



## **Brunswick – Glynn Joint Water & Sewer Commission**

November 18, 2015

**PROJECT :** SR99/US341 Sterling Industrial Park Water Main Extension

**ADDENDUM:** Four (4)

SR 99/ US341 Sterling Industrial Park Water Main Extension is hereby amended as follows:

- 1) After review by JWSC's design and construction standards representative, the following are acceptable substitutions for the above-mentioned project:
  - WL Plastic's HDPE pipe
  - WL Plastics DIPS (DIOD) Pressure Class Pipe - for water distribution and transmission
  - SIP Industries: DIP Mechanical Joint Compact Fittings
  - SIP Industries EZ Grip Joint Restraints for PVC Pipe
  - SIP Industries EZ Grip Joint Restraints for DIP
  - SIP Industries EZ Grip Pipe-to-Pipe Bell Joint Restraint for PVC Pipe

PDF Cut sheets for these products are attached for your reference



All applicants under this Invitation to Bid are kindly requested to acknowledge receipt of this Addendum in original only.

**ACKNOWLEDGEMENT  
ADDENDUM: FOUR (4)**

**Date:** \_\_\_\_\_

The above Addendum is hereby acknowledged:

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(NAME OF BIDDER)

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Signature

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Title

**SUBMITTED MFG TO BE APPROVED**

**BGWSC REQUIRED SPEC**

**SUBMITTED MFG SPEC**

**SIP INDUSTRIES**

**DUCTILE IRON MECH JT FITTINGS**

**ANSI A21.53 (AWWA C153)**

**ANSI A21.53 (AWWA C153)**

**250 PSI MIN WORKING PRESSURE**

**350 PSI RATING**

**SIP INDUSTRIES**

**DUCTILE IRON FLG JT FITTINGS**

**ANSI A21.10 (AWWA C110)**

**ANSI A21.10 (AWWA C110)**

**ANSI B16.1 CL 125 FLGS**

**ANSI B16.1 CL 125 FLGS**

**SIP INDUSTRIES**

**PVC BELL JT RESTRAINTS**

**ASTM A536**

**ASTM A536**

**SERRATED SPLIT RING TO GRIP  
THE PIPE**

**SERRATED SPLIT RING TO GRIP  
THE PIPE**

**2:1 SAFETY FACTOR**

**2:1 SAFETY FACTOR**

**SIP INDUSTRIES**

**MECH JT RESTRAINT FOR PVC**

**ASTM A536**

**ASTM A536**

**ANSI A21.10 (AWWA C110)**

**ANSI A21.10 (AWWA C110)  
ANSI 121.53 (AWWA C153)**

**2:1 SAFETY FACTOR**

**2:1 SAFETY FACTOR**

**MULTIPLE GRIPPING WEDGES  
W/ TWIST OFF NUTS**

**MULTIPLE GRIPPING WEDGES  
W/ TWIST OFF NUTS**

**WL PLASTICS**

**4" AND ABOVE HDPE**

**AWWA 906**

**AWWA 906**

**NSF 61**

**NSF 61**

**PE 3408**

**PE 4710 (EXCEEDS 3408)**

**ASTM D3350**

**ASTM D3350**

**ASTM F714**

**ASTM F714**

**CELL CLASS 345464C**

**CELL CLASS 445574C  
(EXCEEDS 345464C)**

# WL116 WL Plastics Pipe Standards



## Industry Standards for WL Plastics Pipe

WL Plastics HDPE pipe is produced to Customer Purchase Order specifications, and may be limited by industry standards and third party certifications. WL Plastics typically manufactures pipe in accordance with the API, ASTM, AWWA, FM, NSF and AASHTO standards listed below. Upon request and review by WL Plastics prior to order, pipe may be special order manufactured to other industry standards, or custom standards, or proprietary standards or specifications. Contact WL Plastics Customer Service for information, pricing, and availability. Some lower DR's are not available in larger sizes. *Related WL Plastics literature:* IPS Pipe Sizes – WL102A, WL102B; DIPS (DIOD) Pipe Sizes – WL104; PE Compounds – WL106A, WL106B; Internal, surge and external (vacuum) pressure ratings – WL118.

Industry standards are for different service applications, may or may not be compatible with each other, and differ in requirements for materials, sizes, dimensions, tolerances, performance and marking; therefore, pipe made to an industry standard for one service application may be unsuitable for a different service or application although the material and size may be the same. Regulations and Codes frequently require compliance with specific standards, and pipe not so marked may be unacceptable to the jurisdictional authority. Before placing an order, confirm that the pipe specified is acceptable to the jurisdictional authority. WL Plastics offers pre-sale specification review service without charge. Upon receipt, inspect and verify that the pipe received conforms to the Customer Purchase Order. All sales are subject to WL125 WL Plastics Terms and Conditions of Sale.

Industry Standard	Table Notes	Sizing System	OD Size	DR	Application
API 15LE	1	IPS	¾ – 54 in	7 – 32.5	Oil & gas gathering
ASTM D 2513	1, 2	IPS	¾ – 24 in	7 – 32.5	Gas gathering
ASTM F 2619	1	IPS	¾ – 54 in	7 – 32.5	Oil & gas gathering
ASTM D 3035	3, 4, 7	IPS	¾ – 24 in	7 – 32.5	Pressure & non-pressure fluids; municipal & industrial water; sewer & culvert; rehabilitation; geothermal; heat transfer
ASTM F 714	1, 3, 4, 7	DIPS	4 – 30 in	Class 100, 150, 200, 250, 300, 350	
AWWA C901	3, 4, 7	IPS	¾ – 3 in	9 – 21	Water service & distribution
AWWA C906	3, 5	DIOD (DIPS)	4 – 30 in	Class 100, 150, 200, 250, 300, 350	Water distribution & transmission
FM1613	5, 6	IPS	4 – 36 in	Class 150, 200, 267	Underground fire main
AASHTO M-326	8	IPS	12 – 54 in	26, 32.5, 41	Sewer & culvert sliplining

- PE pipe for non-jurisdictional oil and gas gathering may be API 15LE and/or ASTM D2513 and/or ASTM F2619 and/or ASTM F714. Jurisdictional gas gathering in the US requires ASTM D2513. Jurisdictional gas gathering in Canada requires API 15LE. **ASTM D2513, API 15LE and ASTM F2619 pipe is not for potable water use that is subject to municipal code regulations. NSF potable water certification is not available for API 15LE, ASTM D2513 and ASTM F2619 pipe.**
- WL Plastics ASTM D2513 PE pipe for gas distribution in the US is available on special order only. **Per ASTM D2513, optional yellow stripes are available; colors other than yellow are not permitted.**
- General purpose PE pipe may be ASTM F714 and/or ASTM D3035 and/or AWWA C901 and/or AWWA C906 and/or AASHTO M-326. When produced to comply with more than one standard, compatibility is limited to the most restrictive application, material, size, DR and requirement(s) in the compatible standards. General purpose PE pipe is not allowed in jurisdictional gas gathering, gas distribution or gas transmission.
- OD controlled sizes only. Compatible with 3-in and smaller ASTM D3035, and 3-in ASTM F714.
- Pipe manufactured using PE4710, but PC rated as PE3408; PE4710 ratings not applicable.
- By certification agreement with FM approvals, FM Approved pipe is manufactured in accordance with FM1613 and is available only in the sizes and pressure classes specified in WL130. Per FM1613, WL Plastics FM Approved pipe complies with AWWA C906-99. WL Plastics FM Approved pipe complies with NFPA 24. NSF-61 certification for potable water service fire main available upon request. Underground service only.
- Potable water and geothermal applications require NSF-61 certified PE compound. Specify NSF-61 certification when ordering. NSF-14 certified pipe available from Elizabethtown, KY, and Crossfield, AB as follows (Note special sizes and some diameters and DR's excluded. Contact Customer Service for specific listing information.) – ASTM D3035 PE4710 IPS 2-24 DR 7-32.5; ASTM F714 PE4710 IPS 3-24 DR 7.3-41; AWWA C901 PE4710 IPS 2-3 DR 7.3-21; AWWA C906 PE3608 IPS 4-24 DR 7.3-32.5; CSA B137.1 PE4710 NPS 3-6 Series 50-200.
- AASHTO M-326 PE pipe is limited to rehabilitation lining applications; available in DR 26 and 32.5; DR 41 special order.

