

Extension Range	Bison Box	Weight	Cast Iron	Weight
31-46	P02ZHC3146W	6.9	93-D	31.9
33-52	P02ZHC3352W	7.3	93-E	35.4
39-58	P02ZHC3958W	7.8	94-E	41.9
39-64	P02ZHC3964W	8.3	94-F	48.4
49-76	P02ZHC4976W	9.1	94-F & 151 Ext	54.4
55-82	P02ZHC5582W	9.6	94-F & 152 Ext	56.4

STANDARD & CUSTOM ASSEMBLIES

- Easily assembles with cast iron or other plastic components
- Can be used with full cast iron top section and Bison ABS plastic bottom section
- Cast Iron Lids and Rims allow for easy magnetic location
- Standard bottom sections and assemblies have 001 bell

MATERIAL SPECIFICATIONS

Acrylonitrile-Butadiene-Styrene (ABS) Plastic Properties	ASTM Test Method	Minimum Values
Tensile Strength	D-638	5,100 psi
Flexural Strength	D-790	8,000 psi
Flexural Modulus	D-790	230,000 psi
Impact Strength Izod	D-256	3.5 - 6.3 ft-lbs/in
Deflection Temp @ 264 psi	D-648	169 F
Specific Gravity	D-792	1.04

*Cast Iron is ASTM 48A Class 30

BISON ASSEMBLIES

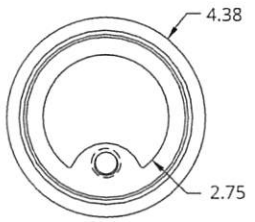
Lid	Ext. Range	Item #
Water	21-28	P02ZHC2128W
Water	25-34	P02ZHC2534W
Water	27-40	P02ZHC2740W
Water	31-46	P02ZHC3146W
Water	33-52	P02ZHC3352W
Water	39-58	P02ZHC3958W
Water	39-64	P02ZHC3964W
Water	49-76	P02ZHC4976W
Water	55-82	P02ZHC5582W

All standard assemblies come with or without a water lid.

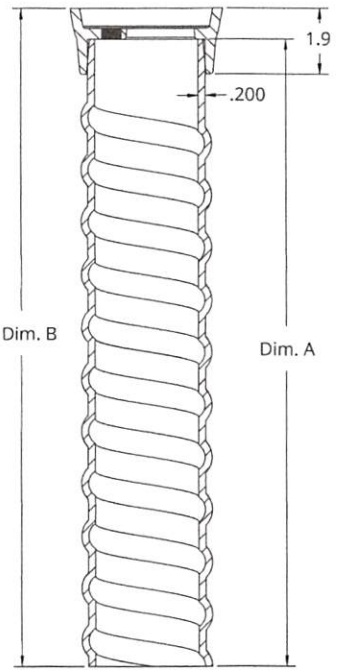
Lid options available. Contact us about custom assemblies.

BISON COMPONENTS

Cast Iron Water Lid - I2LBWNS

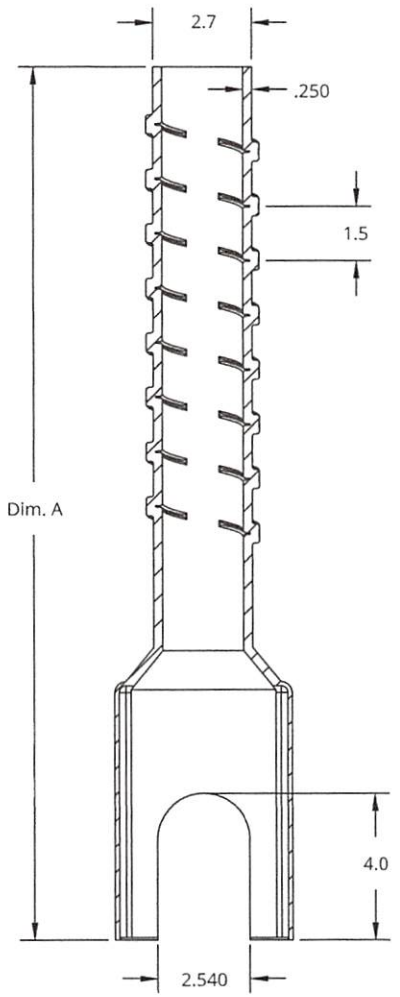


Cast Iron Rim - CUL2RH200R



Top Section w/ Rim

Dim. A	Dim. B	Item #
12	12.9	P02PTHC12
18	18.9	P02PTHC18
24	24.9	P02PTHC24
30	30.9	P02PTHC30



