KUBRICKY CONSTRUCTION CORP.
269 BALLARD ROAD

WILTON, NY 12831
518 792-5864

KUBRICKY CONSTRUCTION CORP.
A PROUD MEMBER OF THE D.A. COLLINS™ COMPANIES

Rutland City BRF 3000 (2014036)
SUBMITTAL 52

Issued 04/16/15
Respond by 04/23/15

To

Timothy Pockette, PE

Topic	629.40 Expansion Assembly (10" Water & 6" Force Main)
Status	For Approval
Spec section	629.40
Responsibility	(16) River Street
Received from submitter	4/16/15
Sent to approver	4/16/15
Required from approver	4/23/15

From

Volker H.D. Burkowski

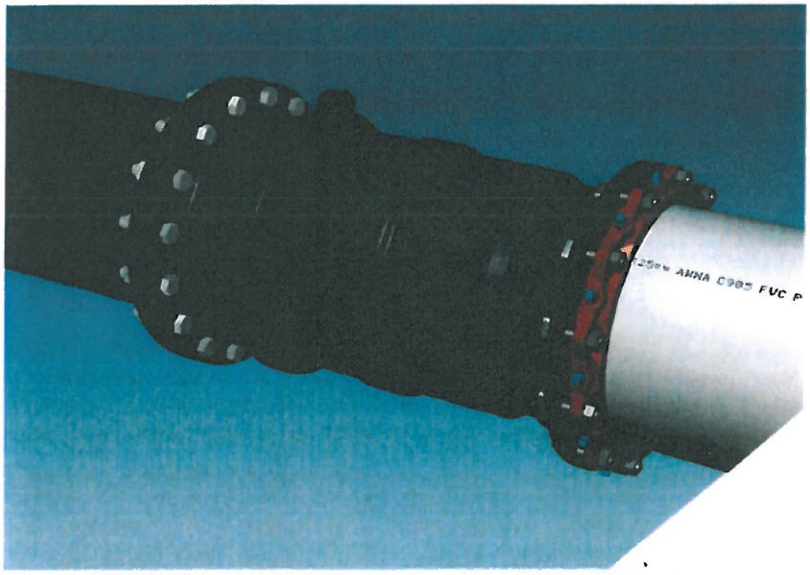
Signed by _____ Date 4/16/15

Proceed as Indicated _____ Date _____
Owner Authorized Representative

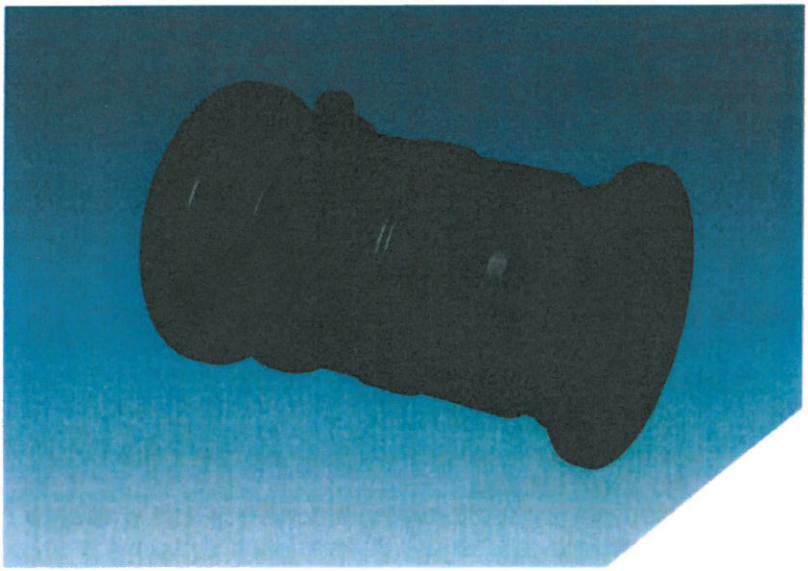
Rutland 2 Briggs

EX-TEND®

Expansion Joint for Water and Waste Water Pipelines



▲ *Series 216C0 EX-TEND, 16 inch combination mechanical joint by flanged expansion joint. (DIP by PVC)*
▼ *Series 216C0 EX-TEND, 16 inch combination mechanical joint by flanged expansion joint.*