**DISCLAIMER:** WL Plastics Corp. disclaims all responsibility and liability for products that are incorrectly or incompletely specified on the Purchase Order received by WL Plastics. The Purchaser designated on the Purchase Order is solely responsible for the Purchase Order received by WL Plastics. WL Plastics liability shall in no event exceed limited liability in accordance with WL125 WL Plastics Terms and Conditions of Sale. Changes to this publication may occur from time to time without notice. Contact WL Plastics Corp. to determine if you have the most current edition.

# WL104 – DIPS (DIOD) PRESSURE CLASS PIPE



CONTACT WL PLASTICS CUSTOMER SERVICE TO CONFIRM THE AVAILABILITY OF SIZES SHOWN, AND FOR PC'S AND DR'S NOT SHOWN. SEE TABLE FOOTNOTES FOR ADDITIONAL INFORMATION.

DIPS Size <sup>A</sup>	Average OD, in	Pressure Class <sup>B</sup> , psi DR	ASTM F714 PE4710						ASTM F714/AWWA C906 PE3608/PE3408					
			PC350	PC300	PC250	PC200	PC150	PC100	PC350	PC300	PC250	PC200	PC150	PC100
4	4.80	Min wall, in	0.591	0.514	0.533	0.436	0.336	0.229	0.707	0.629	0.649	0.533	0.410	0.282
		Avg ID <sup>C</sup> , in	2.707	2.870	3.669	3.875	4.088	4.315	2.461	2.627	3.425	3.669	3.930	4.201
		Weight, lb/ft	2.707	2.408	3.093	2.587	2.040	1.423	3.127	2.849	3.663	3.093	2.447	1.732
6	6.90	Min wall, in	0.716	0.623	0.767	0.627	0.483	0.329	0.857	0.762	0.932	0.767	0.590	0.406
		Avg ID <sup>C</sup> , in	3.281	3.478	5.275	5.570	5.877	6.203	2.983	3.185	4.923	5.275	5.650	6.040
		Weight, lb/ft	3.976	3.539	6.396	5.348	4.215	2.940	4.595	4.184	7.563	6.396	5.062	3.585
8	9.05	Min wall, in	1.030	0.896	1.006	0.823	0.633	0.431	1.232	1.095	1.223	1.006	0.774	0.532
		Avg ID <sup>C</sup> , in	4.717	5.000	6.918	7.306	7.708	8.196	4.288	4.578	6.457	6.918	7.410	7.921
		Weight, lb/ft	8.221	7.315	11.004	9.207	7.245	5.051	9.495	8.643	13.016	11.004	8.710	6.162
10	11.10	Min wall, in	1.351	1.175	1.233	1.009	0.776	0.529	1.616	1.437	1.500	1.233	0.949	0.653
		Avg ID <sup>C</sup> , in	6.186	6.558	8.485	8.961	9.454	9.979	5.624	6.005	7.920	8.485	9.089	9.716
		Weight, lb/ft	14.144	12.582	16.543	13.845	10.894	7.604	16.335	14.876	19.581	16.543	13.099	9.276
12	13.20	Min wall, in	1.657	1.442	1.467	1.200	0.923	0.629	1.982	1.762	1.784	1.467	1.128	0.776
		Avg ID <sup>C</sup> , in	7.588	8.044	10.091	10.656	11.243	11.867	6.898	7.365	9.418	10.091	10.808	11.554
		Weight, lb/ft	21.276	18.937	23.405	19.581	15.409	10.752	24.574	22.373	27.693	23.405	18.516	13.110
14	15.30	Min wall, in	1.970	1.714	1.700	1.391	1.070	0.729	2.357	2.095	2.068	1.700	1.308	0.900
		Avg ID <sup>C</sup> , in	9.023	9.566	11.696	12.351	13.032	13.755	8.203	8.758	10.917	11.696	12.528	13.392
		Weight, lb/ft	30.082	26.770	31.438	26.308	20.704	14.444	34.752	31.635	37.209	31.438	24.886	17.623
16	17.40	Min wall, in	2.284	1.987	1.933	1.582	1.217	0.829	2.732	2.429	2.351	1.933	1.487	1.024
		Avg ID <sup>C</sup> , in	10.459	11.088	13.301	14.047	14.820	15.643	9.508	10.151	12.415	13.301	14.247	15.230
		Weight, lb/ft	40.424	35.970	40.654	34.027	26.780	18.680	46.689	42.512	48.109	40.654	32.176	22.802
18	19.50	Min wall, in	2.597	2.260	2.167	1.773	1.364	0.929	3.107	2.762	2.635	2.167	1.667	1.147
		Avg ID <sup>C</sup> , in	11.894	12.609	14.907	15.742	16.609	17.531	10.813	11.545	13.914	14.907	15.967	17.068
		Weight, lb/ft	52.274	46.527	51.074	42.738	33.637	23.459	60.385	54.976	60.427	51.074	40.423	28.625
20	21.60	Min wall, in	2.910	2.532	2.400	1.964	1.510	1.029		3.429	2.919	2.400	1.846	1.271
		Avg ID <sup>C</sup> , in	13.330	14.131	16.512	17.437	18.398	19.419		14.331	15.412	16.512	17.686	18.906
		Weight, lb/ft	65.646	58.420	62.659	52.440	41.250	28.783		84.725	74.148	62.659	49.585	35.134
24	25.80	Min wall, in		2.805	2.867	2.345	1.804	1.229				2.867	2.205	1.518
		Avg ID <sup>C</sup> , in		15.653	19.723	20.826	21.975	23.195				19.723	21.125	22.583
		Weight, lb/ft		104.259	91.123	76.229	59.995	41.852				91.123	72.106	51.086
30	32.00	Min wall, in				2.909	2.238	1.524					2.735	1.882
		Avg ID <sup>C</sup> , in				25.833	27.256	28.770					26.202	28.009
		Weight, lb/ft				117.285	92.313	64.370					110.930	78.557

Contact WL Plastics Customer Service to confirm availability and for PC's and DR's not shown. (A) DIPS (DIOD) sizes per ASTM F714 and AWWA C906. (B) Pressure Class rating (PC) in psi is for water at 73°F (23°C) and lower. PC will vary for water at other temperatures. See WL106A PE3608/PE3408 Pipe Compound, WL106B PE4710 Pipe Compound and WL118 Pressure Rating. (C) Calculated Avg ID = Avg OD - (2.12 x min wall), and is for estimating water flow. Pipe ID is approximate, not a specification dimension. (D) All dimensions in inches. (E) NSF-61 certification for potable water available on request. (F) See WL101 and WL124 for fusion, electrofusion, mechanical joining and installation information. (G) The information in this publication does not constitute a guarantee or warranty for piping installations and cannot be guaranteed because the conditions of use are beyond our control. The user of this information assumes all risk associated with its use. See WL125 Terms and Conditions of Sale. Changes to this publication may occur from time to time without notice. Contact WL Plastics Corporation to determine if you have the most current edition. Copying without change permitted.