Bottom Section

Dim. A	Item #
18	P02BHC18
24	P02BHC24
30	P02BHC30
36	P02BHC36
42	P02BHC42
48	P02BHC48
54	P02BHC54

**All measurements are in inches*

CONTACT

540-825-8334

sales@bandt-us.com

bandt-us.com

MUELLER

350 PSI RESILIENT WEDGE GATE VALVES

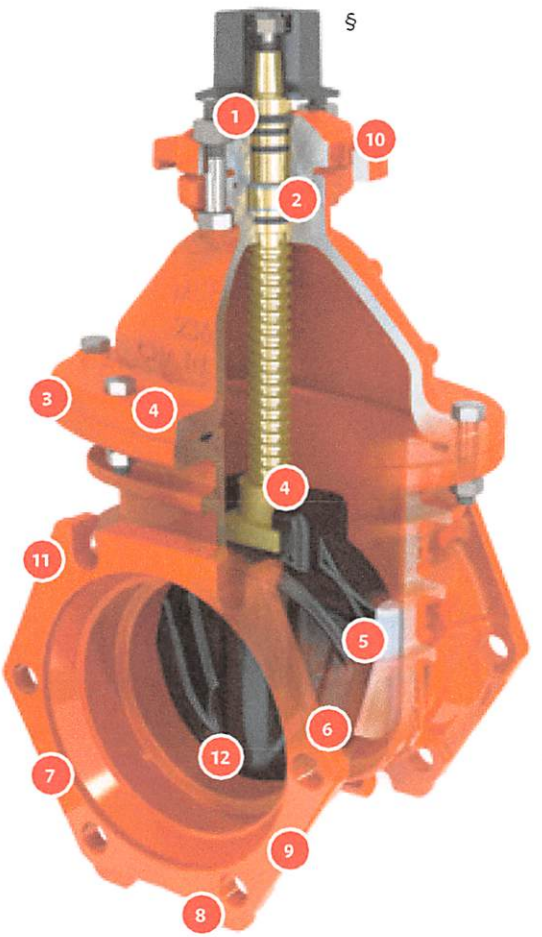
Meets AWWA, UL Listed/FM Approved; Certified to ANSI/NSF 61, ANSI/NSF 372

MUELLER

MUELLER® 350 PSI RESILIENT WEDGE A-2361 GATE VALVES

SIZES 3" - 12"

1. **Triple O-rings and Dirt Seal**
   A dirt seal at the top keeps out debris. Two O-rings above the stem thrust collar bearing area isolate it from ground contaminants, and one below isolates it from the waterway. The two upper O-rings and the dirt seal can easily be replaced in the line while the valve is under pressure in the fully open position.
2. **Forged Bronze Stem and Thrust Collar**
   This time-tested Mueller design has two thrust washers and has repeatedly proven its superior strength over cast stems.
3. **O-ring**
   Provides a superior bonnet seal.
4. **Bronze Stem Nut**
   The nut is electrically isolated from the iron in the wedge for corrosion resistance. The nut is held tightly in place to resist stem binding.
5. **Polymer Wedge Guide Bearing Caps**
   Provides a bearing surface between the encapsulated wedge and the interior epoxy coating, lowering operating torque and extending the service life of the valve.
6. **Oversized, Full Port Opening, Smooth Waterway**
   The bottom of the waterway has no grooves or recesses to collect sediment or debris and compromise the seal. It accommodates full-sized shell cutters with ample clearance during tapping operations.
7. **Mueller PRO-GARD® Epoxy Coating System**
   The superior fusion-bonded (thermosetting) powder epoxy covers the interior and exterior with a thickness of 10 mils nominal. The powder epoxy coating fully complies with ANSI/AWWA Standard C550.
8. **Integral Legs**
   Flats cast in the bottom of the valve body let the valve stand upright in storage or during installation.
9. **Available End Connections**
   FL x FL, MJ x FL, MJ x MJ, SL x SL, and FL x SL.



TRIPLE LISTED

Valve complies with:

- ANSI/AWWA C509 (3")
- ANSI/AWWA C515 (4" - 12")

Listed by Underwriters Laboratory Inc. and ULC

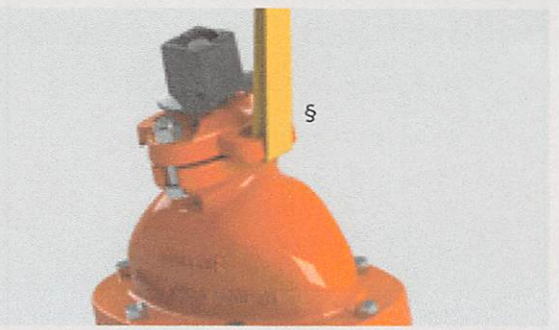
Approved by Factory Mutual Corp.

350 PSI RESILIENT WEDGE A-2361 GATE VALVES

Sizes 3" - 12"

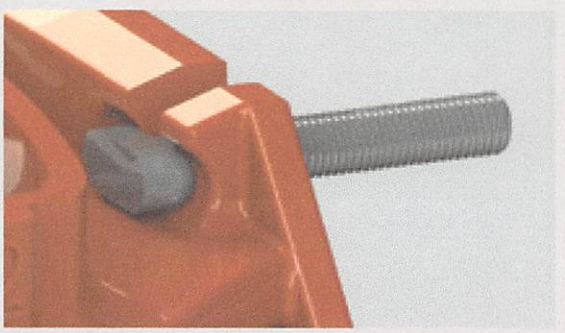
10 Integrated Lift Lugs

The A-2361 resilient wedge gate valves also feature dual-purpose lifting lugs. The ductile iron lugs provide stability and alignment for the valve box. They instantly align the valve box (up to 8" valve size) and eliminate the need for a valve box adapter (standard 7½" I.D.). The lugs can accommodate straps or hooks, providing the contractor with options for lifting and installing while increasing site safety and ease of installation.