Sample Specification

Expansion joints shall be installed in the locations indicated on the drawings and shall be manufactured of ductile iron conforming to the material properties of ANSI/AWWA C153/A21.53. All expansion joints shall be capable of expanding or contracting to the amounts shown on the drawings, or indicated in the specifications, but in no case shall there be less than 4" total axial movement. Separation beyond the maximum extension of the expansion joint shall be prevented without the use of external tie rods. Each expansion joint shall be pressure tested against its own restraint to a minimum of 350 psi (250 psi 24 inch and greater). MEGALUG joint restraint shall be provided with each mechanical joint connection. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16. Sealing gaskets shall be constructed of EPDM. The coating shall meet ANSI/NSF-61. All expansion joints shall be EX-TEND 200, as manufactured by EBAA Iron, Inc., or approved equal.

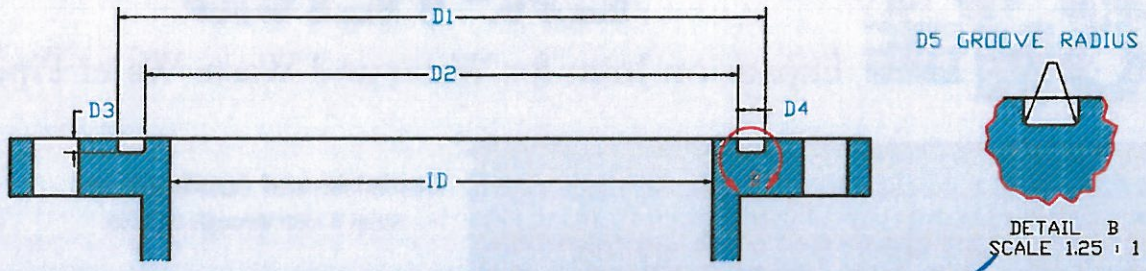
Features and Applications:

- Sizes 3 inch through 36 inch
- For Ductile Iron, Steel, PVC or HDPE pipe
- 3 inch through 20 inch rated at 350 PSI
  24 inch and greater rated at 250 PSI
- Constructed of ASTM A536 Ductile Iron
- Each unit tested to rated working pressure prior to shipment
- Self restrained at full expansion without the use of external tie bars
- Due to the design of the seals, no periodic maintenance is required
- Seals conform to the applicable requirements of ANSI/AWWA C111/A21.11
- End connections:
  Flanged Joint; 3 inch through 36 inch
  Mechanical Joint; 3 inch through 24 inch
  Combination of the two Joints available
- Flange outlets conform to the dimensional requirements of ANSI/AWWA C110/A21.10 (class 150) with the addition of an O-ring gasket which is provided to ensure a watertight seal
- Mechanical Joint end connections conform to the dimensional requirements of either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53 depending on size
- All "wetted" parts are coated with a NSF61 approved fusion bonded epoxy
- Insertion of additional sleeves for increased expansion capacity can be done at the factory or in the field as the need occurs

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

Copyright 2015 © EBAA IRON, INC.

FLEX-TEND, EX-TEND, AND FLEX-900 O-ring Groove



Size	D1	D2	D3	D4	D5	O-ring Diameter	O-ring Part Number
3	4.885	4.185	0.175	0.350	0.0625	0.25	983003
4	5.900	4.700	0.300	0.600	0.0625	0.5	983004
6	8.00	6.800	0.300	0.600	0.0625	0.5	983006
8	10.100	8.900	0.300	0.600	0.0625	0.5	983008
10	12.200	11.000	0.300	0.600	0.0625	0.5	983010
12	14.300	13.100	0.300	0.600	0.0625	0.5	983012
14	16.200	15.00	0.300	0.600	0.0625	0.5	983014
16	18.500	16.900	0.400	0.800	0.1250	0.625	983016
18	20.700	19.100	0.400	0.800	0.1250	0.625	983018
20	23.000	21.400	0.400	0.800	0.1250	0.625	983020
24	27.200	25.600	0.400	0.800	0.1250	0.625	983024
30	33.500	31.700	0.400	0.900	0.1250	0.75	983030
36	40.000	38.300	0.400	0.850	0.1250	0.75	983036
42	46.580	44.080	0.650	1.250	0.1250	N/A	983042
48	52.720	50.220	0.650	1.250	0.1250	1	983048