CASPER PLANT: 2075 North Pyrite Road • P. O. Box 1120 • Mills, WY 82644 • Customer Service: 307-472-6000 • Fax: 307-472-6200  
 CEDAR CITY PLANT: 4660 W. Highway 56 • P. O. Box 627 • Cedar City, UT 84721 • Customer Service: 435-867-8908 • Fax: 435-865-2703  
 ELIZABETHTOWN PLANT: 2151 West Park Road • Elizabethtown, KY 42702 • Customer Service: 270-765-1020 • Fax: 270-765-1030  
 BOWIE PLANT: 1110 Old Wise Road • PO Box 32 • Bowie, TX 76230 • Customer Service: 940-872-8300 • Fax: 940-872-8304  
 SNYDER PLANT: 2160 South Business 84 • Snyder, TX 79549 • Customer Service: 325-574-6100  
 CROSSFIELD PLANT: PO Box 860 • 1030 Western Drive • Crossfield, AB T0M 0S0 Canada • Customer Service: 403-946-0202 • Fax: 403-946-0252



ISO 9001:2008 Certified



# WL104 – DIPS (DIOD) PRESSURE CLASS PIPE



## WL Plastics DIPS Pressure Class Pipe for Water Distribution and Transmission

WL Plastics DIPS Pressure Class Pipe is produced in PC350, PC300, PC250, PC200, PC150 and PC100 in PE4710 and PE3608 compounds. Pressure Class is for continuous internal water pressure at 73°F (23°C) and lower temperatures, including surge pressure allowances above the PC. Pressure Class is reduced for service temperatures above 73°F (23°C).

$$PC_T = PC \times F_T$$

Where  $PC_T$  = Pressure Class rating for water at temperature other than 73°F (23°C), psi

$PC$  = Pressure Class for water  $\leq 73^\circ\text{F}$  ( $\leq 23^\circ\text{C}$ ), psi

$F_T$  = temperature multiplier

Table 1 – Temperature Multipliers,  $F_T$

Continuous Use Temperature		Multiplier, $F_T$	
°F	°C	PE4710	PE3608
73 and lower	23 and lower	1.00	1.00
above 73 to 80	above 23 to 27	0.98	0.97
above 80 to 90	above 27 to 32	0.93	0.90
above 90 to 100	above 32 to 38	0.87	0.82
above 100 to 110	above 38 to 43	0.81	0.75
above 110 to 120	above 43 to 49	0.76	0.68
above 120 to 130	above 49 to 54	0.70	0.61
above 130 to 140	above 54 to 60	0.65	0.54

WL Plastics DIPS Pressure Class Pipe withstands surge pressures that momentarily increase internal pressure above the PC rating without short-term or long-term damage.

- Allowances for momentary surge pressures are applied above the Pressure Class rating, not deducted from PC.
- The allowable pressure in the pipe during a momentary surge pressure event is the sum of PC and the surge pressure allowance.

Surge pressure allowances are added to PC and always available for a momentary surge pressure event. Surge pressure allowance is never used to supplement PC for steady operating pressure (working pressure). If the potential surge pressure is greater than the surge pressure allowance, operating pressure (working pressure) is reduced and the difference is applied to the surge pressure allowance; or pipe having a higher PC is used to provide higher surge pressure allowance.

- **Allowance for recurring surge pressure ( $P_{RS}$ ).** Recurring surge pressures occur frequently and are inherent to the normal design and operation of the system. Recurring surge pressures may be caused by normal pump start-up or shut down and normal control valve opening or closure. The allowance for recurring surge pressure is:

$$P_{RS} = 0.5 \times PC_T$$

- **Allowance for occasional surge pressure ( $P_{OS}$ ).** Occasional surge pressures are generated during irregularly occurring conditions such as emergency operation or system malfunction. Occasional surge pressures are often the result of firefighting or a malfunction, such as a power failure or system component failure, including pump seize-up, valve-stem failure, or pressure-relief-valve failure. The allowance for occasional surge pressure is:

$$P_{OS} = 1.0 \times PC_T$$

Table 2 – PC, Surge Pressure Allowance and Maximum Pressure for Water at  $\leq 73^\circ\text{F}$  ( $\leq 23^\circ\text{C}$ ), psi

PC	Surge Pressure Allowance		Max. Pressure during Surge Event	
	$P_{RS}$	$P_{OS}$	$PC + P_{RS}$	$PC + P_{OS}$
350	175	350	475	700
300	150	300	450	600
250	125	250	375	500
200	100	200	300	400
150	75	150	225	300
100	50	100	150	200

Table 3 – Velocity\* for Water at  $\leq 73^\circ\text{F}$  ( $\leq 23^\circ\text{C}$ )

PC	Allowable Sudden Velocity Change for PE4710, ft/sec		Surge pressure for 1 fps velocity change, psi	Allowable Sudden Velocity Change for PE3608, ft/sec		Surge pressure for 1 fps velocity change, psi
	Occas.	Recur.		Occas.	Recur.	
350	18.0	9.0	19.4	15.9	7.9	22.0
300	16.8	8.4	17.8	14.9	7.4	20.2
250	18.9	9.5	13.2	17.1	8.6	14.6
200	16.7	8.4	12.0	15.1	7.6	13.2
150	14.3	7.1	10.5	12.9	6.5	11.6
100	11.4	5.7	8.7	10.3	5.2	9.7

\* This is the water flow velocity for working pressure equal to PC (WP = PC). Higher flow velocity is allowable where working pressure is lower than PC (WP < PC) because the pressure difference (PC – WP) may be applied to surge pressure allowance, thus increasing allowable velocity.

For example, the allowable flow velocities for WP = 110 psi in PC150 PE3608 pipe are 9.9 fps for recurring surge pressure conditions, and 16.3 fps for occasional surge pressure conditions:

$$6.5 + \frac{(150 - 110)}{11.6} = 9.9 \text{ fps recurring}$$

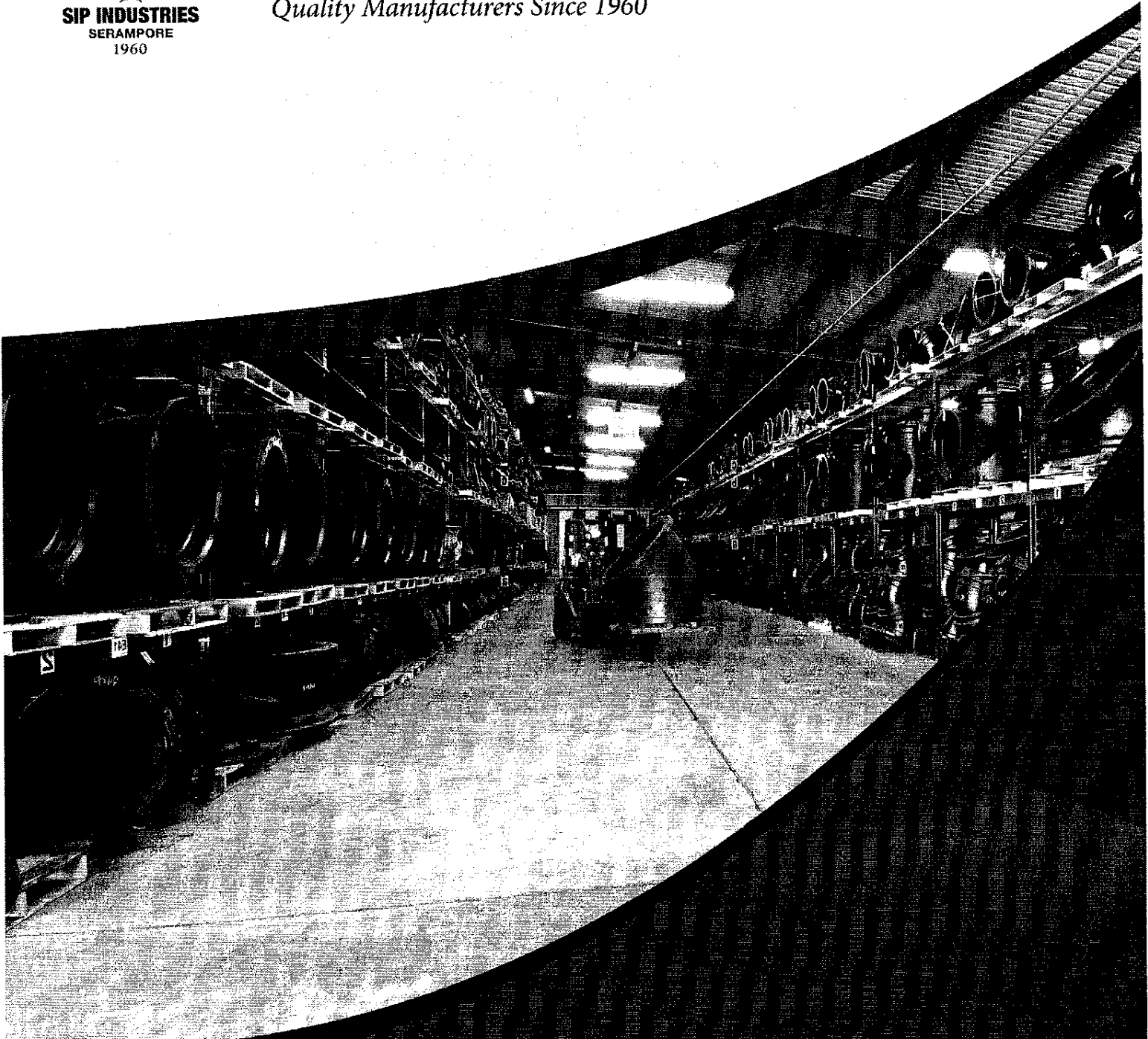
$$12.9 + \frac{(150 - 110)}{11.6} = 16.3 \text{ fps occasional}$$