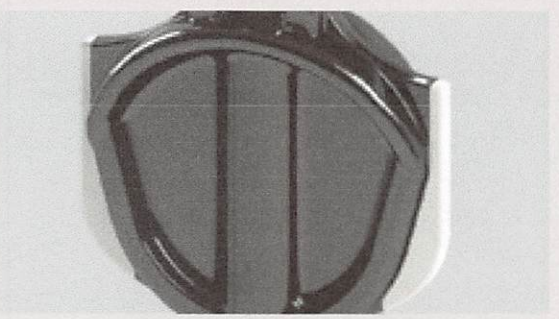
11 T-Head Bolt Retention

On all A-2361 resilient wedge gate valves with MJ flange connections, Mueller has designed a nesting area for T-head bolts to prevent rotation during pipe installation. This unique feature improves site safety, speeds installation, eliminates the need for special anti-rotation bolts, and results in a water-tight connection.

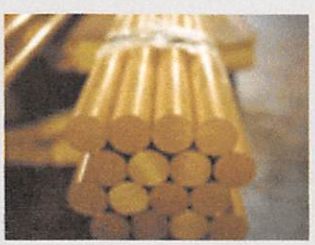


12 Self-Activating Wedge Seal

The shape of the iron wedge casting and the elastomeric encapsulation are specifically designed to provide positive stop, without over-stressing the elastomer or epoxy lining. The maximum operating torque at 350 psi is comparable to current values at 250 psi.



FORGED BRONZE STEM AND THRUST COLLAR MANUFACTURING PROCESS



BRONZE BAR STOCK

BAR STOCK IS CUT TO LENGTH

STEM IS ELECTRICALLY HEATED AND THRUST TOGETHER TO CREATE THE THRUST COLLAR

STEM THREADS AND THRUST COLLAR ARE ROBOTICALLY MACHINED AND SORTED

OUR PRODUCTS

Mueller has built its reputation on producing innovative water distribution products of superior quality – a reputation that is literally "on the line" every day throughout the world. Mueller products and those of its affiliates are used throughout the water system from the source to the consumer. We are committed to continuing research and development of new products and services to meet the growing needs of the water infrastructure industry. Mueller is the largest and only full-line supplier of potable water distribution products in North America and its markets continue to expand globally.

OUR PEOPLE

The capacity to deliver the widest array of products and stand behind those products to ensure your satisfaction is our strength. The success of Mueller is dependent upon the success of those who are involved, both inside and outside our company. Therefore, we feel our future is wholly dependent on long-term relationships with our employees, customers and suppliers. This is why we strive to be proactive and responsive to their needs, always looking for a "better way". It's an approach that has set us apart since 1857 and will assure our mutual achievement and prosperity in the future.

OTHER INNOVATIVE MUELLER PRODUCTS

MUELLER SUPER CENTURION 350™ HYDRANT

- 350 psig (2400 kPa/24 barg) working pressure, 700 psig (4800 kPa/48 barg) test pressure
- Sealed oil reservoir with automatic pressure lubrication
- Entire hydrant - epoxy coating inside and out inhibits corrosion
- Convenient, reversible main valve doubles service life
- Efficient hydraulic design provides maximum flow
- Certified to ANSI/NSF 61, ANSI/NSF 372
- 10-year limited warranty

For more information about Mueller or to view our full line of water products, please visit www.muellerwp.com or call Mueller customer service at 1.800.423.1323.