Determine your expansion requirements

Expansion Coefficient Table

Material	Coefficient inch/inch/degree F
Ductile Iron	0.0000062
PVC	0.000030
Cast Iron	0.0000058
Steel	0.0000065
HDPE	0.000080
Concrete	0.0000055

The Change in length (ΔL) due to thermal contraction/expansion is given by:

$$\Delta L = L\,(\Delta T)(C)$$

Where: L = length of pipe (inches)
ΔT = change in Temperature (degrees F)
C = coefficient of thermal expansion

Example:

1. Determine the Expansion Needed

   1000 Foot Bridge; 6 inch Ductile Iron Pipe; 120° F Total Temperature Change
   (1000)(12in/ft)(120° F)(0.0000062in/in/°F) = 8.93 in (Nearly 9 inches)

2. Select Proper Unit

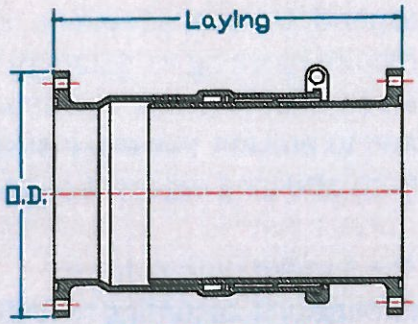
   Referring to the chart on the opposite page, we will require a Series 206M2 EX-TEND because of the ability to accommodate the nine inches of expansion needed, with it's 12 inches of maximum expansion.

3. Determine the installation preset

   Factory preset for the EX-TEND is at 50% Contraction 50% Expansion setting, but the preset can be changed in the field to accommodate the present installation Temperature .

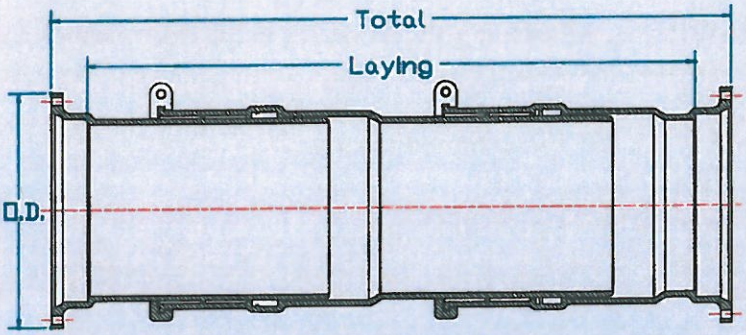
Series 200 EX-TEND® Submittal Reference Drawing