# SIP Industries



*Quality Manufacturers Since 1960*



## **Compact MJ Fittings**

**ANSI/AWWA C153/21.53**

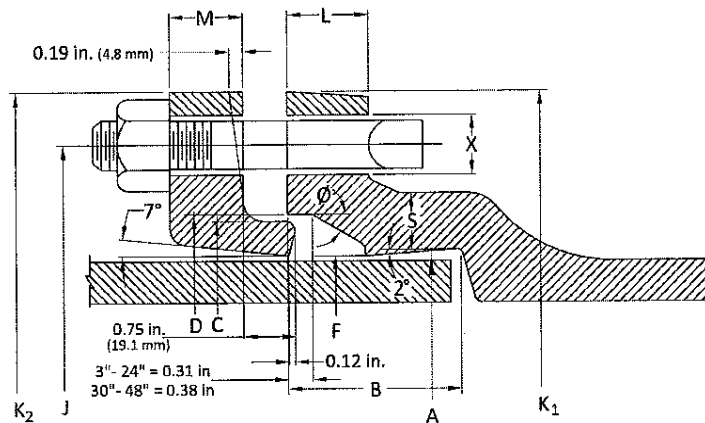
**[www.sipindustries.com](http://www.sipindustries.com)**

**Toll Free 877-921-6111**

**3" - 64" DUCTILE IRON MECHANICAL JOINT COMPACT FITTINGS**

**General Specifications**

- Material** : Ductile Iron per ASTM A536
- Pressure** : 350 PSI rating for 2"- 24" sizes, 250 PSI rating for 30" - 48" sizes and 150 PSI rating for 54" - 64" sizes
- Testing** : In accordance with ANSI/AWWA C153/A21.53 and UL, FM requirements
- Laying Length** : In accordance with ANSI/AWWA C153/A21.53  
(fittings not listed in ANSI/AWWA have dimensions per SIP design as noted in the catalog)
- Deflection** : 2"- 4"= 8° | 6"= 7° | 8"-12"= 5° | 14"-16"= 3 ½° | 18"-24"= 3° | 30"-48"= 2°
- Flanges** : Flanged ends on fittings match ANSI/AWWA C115/A21.15 and ANSI B16.1 class 125 flanges
- Gaskets** : SBR in accordance with ANSI/AWWA C111/A21.11 (see fittings accessories catalog)
- T-Bolts / Nuts** : Low alloy steel in accordance with ANSI/AWWA C111/A21.11 (see fittings accessories catalog)
- Cement Lining** : In accordance with ANSI/AWWA C104/A21.4 -- size 2" - 3" single thickness and sizes 4" - 64" double thickness
- Coating** : Asphaltic seal coat inside and out in accordance with ANSI/AWWA C104/A21.4 and referenced in ANSI/AWWA C153/A21.53 and also available in Fusion-Bonded epoxy (FBE) power coated oxide red color in accordance with the ANSI/AWWA C116/A21.16
- Weight** : Are in pounds, unless noted otherwise and do not include accessories, cement lining and coating
- Dimensions** : All dimensions are in inches unless noted otherwise.
- Installations** : Per ANSI/AWWA C600 and C111 using DIP conforming to C150/C151 and PVC pipe conforming to C900/C905
- Approvals** : 3" - 24" UL Listed | 3" - 24" FM Approved | 3" and higher UL/NSF Standards 61 | 3" and higher NSF/ANSI Standards 61  
Approved for Drinking Water. Please consult SIP for detail listing and approvals.



**Technical Specifications**

SIZE	A	B	C	D	F	J	K <sub>1</sub>	K <sub>2</sub>	M	S	L	Ø	X	BOLTS		
														NO.	SIZE	LENGTH
*2	2.50	2.50	3.39	3.50	2.61	4.75	6.19	6.25	0.62	0.36	0.58	28°	¾	2	5/8	3
3	3.96	2.50	4.84	4.94	4.06	6.19	7.62	7.69	0.62	0.39	0.58	28°	¾	4	¾	3
4	4.80	2.50	5.92	6.02	4.90	7.50	9.06	9.12	0.75	0.39	0.60	28°	7/8	4	¾	3 ½
6	6.90	2.50	8.02	8.12	7.00	9.50	11.06	11.12	0.88	0.43	0.63	28°	7/8	6	¾	3 ½
8	9.05	2.50	10.17	10.27	9.15	11.75	13.31	13.37	1.00	0.45	0.66	28°	7/8	6	¾	3 ½
10	11.10	2.50	12.22	12.34	11.20	14.00	15.62	15.62	1.00	0.47	0.70	28°	7/8	8	¾	4
12	13.20	2.50	14.32	14.44	13.30	16.25	17.88	17.88	1.00	0.49	0.73	28°	7/8	8	¾	4
14	15.30	3.50	16.40	16.54	15.44	18.75	20.25	20.25	1.25	0.55	0.79	28°	7/8	10	¾	4 ½
16	17.40	3.50	18.50	18.64	17.54	21.00	22.50	22.50	1.31	0.58	0.85	28°	7/8	12	¾	4 ½
18	19.50	3.50	20.60	20.74	19.64	23.25	24.75	24.83	1.38	0.68	1.00	28°	7/8	12	¾	4 ½
20	21.60	3.50	22.70	22.84	21.74	25.50	27.00	27.08	1.44	0.69	1.02	28°	7/8	14	¾	4 ½
24	25.80	3.50	26.90	27.04	25.94	30.00	31.50	31.58	1.56	0.75	1.02	28°	7/8	16	¾	5
30	32.00	4.00	33.29	33.46	32.17	36.88	39.12	39.12	2.00	0.82	1.31	20°	1 1/8	20	1	6
36	38.30	4.00	39.59	39.76	38.47	43.75	46.00	46.00	2.00	1.00	1.45	20°	1 1/8	24	1	6
42	44.50	4.00	45.79	45.96	44.67	50.62	60.00	60.00	2.00	1.25	1.45	20°	1 3/8	28	1 1/4	6 ½
48	50.80	4.00	52.09	52.26	50.97	57.50	63.12	63.12	2.00	1.35	1.45	20°	1 3/8	32	1 1/4	6 ½

NB : Fittings & Dimensions for Size 54, 60 & 64 available on request only.

All dimensions are in inches unless noted otherwise.

All weights are approximate in pounds unless noted otherwise.