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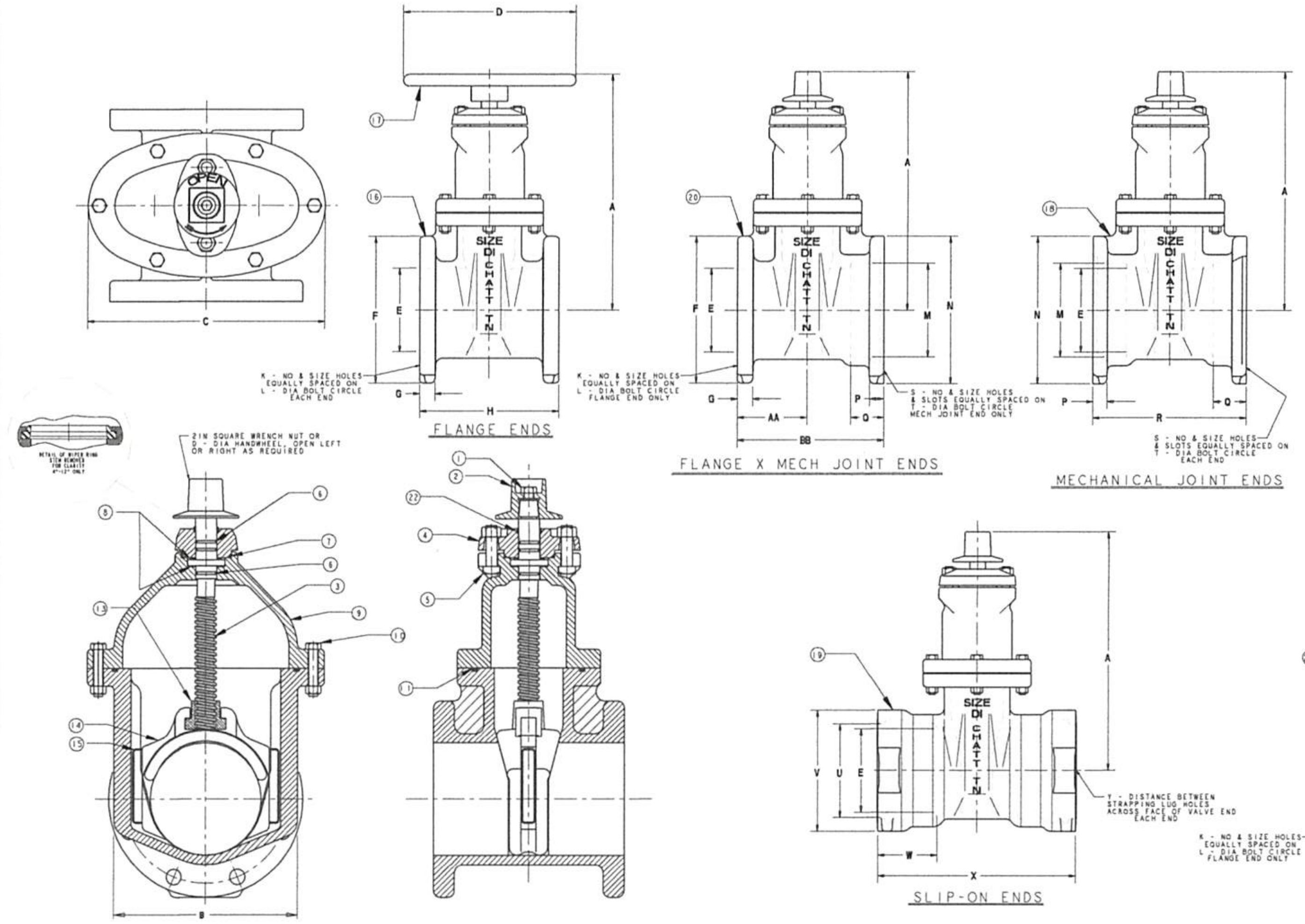
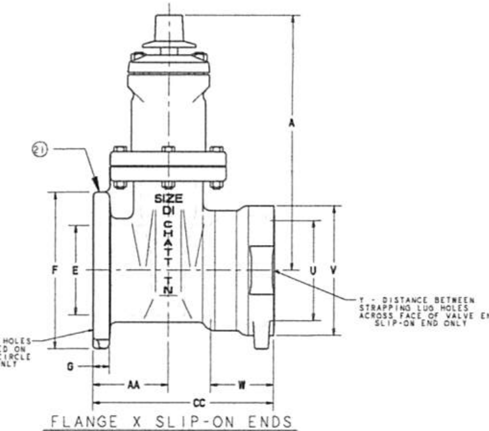
MUELLER





PART LIST

ITEM	DESCRIPTION	REQ'D	MATERIAL	ASTM	
1	CAP SCREW	1	316 STAINLESS STEEL	F593	GROUP 2-CW
2	WRENCH NUT	1	DUCTILE IRON	A536	
3	STEM	1	MANGANESE BRONZE	B138	
4	STUFFING BOX	1	DUCTILE IRON	A536	
5	STUFFING BOX BOLTS STUFFING BOX NUTS	2	316 STAINLESS STEEL 316 STAINLESS STEEL	F593 F594	GROUP 2-CW GROUP 2-CW
6	O-RING	3	RUBBER	D2000	
7	O-RING	1	RUBBER	D2000	
8	ANTI-FRICTION WASHER	2	ACETAL		
9	BONNET	1	DUCTILE IRON	A536	
10	BONNET BOLTS BONNET NUTS	"Z"	316 STAINLESS STEEL 316 STAINLESS STEEL	F593 F594	GROUP 2-CW GROUP 2-CW
11	BONNET GASKET (O-RING)	1	RUBBER	D2000	
13	DISC NUT	1	BRONZE	B584	
14	DISC	1	SEE NOTE 1 & 2		
15	GUIDE CAP	2	ACETAL		
16	BODY - FLANGE ENDS	1	DUCTILE IRON	A536	
17	HANDWHEEL	1	CAST IRON (SEE NOTE 2)	A126	CLASS B
18	BODY - MJ ENDS	1	DUCTILE IRON	A536	
19	BODY - SLIP-ON ENDS	1	DUCTILE IRON	A536	
20	BODY - FLANGE x MJ END	1	DUCTILE IRON	A536	
21	BODY - FLANGE x SLIP-ON END	1	DUCTILE IRON	A536	
22	WIPER RING	1	RUBBER		

NOTES:
1. RUBBER ENCAPSULATED DUCTILE IRON DISC DUCTILE IRON - ASTM A536 RUBBER - SBR- ASTM D2000
2. MANUFACTURER'S OPTION TO UPGRADE MAT'L TO DI - A536 OR 65-45-12 OR 70-50-05

DIMENSIONS FOR RESILIENT WEDGE VALVE - INCHES (this drawing only)