FLANGE BY FLANGE



STANDARD UNIT

MECHANICAL JOINT BY MECHANICAL JOINT



UNIT WITH ONE ADDITIONAL SLEEVE

EBAA IRON

MADE IN USA

		Flange by Flange				Mechanical Joint by Mechanical Joint				
Nominal Pipe Size	Expansion (Linear)	Series Number	Maximum O.D.	Laying*	Weight (Approx)	Series Number	Maximum O.D.	Laying*	Total*	Weight (Approx)
	4	203F0	‡	‡	‡	203M0	‡	‡	‡	‡
3	8	203F1	‡	‡	‡	203M1	‡	‡	‡	‡
	12	203F2	‡	‡	‡	203M2	‡	‡	‡	‡
	4	204F0	11.0	18.2	69	204M0	11.0	15.6	20.6	74
4	8	204F1	11.0	33.5	113	204M1	11.0	30.9	35.9	118
	12	204F2	11.0	48.8	157	204M2	11.0	46.2	51.2	162
	4	206F0	12.4	19.5	95	206M0	12.4	15.4	20.4	96
6	8	206F1	12.4	33.8	160	206M1	12.4	29.7	34.7	161
	12	206F2	12.4	48.1	225	206M2	12.4	44.0	49.0	226
	4	208F0	14.8	20.7	143	208M0	14.8	16.4	21.4	139
8	8	208F1	14.8	37.8	235	208M1	14.8	33.5	38.5	231
	12	208F2	14.8	54.9	327	208M2	14.8	50.6	55.6	323
	4	210F0	17.0	21.0	196	210M0	17.0	16.5	21.5	192
10	8	210F1	17.0	36.8	333	210M1	17.0	30.5	35.5	329
	12	210F2	17.0	52.6	470	210M2	17.0	44.5	49.5	466
	4	212F0	19.3	21.5	245	212M0	19.3	19.2	24.2	244
12	8	212F1	19.3	37.5	396	212M1	19.3	35.2	40.2	395
	12	212F2	19.3	53.5	547	212M2	19.3	51.2	56.2	546
	8	214F0	22.3	32.4	389	214M0	22.3	27.0	34.0	432
14	16	214F1	22.3	58.8	677	214M1	22.3	53.3	60.0	677
	24	214F2	22.3	85.3	922	214M2	22.3	79.6	87.0	921
	8	216F0	24.5	33.9	621	216M0	24.5	31.3	38.8	621
16	16	216F1	24.5	61.8	959	216M1	24.5	59.2	66.2	959
	24	216F2	24.5	89.7	1297	216M2	24.5	87.1	94.1	1297
	8	218F0	27.1	33.7	661	218M0	27.1	27.6	34.6	652
18	16	218F1	27.1	60.8	1041	218M1	27.1	54.7	61.7	1032
	24	218F2	27.1	87.9	1421	218M2	27.1	81.8	88.8	1412
	8	220F0	27.5	32.7	701	220M0	27.5	27.5	34.5	683
20	16	220F1	27.5	60.0	1123	220M1	27.5	54.8	61.8	1105
	24	220F2	27.5	87.3	1545	220M2	27.5	82.1	89.1	1527
	8	224F0	34.9	33.5	908	224M0	34.9	29.0	36.0	882
24	16	224F1	34.9	60.8	1610	224M1	34.9	56.3	63.3	1584
	24	224F2	34.9	88.1	2312	224M2	34.9	83.6	90.6	2286
		230F0	‡	‡	‡	~	~	~	~	~
30	10	230F1	‡	‡	‡	~	~	~	~	~
		230F2	‡	‡	‡	~	~	~	~	~
36	10	236F0	49.2	46.8	2347	~	~	~	~	~

NOTE: Dimensions are in inches ± 1 and are subject to change without notice. Contact EBAA for availability of sizes not shown or listed.
* Laying Lengths and Total Lengths reflect unit set at midpoint of expansion capacity.
‡ Contact EBAA for sizes not listed.

Installation Instructions for EX-TEND® 200

1. Remove protective end covers.
2. Remove polyethylene sleeve and other material.
3. Check interior, remove dirt and foreign material from interior and end connections.
4. For buried applications install polyethylene sleeve per ANSI/AWWA C105/A21.5 recommendations.
5. Assembly of flange joint:
   a. Place flange o-ring in groove.
   b. Place EX-TEND flange against adjoining flange, install and hand tighten bolts.
   c. Tighten flange bolts.
6. Install mechanical joint EX-TEND end connections using the EBAA IRON MEGALUG® Joint Restraint suitable for adjacent pipe material.

   MEGALUG 1100 should be used on ductile iron pipe.

   MEGALUG 2000PV should be used on AWWA PVC pipe.

   Assembly instructions for each of these products are included with restraint device.
7. Assembly of restrained plain end:
   a. Lubricate and install EBAA-Seal® gasket provided over plain end per ANSI/AWWA C600.
   b. Insert plain end into adjacent mechanical joint bell.
   c. Install and hand tighten t-bolts.
   d. Tighten t-bolts per AWWA recommendations.
8. Remove shipping skid.
9. Touch up exterior coating as necessary. Use coal tar epoxy following

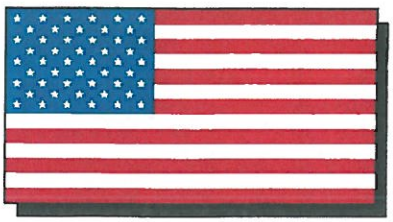
Important Notes

Due to hydrostatic forces that cause the EX-TEND 200 to expand, some applications may require blocking to isolate the areas of anticipated movement and to prevent this expansion from affecting adjacent piping.