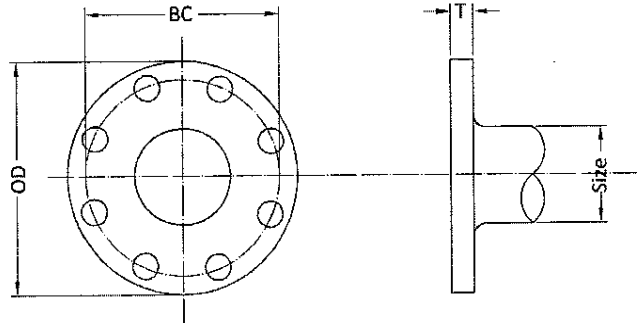
\* not included in AWWA C153



**1" - 64" DUCTILE IRON FLANGED FITTINGS**

**General Specifications**

- Material** : Ductile Iron per ASTM A536
- Pressure** : 250 PSI rating for 1" - 48" sizes and 150 PSI rating for 54" - 64" sizes
- Testing** : In accordance with ANSI/AWWA C110/A21.10 and UL, FM requirements
- Laying Length** : 2" - 48" : In accordance with ANSI/AWWA C110/A21.10 | ANSI B16.1  
54" - 64" : In accordance with ANSI/AWWA C153/A21.53  
(fittings not listed in ANSI/AWWA have dimensions per SIP design as noted in the catalog)
- Drilling** : In accordance with ANSI/AWWA C110/A21.10 | ANSI/AWWA C153/A21.53 | ANSI B16.1 Class 125 Flanges
- Cement Lining** : In accordance with ANSI/AWWA C104/A21.4 -- size 1" - 3" single thickness and sizes 4" - 64" double thickness
- Coating** : Asphaltic seal coat inside in accordance with ANSI/AWWA C104/A21.4 and prime coat red color outside (other coatings and linings are available on request / specified at time of order)
- Weight** : Are in pounds, unless noted otherwise and do not include accessories, cement lining and coating
- Dimensions** : All dimensions are in inches unless noted otherwise.
- Installations** : Per ANSI/AWWA C600 and C111
- Approvals** : 2" - 24" UL Listed | 2" - 24" FM Approved | 2" and higher UL/NSF Standards 61 | 2" and higher NSF/ANSI Standards 61 Approved for Drinking Water. Please consult SIP for detail listing and approvals.



**Technical Specifications**

SIZE	O.D.	B.C.	T	B O L T S			
				HOLE DIA.	NO.	SIZE	LENGTH
*1	4.25	3.12	0.44	0.62	4	½	2
*1½	5.00	3.88	0.56	0.62	4	½	2
*2	6.00	4.75	0.62	0.75	4	¾	2 ¼
*2½	7.00	5.50	0.69	0.75	4	¾	2 ½
3	7.50	6.00	0.75	0.75	4	¾	2 ½
4	9.00	7.50	0.94	0.75	8	¾	3
*5	10.00	8.50	0.94	0.88	8	¾	3
6	11.00	9.50	1.00	0.88	8	¾	3 ½
8	13.50	11.75	1.12	0.88	8	¾	3 ½
10	16.00	14.25	1.19	1.00	12	¾	4
12	19.00	17.00	1.25	1.00	12	¾	4
14	21.00	18.75	1.38	1.13	12	1	4 ½
16	23.50	21.25	1.44	1.13	16	1	4 ½
18	25.00	22.75	1.56	1.25	16	1 ⅛	5
20	27.50	25.00	1.69	1.25	20	1 ⅛	5
24	32.00	29.50	1.88	1.38	20	1 ¼	5 ½
30	38.75	36.00	2.12	1.38	28	1 ¼	6 ½
36	46.00	42.75	2.38	1.63	32	1 ½	7
42	53.00	49.50	2.62	1.63	36	1 ½	7 ½
48	59.50	56.00	2.75	1.63	44	1 ½	8
*54	66.25	62.75	3.00	2.00	44	1 ¾	8 ½
*60	73.00	69.25	3.12	2.00	52	1 ¾	9
*64	80.00	76.00	3.38	2.00	52	1 ¾	9

\* not included in AWWA C110

All dimensions are in inches unless noted otherwise.

All weights are approximate in pounds unless noted otherwise.



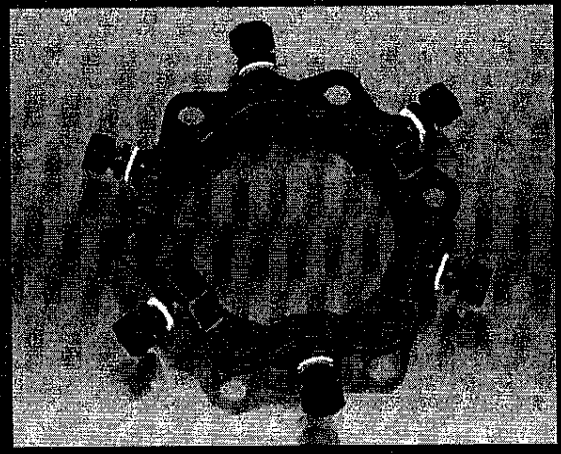
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Quality Manufacturers Since 1960

**EZ GRIP™**

JOINT RESTRAINT FOR PVC PIPE U.S. PATENT # 6,739,631 B2

## The EZ GRIP®

Joint Restraint is a proven design, offering an efficient, reliable, and inexpensive method of restraining PVC Pipe with Mechanical Joint Pipe or appurtenances, by integrating a series of gripping wedges into a Mechanical Joint follower gland.



### ADVANTAGES, BENEFITS, FEATURES

- The EZ GRIP® Joint Restraint eliminates clamps, tie rods, cables, and thrust blocks.
- The EZ GRIP® Joint Restraint performs optimally with all mechanical joint sockets of the ANSI/AWWA C111/A21.11, C110/A21.10, and C153/121.53 Standards and may be used with 4" - 12" AWWA C900 (PVC), C905 (PVC), C906 (HDPE) C909 (PVCO) or 3"-12" ASTM D2241 IPS PVC Pipe.
- The EZ GRIP® Joint Restraint will allow joint deflection, and maintain the seal and restraint while under pressure, and while subjected to ground movements
- The EZ GRIP® Joint Restraint shall have a pressure rating equal to that of the PVC pipe and shall have a minimum safety factor of at least 2 to 1.
- The contoured wedges provide greater circumferential contact with the pipe wall and increase the grip as the hydrostatic pressure increases.
- The hex head of the actuating screw is the same size as a standard T-bolt nut (1 1/4"), and requires no tool other than the tool required to install a standard Mechanical Joint T-Bolt and Nut.
- The hex head of the torque control screw is designed to shear at a preset limit, assuring proper installation and to prevent damage to the PVC pipe.
- When the actuating screw is rotated in the correct direction (clockwise) the torque control head breaks off, exposing a 5/8" hex head, indicating proper deployment of the wedge.
- After removing the 1-1/4" torque control hex head, a 5/8" hex head remains for multiple disassembly and re-installation, if necessary.
- EZ Grip Joint Restraints offers 5° deflection up to sizes 12", 3° on 14"-24", 2° on 30"-36"
- The gland, wedges, and screws are manufactured from high strength Ductile Iron in compliance with the ASTM A536 Standard, Grade 65-45-12.
- The EZ GRIP® Joint Restraint is designed to perform optimally for potable and recycled water, and for wastewater applications.
- The EZ GRIP® Joint Restraint for PVC Pipe is provided with a coating that is compatible with most field applied coatings.
- The standard color for the EZ Grip for PVC Pipe is red.
- Approved by Factory Mutual (FM) for sizes 4"-12" at 200psi for AWWA C900 Class 305 DR-14 pipe and at 150psi on AWWA C900 Class 235 DR-18 pipe. Listed with Underwriters Laboratories (UL) for sizes 4"-12" at 235psi on AWWA C900 Class 235 DR-18 pipe.