VALVE SIZE	A	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	TURN TO OPEN
4	14.19	8.25	10.79	11.00	4.30	9.00	1.00	9.00	8 - 0.75	7.50	4.90	9.12	1.00	2.50	10.00	4 - 0.88	7.50	4.96	6.88	4.12	12.82	8.62	4	4.50	9.50	10.91	14
6	18.00	10.49	13.50	13.00	6.30	11.00	1.06	10.50	8 - 0.88	9.50	7.00	11.12	1.09	2.50	11.62	6 - 0.88	9.50	7.02	9.12	4.38	14.96	10.62	6	5.25	11.06	12.73	20.5
8	21.50	13.21	16.36	14.00	8.30	13.50	1.19	11.50	8 - 0.88	11.75	9.15	13.37	1.18	2.50	12.68	6 - 0.88	11.75	9.30	11.38	5.62	17.94	13.12	6	5.75	12.09	14.72	26.5
10	25.50	16.48	19.99	16.00	10.30	16.00	1.25	13.00	12 - 1.00	14.25	11.20	15.62	1.25	2.50	14.88	8 - 0.88	14.00	11.23	13.50	5.62	18.50	16.38	8	6.50	13.94	15.75	33
12	28.62	16.83	21.00	16.00	12.30	19.00	1.31	14.00	12 - 1.00	17.00	13.30	17.88	1.31	2.50	15.00	8 - 0.88	16.25	13.33	15.75	5.62	18.70	18.12	8	7.00	14.50	16.35	38.5

ECO 1838067

APPROVED
By Matthew Sliger at 11:37 am, Jun 06, 2017

MAT'L NOTED

Mueller Co.

41N - 121N RWGV A2382

7420

MUELLER® SUPER CENTURION® FIRE HYDRANT

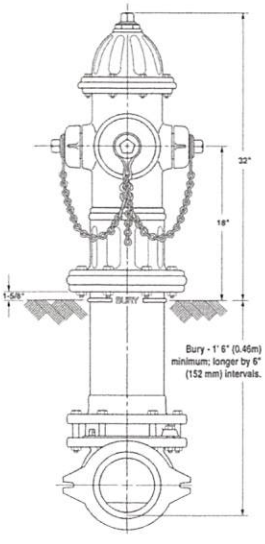
Rev. 8-19 Shaded area indicates changes

Super Centurion Fire Hydrants

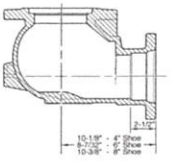
Pressure Rating		Main Valve		Nozzles		Listings	
250 PSI	350 PSI	4-1/2"	5-1/4"	Pumper	Hose	UL	FM
A421	A421HP	•		1	2	•	•
A423	A423HP		•	1	2	•	•
A424	A424HP	•		1	0		•
A425	A425HP		•	2	0	•	
A433	A433HP	•		0	2	•	•
A435	A435HP		•	0	2	•	•
A454	A454HP		•	0	3	•	•
A455	A455HP		•	0	4	•	•
A458	A458HP		•	1	3	•	•
A459	A459HP		•	2	2	•	
A461	A461HP	•		1	2	•	•
A473	A473HP		•	1	2	•	•
A477			•	1	0		

- 10 year limited warranty on material and workmanship
- Meets all applicable parts of ANSI/AWWA C502 Standard
- Post type dry barrel design
- Dry top design with O-ring sealed oil reservoir
- Traffic feature with stainless steel stem coupling
- Encapsulated, reversible, compression-type main valve closes with pressure for positive seal; it is made of rubber and is conveniently reversible providing a spare for long service life
- Operating nut available in wide variety of shapes and sizes-open left or right
- Field replaceable hose and pumper nozzles
- Hose and pumper nozzles have large radius, full flow openings for low friction loss
- Contoured shoe is designed for full flow
- Dual bronze drain valves provide effective barrel drainage
- 350 psig (2400 kPa/24 barg) maximum working pressure, 700 psig (4800 kPa/48 barg) static test pressure; 250 psig (1725 kPa/17 barg) maximum working pressure, 500 psig (3450 kPa/35 barg) static test pressure;

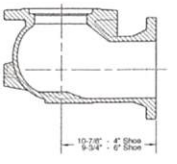
Dimensions



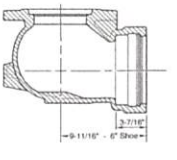
Mechanical joint standard and D-150



Flange
ASME B16.1 Class 125
PN 10/16 Drilling

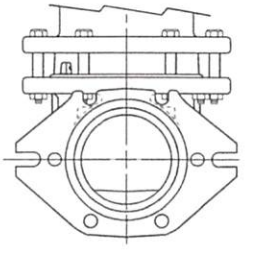


Slip-on

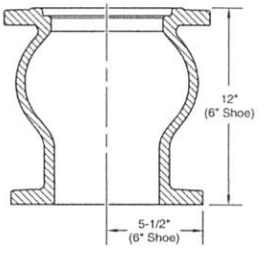


Non-rotating bolt design: cast-in pads eliminate need for anti-rotation bolts.