The flanged outlets have dimensions according to ANSI/AWWA C110/A21.10 with each flange to ensure a proven water tight seal to a maximum of 350 PSI pressure.

Mechanical joint connections conform to the dimensional requirements of either ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 depending on the size.

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

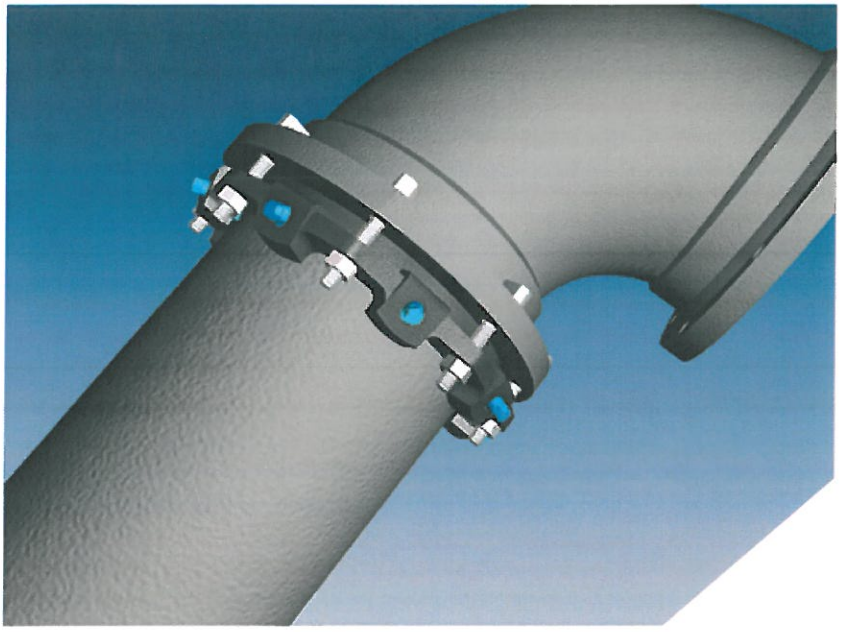


Members of...
AMERICAN FOUNDRY SOCIETY

EBAA IRON INC
Your Connection to the Future™

MEGALUG®
Series 1100

Mechanical Joint Restraint for Ductile Iron Pipe



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

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

Features and Applications:

- Sizes 3 inch through 48 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 48 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

Made In The USA

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

0910-5-H

Copyright © 2007. EBAA Iron, Inc. All Rights Reserved.

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.

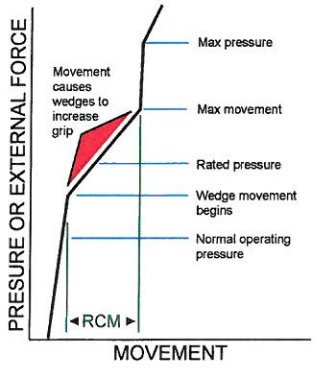
For use on all classes of ductile iron pipe (PC350 through PC150 and CL56 through CL50), for practically any application including valves, hydrants and pipe, the MEGALUG Mechanical Joint Restraint effectively and safely performs without damage to the pipe or cement linings.

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.

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 48 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 and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

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.

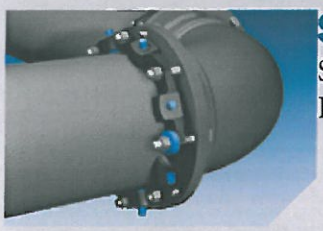
All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

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.