Available: Made in USA (4"-12") Import

Toll Free 877- 921-6111

[www.sipindustries.com](http://www.sipindustries.com)

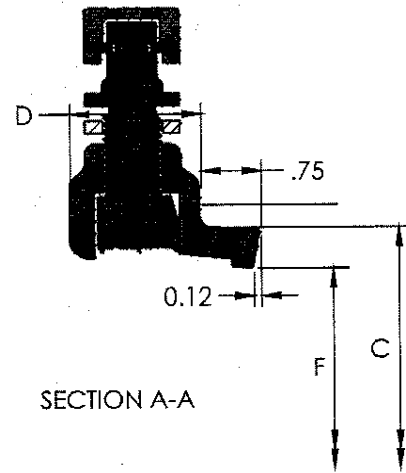
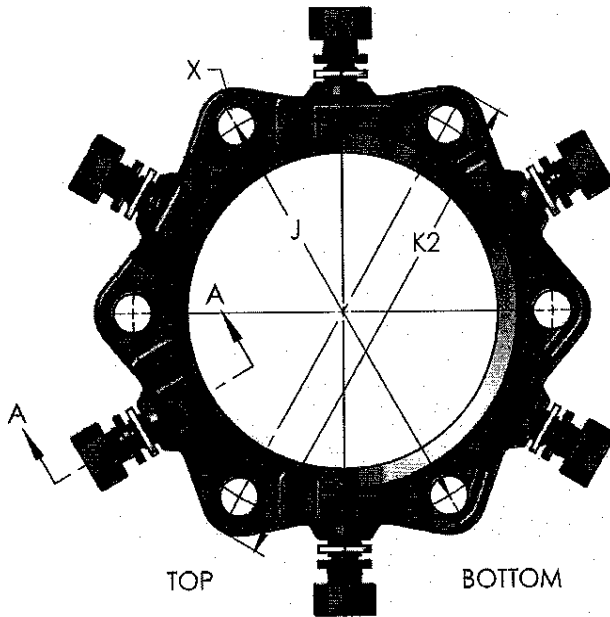


**SIP Industries**

**EZ GRIP®**

JOINT RESTRAINT FOR PVC PIPE  
U.S. PATENT # 6,739,631 B2

**Technical Data**



**EZ-GRIP PVC RESTRAINTS SPECIFICATIONS**

NOMINAL PIPE SIZE	SERIES NUMBER	C	D	F	X	J	K2	BOLT QTY	WEDGE QTY	APPROX. WEIGHT (LBS)
3	EZPVCP03	4.84	1.60	4.06	3/4	6.19	7.96	4	4	7.50
4	EZPVCP04 (D or I)	5.92	1.76	4.90	7/8	7.50	9.16	4	4	7.75
6	EZPVCP06 (D or I)	8.02	1.75	7.00	7/8	9.50	11.12	6	6	11.40
8	EZPVCP08 (D or I)	10.17	2.26	9.15	7/8	11.75	13.75	6	6	16.49
10	EZPVCP10 (D or I)	12.22	2.32	11.20	7/8	14.00	15.91	8	8	22.10
12	EZPVCP12 (D or I)	14.32	2.39	13.30	7/8	16.25	18.23	8	8	29.63
14	EZPVCP14	16.40	2.29	15.44	7/8	18.75	20.75	10	10	48.70
16	EZPVCP16	18.50	2.38	17.54	7/8	21.00	23.13	12	12	57.25
18	EZPVCP18	20.60	2.39	19.64	7/8	23.25	25.25	12	12	61.45
20	EZPVCP20	22.70	2.41	21.74	7/8	25.50	27.50	14	14	75.68
24	EZPVCP24	26.90	2.50	25.94	7/8	30.00	32.13	16	16	92.92
30	EZPVCP30	33.29	3.45	32.17	1 1/8	36.88	39.57	20	20	172.40
36	EZPVCP36	39.59	3.70	38.47	1 1/8	43.75	46.34	24	24	218.88

All dimensions are in inches, unless otherwise noted

(D) Made in USA

(I) Import

STANDARDIZED PRESSURE RATINGS

ANSI/AWWA C900 C100		ANSI/AWWA C905 C100		ASTM D2241 PS OD	
DR 14	305 PSI	DR 18	235 PSI	SDR 17	250 PSI
DR 18	235 PSI	DR 21	200 PSI	SDR 21	200 PSI
DR 25	165 PSI	DR 25	165 PSI	SDR 26	160 PSI
		DR 32.5	125 PSI		

Toll Free 877- 921-6111

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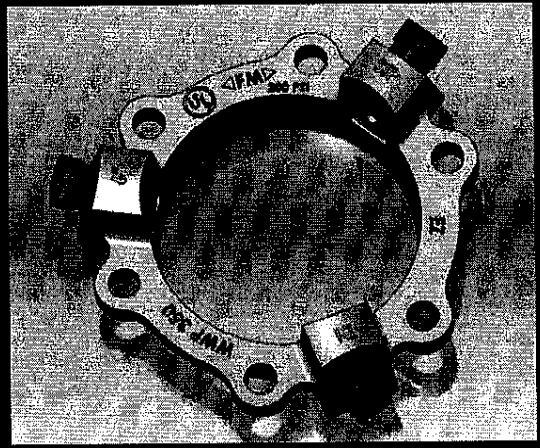
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Quality Manufacturers Since 1960

**EZ GRIP®**

JOINT RESTRAINT FOR DUCTILE IRON PIPE  
U.S. PATENT # 6,739,631 B2

## The EZ GRIP®

Joint Restraint is a proven design, offering an efficient, reliable, and inexpensive method of restraining Ductile Iron Pipe with Mechanical Joint Pipe or appurtenances, by integrating a series of gripping wedges into a Mechanical Joint follower gland.



### ADVANTAGES, BENEFITS, FEATURES

- The EZ GRIP® Joint Restraint eliminates clamps, tie rods, cables, and thrust blocks.
- The EZ GRIP® Joint Restraint performs optimally on any Ductile Iron Pipe conforming to the ANSI/AWWA C151/A21.51 Standard and is compatible with all mechanical joint sockets of the ANSI/AWWA C111/A21.11, C110/A21.10, and C153/121.53 Standards.
- The EZ GRIP® Joint Restraint is rated at 350 PSI working water pressure (WWP) for nominal diameters of 3"-16" and 250 PSI WWP for nominal diameters 18" and greater, and has a minimum safety factor of at least 2 to 1 for all diameters.
- The grip on the pipe increases as the hydrostatic pressure increases.
- The hex head of the actuating screw is the same size as a standard T-bolt nut (1-1/4"), and requires no tool other than the tool required to install a standard Mechanical Joint T-Bolt and Nut.
- The hex head of the torque control screw is designed to shear at a preset limit, assuring proper installation and to prevent damage to the pipe or lining.
- When the actuating screw is rotated in the correct direction (clockwise) the torque control head breaks off, exposing a 5/8" hex head, indicating proper deployment of the wedge.
- After removing the 1-1/4" torque control hex head, a 5/8" hex head remains for multiple disassembly and re-installation, if necessary.
- EZ Grip Joint Restraints offers 5° deflection up to sizes 12", 3° on 14"-24", 2° on 30"-36" & 1° on 42"-48"
- The gland, wedges, and screws are manufactured from high strength Ductile Iron in compliance with the ASTM A536 Standard, Grade 65-45-12.
- The wedges are heat treated to a minimum hardness of 370 BHN.
- The EZ GRIP® Joint Restraint is designed to perform optimally for potable and recycled water, and for wastewater applications.
- The EZ GRIP® Joint Restraint for Ductile Iron Pipe is provided with a coating that is compatible with most field applied coatings.
- The standard color for the EZ Grip for DI Pipe is black.
- Approved by Factory Mutual (FM) for sizes 3"-12". Listed with Underwriters Laboratories (UL) for sizes 3"-24"