Front view detail of Mechanical joint (Standard only)



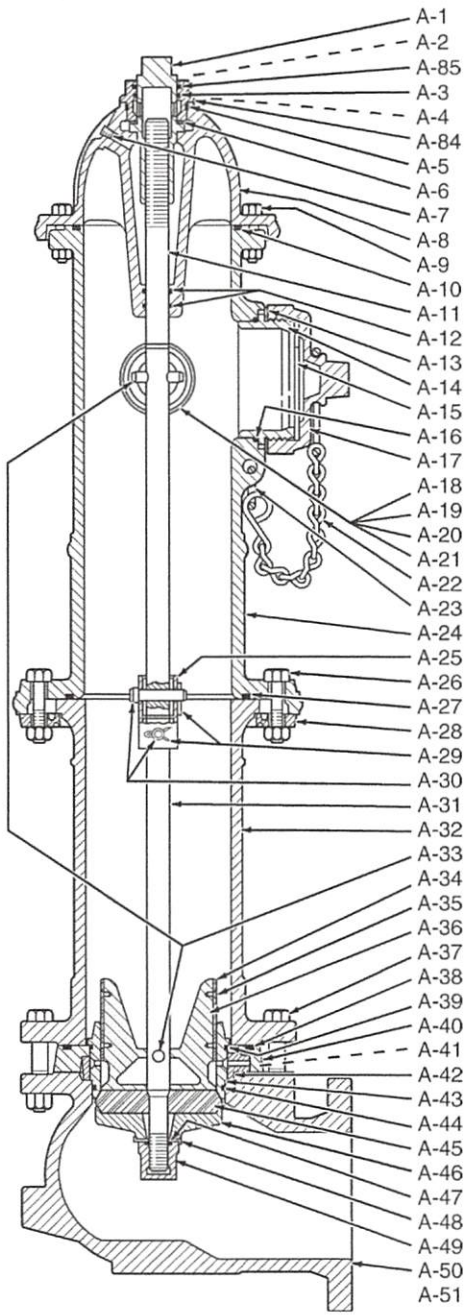
Vertical Flange
ASME B16.1 Class 125
PN 10/16 Drilling



SEE PAGE 9.25 FOR ORDERING INSTRUCTIONS

Mueller Super Centurion Fire Hydrant Parts

Catalog Part Number	Description	Material	Material Standard
A-1	Operating Nut	Bronze	ASTM B62
A-2	Weather Cap (not shown - used only on pre-1988 models)	Cast Iron	ASTM A126 CL.B
A-3	Hold Down Nut O-ring	Rubber	ASTM D2000 - BUNA N
A-4	Hold Down Nut (not shown - used only on pre-1998 models	Bronze	ASTM B62
A-5	Bonnet O-ring	Rubber	ASTM D2000 - BUNA N
A-6	Anti-friction Washer	Acetal	-
A-7	Oil Plug	Brass	ASTM B16
A-8	Bonnet	Cast Iron	ASTM A126 CL.B
A-9	Bonnet Bolt and Nut	Steel	SAE J429
A-10	Bonnet O-ring (1997 and newer 3-way models; all pre-1997 models and 1-way and 2-way models have flat gasket)	Rubber	ASTM D2000 - BUNA N
A-11	Upper Stem	Steel	ASTM A576 1144T
A-12	Stem O-ring	Rubber	ASTM D2000 - BUNA N
A-13	Nozzle Lock	Stainless Steel	ASTM A276
A-14	Pumper Nozzle	Bronze	ASTM B584
A-15	Pumper Nozzle Gasket	Rubber	ASTM D2000 - Neoprene
A-16	Pumper Nozzle O-ring	Rubber	ASTM D2000 - BUNA N
A-17	Pumper Nozzle Cap	Cast Iron	ASTM A126 CL.B
A-18	Hose Nozzle	Bronze	ASTM B584
A-19	Hose Nozzle Gasket	Rubber	ASTM D2000 - Neoprene
A-20	Hose Nozzle O-ring	Rubber	ASTM D2000 - BUNA N
A-21	Hose Nozzle Cap	Cast Iron	ASTM A126 CL.B
A-22	Cap Chain	Steel	Plated
A-23	Chain Ring	Steel	Plated
A-24	Upper Barrel Less Nozzles	Cast Iron	ASTM A126 CL.B
A-25	Stem Coupling	Stainless Steel	ASTM A890
A-26	Traffic Flange Bolt and Nut	Steel***	SAE J429 Grade 2******
A-27	Traffic Flange O-ring (1997 and newer models; pre-1997 models have a flat gasket)	Rubber	ASTM D2000 - BUNA N
A-28	Traffic Flange	Cast Iron	ASTM A126 CL.B
A-29	Reusable Clip	Stainless Steel	ASTM A276
A-30	Clevis Pen	Stainless Steel	ASTM A276
A-31	Lower Stem	Steel	ASTM A576 1144T
A-32	Lower Barrel	Cast Iron	ASTM A126 CL.B
A-33	Stem Pin	Stainless Steel	ASTM A582
A-34	Drain Valve Facing	Plastic	-
A-35	Drain Valve Screw	Stainless Steel	ASTM A276
A-36	Upper Valve Plate (includes A-34 and A-35)	Bronze	ASTM B584
A-37	Shoe Bolt and Nut	Steel***	SAE J429
A-38	Drain Ring Housing O-ring (1997 and newer models; pre-1997 models have a square gasket)	Rubber	ASTM D2000 - BUNA N
A-39	Seat Ring Top O-ring	Rubber	ASTM D2000 - BUNA N
A-40	Drain Ring Housing	Cast Iron	ASTM A126 CL.B
A-41	Drain Ring Housing Bolt and Nut (not shown - used only on pre-1997 model hydrants)	Steel	ASTM A307 Plated
A-42	Drain Ring	Bronze	ASTM B62
A-43	Seat Ring	Bronze	ASTM B584
A-44	Seat Ring Bottom O-ring	Rubber	ASTM D2000 - BUNA N
A-45	Reversible Encapsulated Main Valve* (1997 and newer models only; pre-1997 models use non-reversible main valve and lower valve plate - not shown)	Rubber	ASTM D2000 reinforced Cast Iron ASTM A126 CL.B
A-46	Lower Valve Plate (1997 and newer models for reversible main valve; pre-1997 models have non-reversivble main valve - not shown	Cast Iron	ASTM A126 CL.B
A-47	Cap Nut Seal	Rubber	ASTM D2000 - Natural
A-48	Lock Washer	Stainless Steel	ASTM A276
A-49	Lower Valve Plate Nut	Cast Iron	ASTM A126 CL.B
A-50	Shoe**	Cast Iron	ASTM A536
A-84	Hold Down Nut	Bronze	ASTM B62
A-85	Weather Seal	Rubber	ASTM D2000 - EPDM
A-86	Bury Tag	Stainless Steel	300 Series
A-51	10.5 ounce Hydrant Lubricating Oil	-	-