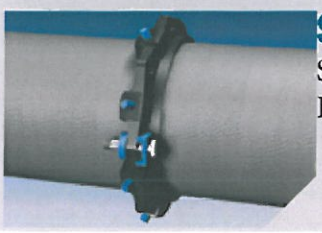
Support Products

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

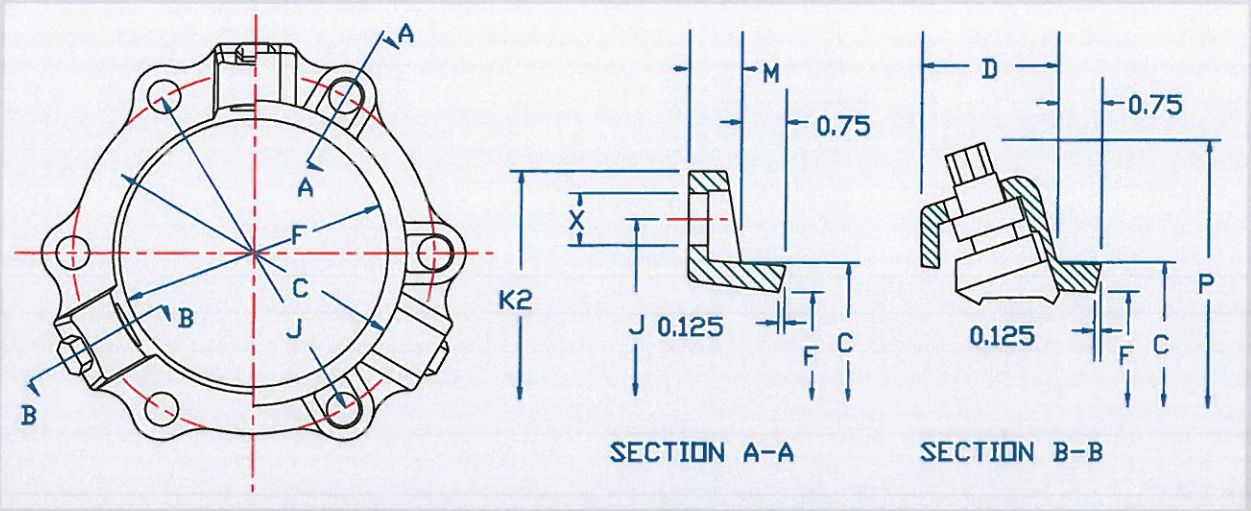


Series 1100SDB
Split MEGALUG Restraint
For Mid-Span Applications

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

Series 1100 Submittal Reference Drawing

EBAA IRON



MADE IN USA

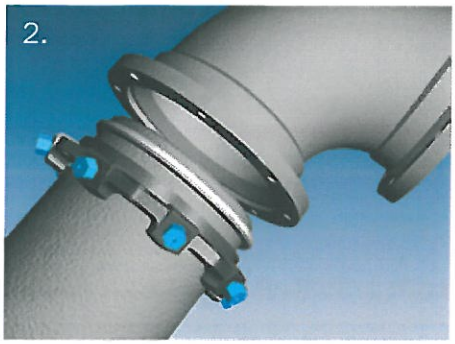
Nominal Pipe Size	Series Number	C	D	F	M	P*	X	J	K2	Wedge QTY.	Bolt QTY.	Weight (LBS.)	Pressure Rating (PSI)
3	1103	4.48	2.27	4.06	0.62	9.06	0.750	6.19	7.69	2	4	6.1	350
4	1104	5.92	2.27	4.90	0.75	9.90	0.875	7.50	9.12	2	4	7.6	350
6	1106	8.02	2.27	7.00	0.88	12.00	0.875	9.50	11.12	3	6	11.8	350
8	1108	10.17	2.31	9.15	1.00	14.15	0.875	11.75	13.37	4	6	14.9	350
10	1110	12.22	2.37	11.20	1.00	16.20	0.875	14.00	15.62	6	8	23.9	350
12	1112	14.32	2.37	13.30	1.25	18.30	0.875	16.25	17.88	8	8	31.2	350
14	1114	16.40	2.69	15.44	1.50	20.94	0.875	18.75	20.25	10	10	49.7	350
16	1116	18.50	2.69	17.54	1.56	22.90	0.875	21.00	22.50	12	12	56.4	350
18	1118	20.60	2.69	19.64	1.63	25.00	0.875	23.25	24.75	12	12	63.6	250
20	1120	22.70	2.69	21.74	1.69	27.10	0.875	25.50	27.00	14	14	71.0	250
24	1124	26.90	3.20	25.94	1.81	32.64	0.875	30.00	31.50	16	16	128.7	250
30	1130	33.29	3.20	32.17	2.25	38.87	1.125	36.88	39.12	20	20	190.7	250
36	1136	39.59	3.20	38.47	2.25	45.17	1.125	43.75	46.00	24	24	226.5	250
42	1142	45.79	4.56	44.67	3.88	55.57	1.375	50.62	53.48	28	28	518.9	250
48	1148	52.09	4.56	50.97	3.88	61.87	1.375	57.50	60.36	32	32	608.3	250