Available: Made in USA (4"-12") Import

Toll Free 877- 921-6111

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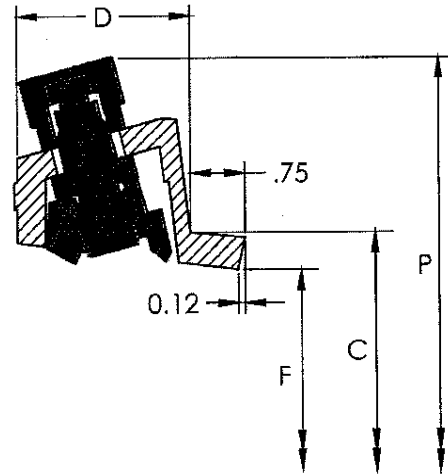
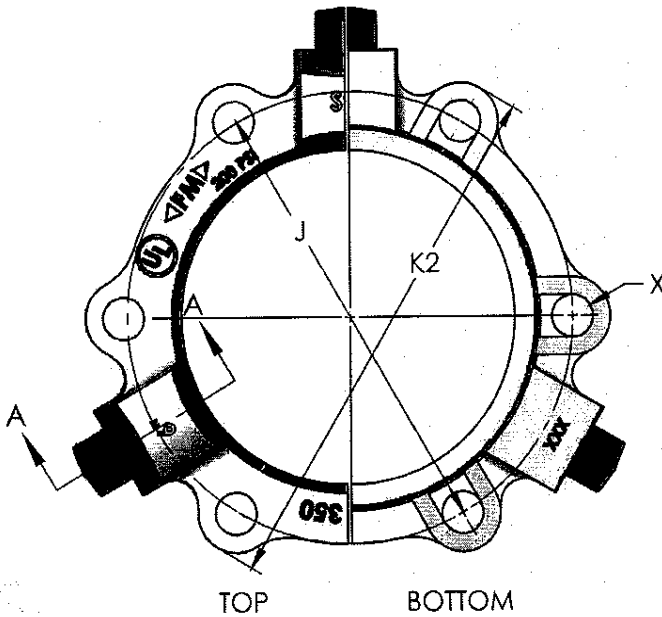


**SIP Industries**

**EZ GRIP®**

JOINT RESTRAINT FOR DUCTILE IRON PIPE  
U.S. PATENT # 6,739,631 B2

**Technical Data**



SECTION A-A

**EZ-GRIP DI RESTRAINTS SPECIFICATIONS**

NOMINAL PIPE SIZE	SERIES NUMBER	C	D	F	J	X	P	K2	BOLT QTY	WEDGE QTY	APPROX. WEIGHT (LBS)
3	EZDP03	4.84	2.43	4.06	6.19	3/4	10.00	7.69	4	2	6.38
4	EZDP04 (D or I)	5.92	2.46	4.90	7.50	7/8	11.00	9.12	4	2	7.88
6	EZDP06 (D or I)	8.02	2.46	7.00	9.50	7/8	13.14	11.12	6	3	11.57
8	EZDP08 (D or I)	10.17	2.46	9.15	11.75	7/8	15.30	13.39	6	4	15.91
10	EZDP10 (D or I)	12.22	2.46	11.20	14.00	7/8	17.30	15.62	8	6	22.34
12	EZDP12 (D or I)	14.32	2.46	13.30	16.25	7/8	19.45	17.89	8	8	29.82
14	EZDP14	16.40	2.98	15.44	18.75	7/8	21.45	20.80	10	10	49.90
16	EZDP16	18.50	2.84	17.54	21.00	7/8	24.20	22.50	12	12	58.02
18	EZDP18	20.60	2.95	19.64	23.25	7/8	26.00	25.25	12	12	68.52
20	EZDP20	22.70	2.91	21.74	25.50	7/8	28.20	27.50	14	14	75.94
24	EZDP24	26.90	3.20	25.94	30.00	7/8	33.50	31.87	16	16	126.18
30	EZDP30	33.29	3.50	32.17	36.88	1 1/8	39.80	39.12	20	20	196.60
36	EZDP36	39.59	3.50	38.47	43.75	1 1/8	46.10	46.00	24	24	243.52
42	EZDP42	45.79	5.18	44.67	50.62	1 3/8	54.50	53.12	28	28	441.96
48	EZDP48	52.09	5.18	50.97	57.50	1 3/8	60.80	60.00	32	32	522.24

All dimensions are in inches, unless otherwise noted

(D) Made in USA

(I) Import

Toll Free 877- 921-6111

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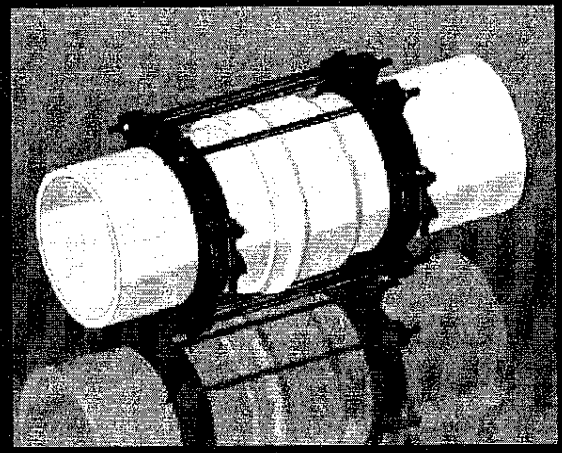
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Quality Manufacturers Since 1960

**EZ GRIP™**  
**PTP SERIES**

BELL JOINT RESTRAINT FOR PVC PIPE

## The EZ GRIP®

Pipe-To-Pipe Joint Restraint is a proven design, offering an efficient, reliable, and inexpensive method of restraining PVC Bell and Spigot (Push-On) Joints by utilizing a series of rigid machined gripping serrations that grab, hold, and secure the PVC Bell and Spigot ends.



### ADVANTAGES, BENEFITS, FEATURES

- The PTP Joint Restraint eliminates the need of timely thrust blocks.
- The PTP Joint Restraint performs optimally with AWWA C900 (PVC), C905 (PVC), C906 (HDPE), C909 (PVCO), or ASTM D2241 IPS PVC Pipe.
- Composed of high strength Ductile Iron in compliance with the ASTM A536 Standard, Grade 65-45-12
- T-Bolts, Rods, and Hex nut are manufactured from high-strength low-alloy (HSLA) steel as per ANSI/AWWA C111/A21.11
- Machined to exact tolerances with a minimum safety factor of 2:1.
- Easily maintains a water working pressure equal to that of the PVC pipe on which it is installed
- The PTP Joint Restraint is designed and manufactured to be disassembled, reinstalled, and reusable.
- The PTP Joint Restraint can be installed on new or existing water systems.
- The PTP Joint Restraint allows full joint deflection and maintains the seal while under pressure, and while subjected to ground movements.
- The internal serrations offer 360° circumferential contact with the pipe wall and increase the grip as the hydrostatic pressure increases whilst concurrently offering support of the pipe wall.
- With the split castings, the PTP Joint Restraint can conveniently be installed in or outside the trench.
- The PTP Joint Restraint for PVC Pipe is provided with a coating that is compatible with most field applied coatings. The standard color of the PTP Joint Restraint is red.
- Offered in sizes from 4" up to 36".
- Approved by Factory Mutual (FM) for sizes 4"-12" at 200psi for AWWA C900 Class 305 DR-14 pipe and at 150psi for AWWA C900 Class 235 DR-18 pipe.