* *Pre-1997 models may be upgraded to use the reversible main valve by also replacing the lower valve plate with the 1997 model.*

** *6" MJ shoe is Ductile Iron, ASTM A536*

*** *Stainless steel Type 316 available as an option*

SEE PAGE 9.25 FOR ORDERING INSTRUCTIONS

Bison Valve Boxes

Cast iron rims, lids, and top sections are suitable for roadway installations, are ASTM 48A Class 30, and are H-20 load rated. Once the cast iron rim or top section is embedded in the concrete or asphalt, the roadway takes the loading, not the plastic components below.

HEAVY DUTY & LIGHTWEIGHT

- Cast Iron rim permanately bonded to ABS top section
- Thick-Walled ABS Plastic
- 5.25" Inside Diameter
- White interior increases visibility
- Screw or Slide Adjustment
- Weighs less than 25% of an all cast iron curb box

SCREW TYPE

Extension Range	Bison Box	Weight*	Cast Iron	Weight*
22-28	P05ZHC2228A1W	15.3	18	44.5
27-38	P05ZHC2738A1W	17.1	20	60
39-50	P05ZHC3950A1W	19.4	21	74.5
39-60	P05ZHC3960A1W	20.8	22	90.5
51-72	P05ZHC5172A1W	23.1	22 & 58 Ext	113.5

**Weights do not include 13.5 lb lid*

SLIDE TYPE

Extension Range	Bison Box	Weight*	Cast Iron	Weight*
22-28	P05ZHS2228A1W	15.3	5461-S	45.5
27-38	P05ZHS2738A1W	17.1	5562-S	61.5
39-50	P05ZHS3950A1W	19.4	5564-S	74.5
36-48	P05ZHS3648A1W	18.5	5662-S	76.5
39-60	P05ZHS3960A1W	20.8	5664-S	89.5
51-72	P05ZHS5172A1W	23.1	5664-S & 64-E Ext	112.5

**Weights do not include 13.5 lb lid*

STANDARD & CUSTOM ASSEMBLIES

- Easily assembles with cast iron or other plastic components
- Full Flange, Partial Flange, and No Flange cast iron rim options
- Can be used with full cast iron top section and Bison ABS plastic bottom section
- Standard bottom sections and assemblies have 101 bell
- 106 or 107 bells can be used to increase bell area

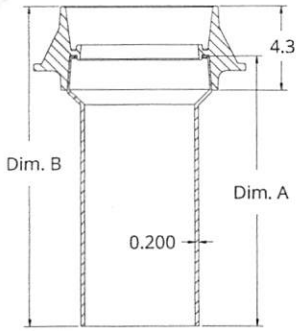
MATERIAL SPECIFICATIONS

Acrylonitrile-Butadiene-Styrene (ABS) Plastic Properties	ASTM Test Method	Minimum Values
Tensile Strength	D-638	5,100 psi
Flexural Strength	D-790	8,000 psi
Flexural Modulus	D-790	230,000 psi
Impact Strength Izod	D-256	3.5 - 6.3 ft-lbs/in
Deflection Temp @ 264 psi	D-648	169 F
Specific Gravity	D-792	1.04

*Cast Iron is ASTM 48A Class 30

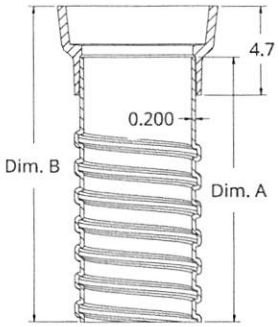
Standard Components

*All measurements are in inches



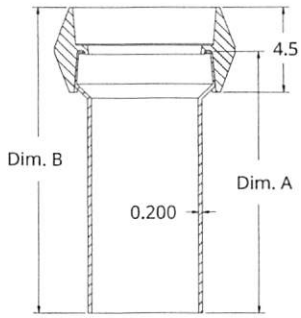
Top Section w/ PI Rim
(Full Flange)

	Dim. A	Dim. B	Item #
Screw	10	12.6	P05PTHCP10
	14	16.6	P05PTHCP14
	24	26.6	P05PTHCP24
Slide	10	12.6	P05PTHSP10
	14	16.6	P05PTHSP14
	24	26.6	P05PTHSP24