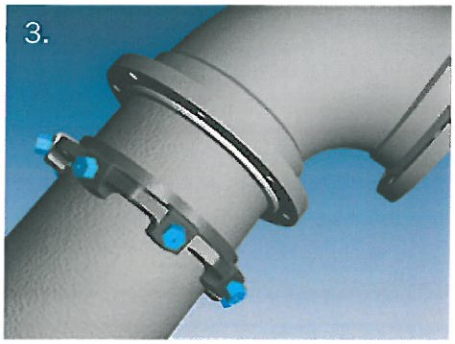
* With Twist-Off Nuts twisted off.

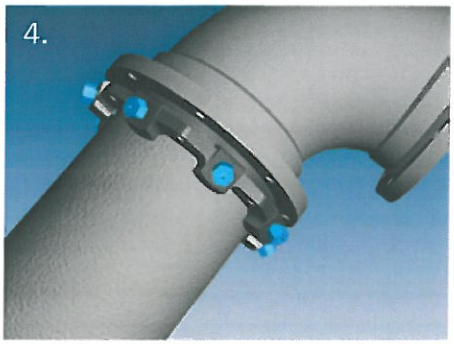
NOTE: Dimensions are in inches and are subject to change without notice.

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 48 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 and 48 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.







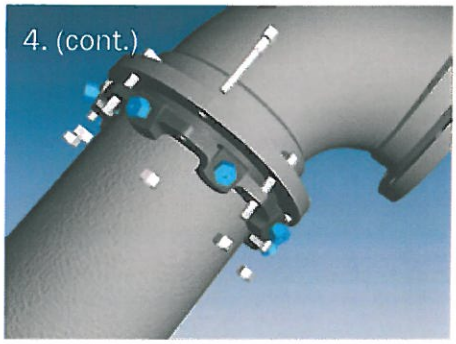
1. The Series 1100 MEGALUG joint restraint is designed for use on ductile iron pipe conforming to ANSI/AWWA C151/A21.51 (all thickness classes) when restraining mechanical joint pipe fittings.

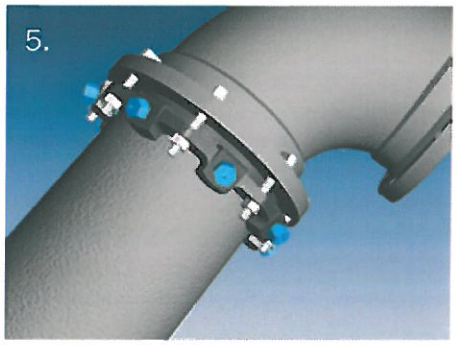
2.* Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or an approved pipe lubrication meeting the requirement of ANSI/AWWA C111/A21.11, just prior to slipping the gasket onto the plain end for joint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

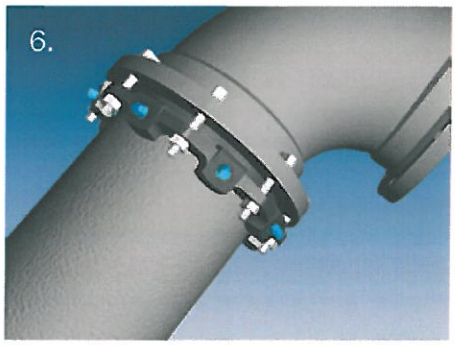
NOTE: In cold weather it is preferable to warm the gasket to facilitate assembly of the joint.

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 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., 4-24 inch 75-90 ft-lbs., 30-36 inch 100-120 ft-lbs., and 42-48 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 (30-48 inch), 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.

* These steps are requirements of AWWA. AWWA Standard C600

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

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".