Available: Import

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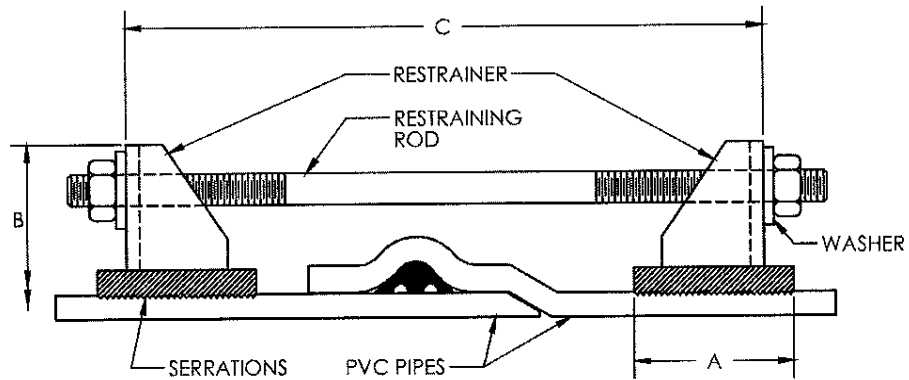


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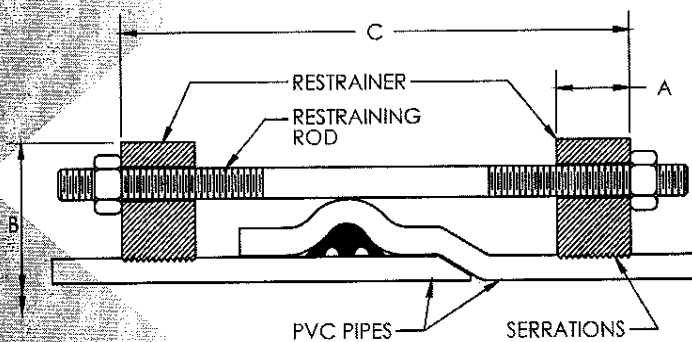
**EZ GRIP™  
PTP SERIES**

BELL JOINT RESTRAINT FOR PVC PIPE

**Technical Data**



SIZES: 14" - 36"



SIZES: 4" - 12"

**PTPVC PIPE RESTRAINTS SPECIFICATIONS**

NOMINAL PIPE SIZE	C900/C909 PVC PIPES PTPVC SERIES		IPS PVC PIPES PTPVS SERIES		A	B (APPROX.)	C (MAX.)	RESTRAINT BOLTS/RODS		CLAMPING BOLTS		WEIGHT (APPROX.) LBS
	O.D.	ITEM CODE	O.D.	ITEM CODE				QTY	SIZE	QTY	SIZE	
4	4.80	PTPVC04	4.50	PTPVS04	1.12	9.15	12.00	2	3/4 X 17	4	5/8 X 3 1/2	16
6	6.90	PTPVC06	6.63	PTPVS06	1.15	11.12	13.00	2	3/4 X 17	4	5/8 X 3 1/2	20
8	9.05	PTPVC08	8.63	PTPVS08	1.47	14.75	15.00	2	3/4 X 17	4	3/4 X 4	32
10	11.10	PTPVC10	10.75	PTPVS10	1.38	16.82	16.00	4	3/4 X 24	4	7/8 X 5	52
12	13.20	PTPVC12	12.75	PTPVS12	1.42	19.45	18.00	4	3/4 X 24	4	7/8 X 5	56
14	15.30	PTPVC14	N/A	N/A	4.00	22.56	24.00	6	3/4 X 30	8	7/8 X 7	150
16	17.40	PTPVC16	N/A	N/A	4.00	24.64	28.00	6	3/4 X 30	8	7/8 X 7	154
18	19.50	PTPVC18	N/A	N/A	5.00	26.64	28.00	8	3/4 X 30	8	7/8 X 7	222
20	21.60	PTPVC20	N/A	N/A	5.00	28.75	28.00	8	3/4 X 36	8	1 1/8 X 9	195
24	25.80	PTPVC24	N/A	N/A	5.00	33.90	34.00	12	3/4 X 36	8	1 1/8 X 9	237
30	32.00	PTPVC30	N/A	N/A	5.50	40.75	38.00	10	1 X 40	8	1 1/4 X 9	475
36	38.30	PTPVC36	N/A	N/A	9.00	49.10	38.00	14	1 X 40	12	1 1/8 X 10	722

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# WL106 PE4710 PIPE COMPOUND



## Typical Physical Properties for WL Plastics PE4710 Pipe Compound

- WL Plastics PE4710 pipe is manufactured from pressure rated PE4710 polyethylene compounds that meet or exceed ASTM D 3350 requirements and Cell Classification PE445574C. WL Plastics PE4710 compound meets or exceed ASTM D3350 requirements and Cell Classification PE345464C and material code designations PE3608 and PE3408.
- WL Plastics PE4710 polyethylene pipe compounds are Listed by PPI in TR-4 and are stress rated for pressure pipe with PPI HDS ratings for water at 73°F (23°C) and PPI HDB ratings at 73°F (23°C) and 140°F (60°C).
- WL Plastics PE4710 exceeds PPI TR-3 and ASTM D3350 SCG resistance requirements per ASTM F1473 (PENT). WL Plastics PE4710 ductility is substantiated with greater than 438,300 hours (50 years) at 73°F (23°C) before the onset of SCG.
- For potable water service, WL Plastics PE4710 black polyethylene compounds are certified to NSF-61

Physical Property	Test Method	Typical Value <sup>(1)</sup>
Cell classification (black compound)	ASTM D3350	PE445574C
Melt Index (190/2.16)	ASTM D1238	0.1 g/10 min
High Load Melt Index <sup>(2)</sup> (190/21.6)	ASTM D1238	4 – 20 g/10 min
Density natural resin (73°F/23°C)	ASTM D792/D1505	0.941-0.959 g/cm <sup>3</sup>
Density with 2% minimum carbon black (73°F/23°C)	ASTM D792/D1505	0.960 g/cm <sup>3</sup>
Tensile strength at yield (2 in/min; 73°F/23°C)	ASTM D638	3500 – 4000 psi
Tensile elongation (2 in/min; 73°F/23°C)	ASTM D638	>400%
Flexural modulus (73°F/23°C)	ASTM D790	>120,000 psi
SCG Resistance, PENT (80°C, 2.4 MPa)	ASTM F1473	> 500 h
Thermal stability	ASTM D3350	>428°F (> 220°C)
Brittleness temperature	ASTM D746	<-103°F (<-75°C)
Thermal expansion coefficient	ASTM D696	9 x 10 <sup>-5</sup> in/in/°F
HDB <sup>(3)</sup> at 73°F (23°C)	ASTM D2837/PPI TR-3	1600 psi (11.0 MPa)
HDB <sup>(3)</sup> at 140°F (60°C)	ASTM D2837/PPI TR-3	1000 psi (6.9 MPa)
HDS <sup>(3)</sup> for water at 73°F (23°C)	ASTM D2837/PPI TR-3	1000 psi (6.9 MPa)
HDS for water at 140°F (60°C)	ASTM D2837/PPI TR-3	630 psi (4.3 MPa)
RCP Resistance, Critical Pressure at 32°F (0°C)	ISO 13477	>174 psi (>1.2 MPa) <sup>(4)</sup>
RCP Resistance, Critical Temp. at 72.5 psi (0.5 MPa)	ISO 13477	<2°F (<-17°C) <sup>(4)</sup>

Contact WL Plastics Customer Service for availability. (1)Typical values determined from laboratory tests of samples of compounds (resins) prepared as plaque specimens in accordance with industry standard test methods. Values determined on samples prepared from pipe may vary. The typical values presented herein are for PE4710 polyethylene pipe compounds (resins) but do not constitute engineering properties for pipe. (2)Overall range of HLMl values for all compounds from all WL Plastics compound suppliers; HLMl variation for an individual compound will be well within the overall range. (3)Listed HDB and HDS ratings in accordance with ASTM D 2837 and PPI TR-3 are published in PPI TR-4 by the compound manufacturer (independent listing) and by WL Plastics (dependent listing). WL Plastics dependent listing compounds are identified by a compound code for the supplier: C (Chevron-Phillips); D (Dow); E (Lyondell Basell); S (Ineos). (4)RCP data not available for compound code C.

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