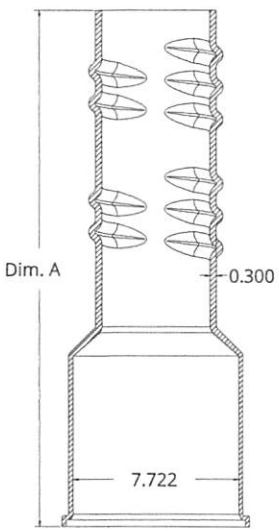
Top Section w/ P500 Rim
(No Flange)

	Dim. A	Dim. B	Item #
Screw	10	12.7	P05PTHC10
	14	16.7	P05PTHC14
	24	26.7	P05PTHC24
Slide	10	12.7	P05PTHS10
	14	16.7	P05PTHS14
	24	26.7	P05PTHS24



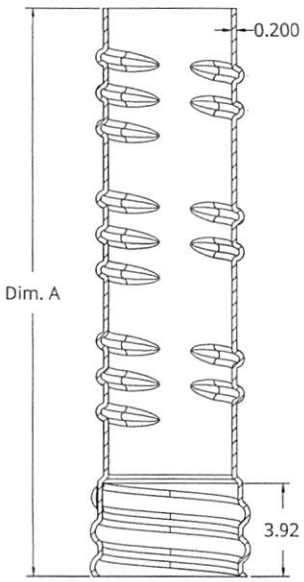
Top Section w/ PI3 Rim
(Partial Flange)

	Dim. A	Dim. B	Item #
Screw	10	12.3	P05PTHC310
	14	16.3	P05PTHC314
	24	26.3	P05PTHC324
Slide	10	12.3	P05PTHS310
	14	16.3	P05PTHS314
	24	26.3	P05PTHS324



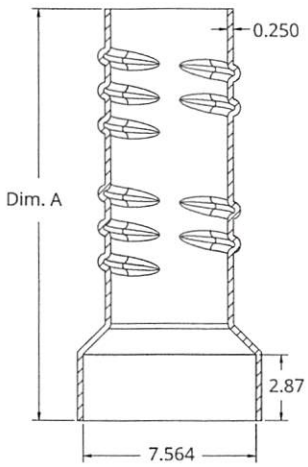
Bottom Section w/ 101 Bell

	Dim. A	Item #
Screw	18	P05BHC18
	24	P05BHC24
	36	P05BHC36
	48	P05BHC48
Slide	18	P05BHS18
	24	P05BHS24
	36	P05BHS36
	48	P05BHS48



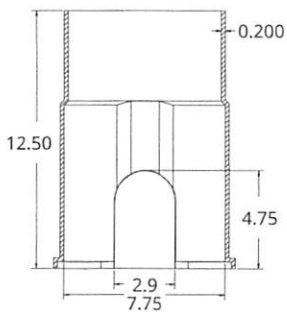
Extension

	Dim. A	Item #
Screw	24	P05EHC24
	30	P05EHC30
Slide	24	P05EHS24
	30	P05EHS30



Stem for 106/107 Bell

	Dim. A	Item #
Screw	12	P05SHC12
	18	P05SHC18
	24	P05SHC24
	30	P05SHC30
Slide	12	P05SHS12
	18	P05SHS18
	24	P05SHS24
	30	P05SHS30



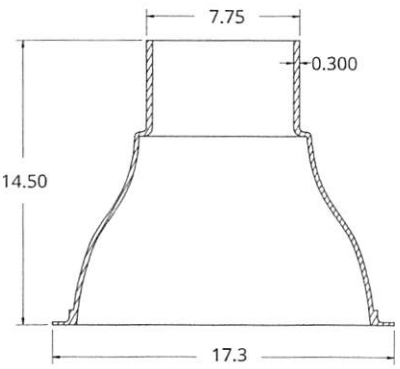
106 Bell - P05BH106

Standard Assemblies

All standard assemblies come with the 101 bell and either a water lid or no lid.

	Lid	Rim	Ext. Range	Item #
Screw	Water	PI	22-28	P05ZHC2228B1W
	Water	PI	27-38	P05ZHC2738B1W
	Water	PI	39-50	P05ZHC3950B1W
	Water	PI	36-48	P05ZHC3648B1W
	Water	PI	39-60	P05ZHC3960B1W
	Water	PI	51-72	P05ZHC5172B1W
	Water	P500	22-28	P05ZHC2228A1W
	Water	P500	27-38	P05ZHC2738A1W
	Water	P500	39-50	P05ZHC3950A1W
	Water	P500	36-48	P05ZHC3648A1W
	Water	P500	39-60	P05ZHC3960A1W
	Water	P500	51-72	P05ZHC5172A1W
Slide	Water	PI	22-28	P05ZHS2228B1W
	Water	PI	27-38	P05ZHS2738B1W
	Water	PI	39-50	P05ZHS3950B1W
	Water	PI	36-48	P05ZHS3648B1W
	Water	PI	39-60	P05ZHS3960B1W
	Water	PI	51-72	P05ZHS5172B1W
	Water	P500	22-28	P05ZHS2228A1W
	Water	P500	27-38	P05ZHS2738A1W
	Water	P500	39-50	P05ZHS3950A1W
	Water	P500	36-48	P05ZHS3648A1W
	Water	P500	39-60	P05ZHS3960A1W
	Water	P500	51-72	P05ZHS5172A1W

Lid options available. Contact us about custom assemblies.



107 Bell - P05BH107

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