

Section C: Joint Restraints	Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
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C 1 – JOINT RESTRAINTS/ BELL/ SPIGOT JOINT/ NEW & IN-SERVICE INSTALLATIONS/ 2” IPS PVC PIPE:

Effective Date: 01-01-20
Revision #: 2

SPECIFICATION:

Restraint devices for nominal IPS pipe joints and fittings on size 2 inch shall consist of two split rings with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on one pipe to the other, shall meet or exceed the performance specifications of:

- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.

MATERIAL:

- Ductile iron- ASTM Standards A536. Grade 65-45-12.
- T-bolts, rods and hex nuts- 316 SS.

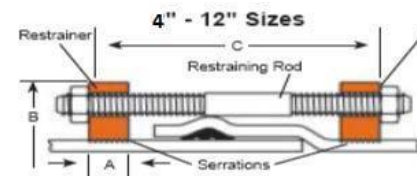
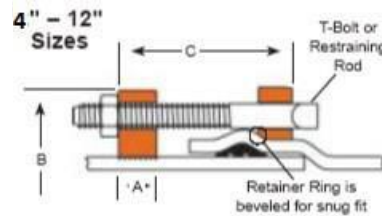
DESIGN:

- Restraint devices for PVC pipe shall consist of two split rings a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on one pipe to the retainer on the next pipe or fitting.
- Shall be capable of installation on a new installation and in-service pipelines without disrupting pipe line service.

INCLUDE:

- Four (4)- Split ring halves
- Two (2)- Side clamping bolts and nuts
- Two (2) - Proper number, length and size, T-bolts and nuts or tie rods and nuts.

RESTRICTIONS:



MANUFACTURER:

- EBAA IRON- 6500, 7500 SERIES
- FORD- UNIFLANGE 1350, 1360, 1390 SERIES
- SIGMA- PVP SERIES (BELL & SPIGOT ONLY)

C 1.1 – JOINT RESTRAINTS / BELL / SPIGOT JOINT / NEW & IN-SERVICE INSTALLATIONS/ (AWWA C-900) PVC PIPE: Effective Date: 01-01-20
Revision #: 2

SPECIFICATION:

Restraint devices for nominal pipe sizes 4 inch through 12 inch shall consist of two split rings with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on one pipe to the other, shall meet or exceed the performance specifications of:

- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.

MATERIAL:

- Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- T-bolts, rods and hex nuts- 316 SS.

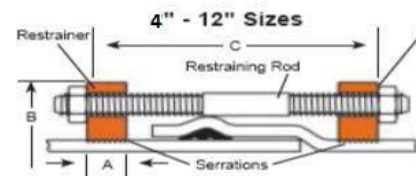
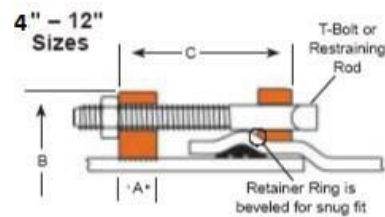
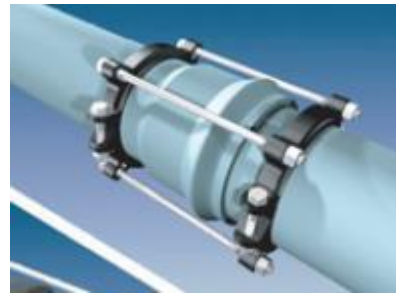
DESIGN:

- Restraint devices for PVC pipe shall consist of two split rings with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on one pipe to the retainer on the next pipe.
- Shall be capable of installation on a new installation and in-service pipelines without disrupting pipe line service.

INCLUDE:

- Four (4)- Split ring halves
- Four (4)- Side clamping bolts and nuts
- Proper number, length and size, T-bolts and nuts or tie rods and nuts.

RESTRICTIONS:



MANUFACTURER:

- EBAA IRON- 1500 & 1600 SERIES
- FORD- UNIFLANGE 1390 SERIES
- STAR PRODUCTS-1100, 1100G2, & 1200 SERIES
- SIGMA- PV-LOK- PWP SERIES
- SMITH-BLAIR- 165 BELL-LOCK
- ROMAC 600 SERIES

C 1.1.1 – Joint Restraints/ Bell & Spigot Joint/ New & In-Service Installation (AWWA C-900) PVC & DI Pipe:

Effective Date: 01-01-20
Revision #: 2

SPECIFICATION:

Dual use (PVC & DI pipe) bell and spigot restraint devices for nominal pipe sizes 4” through 12” shall meet or exceed the performance specifications of:

- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.
- Shall be capable of new and in-service installations on PVC and DI pipe.

MATERIAL:

- Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- T-bolts, rods and hex nuts- 316 SS.

DESIGN:

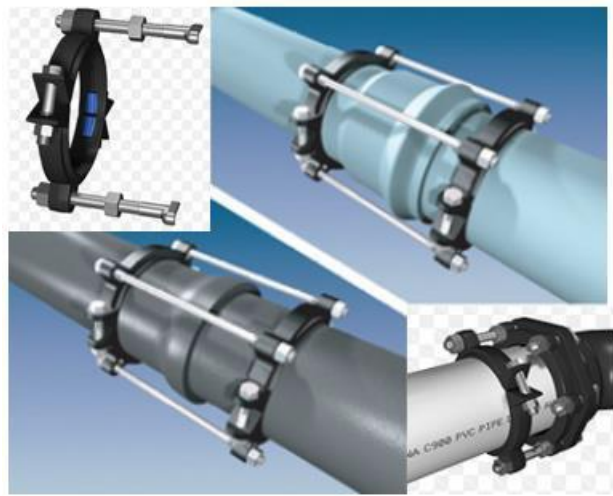
- Restraint devices for PVC & DI pipe shall consist of a split ring behind the pipe bell and a split ring with multiple gripping wedges and/or a series of serrations to grip the pipe spigot in conjunction with a sufficient number of bolts connecting the bell ring on one pipe to the retainer on the next pipe.
- Shall be capable of installation on a new installation and in-service pipelines without disrupting pipe line service.
- Gripping wedges and/or a series of serrations are optional on the bell ring, required on spigot ring.

REQUIREMENTS:

- Each accessory kit shall be a boxed package.

INCLUDE:


- Four (4) - Split ring halves.
- Four (4) - Side clamping bolts and nuts.
- Proper number, length and size, T-bolts and nuts or tie rods and nuts.



MANUFACTURER:

- EBAA IRON-1500TD & 1600TD SERIES
- SIGMA PV-LOK

RESTRICTIONS:

C 1.2 – JOINT RESTRAINTS / BELL & SPIGOT JOINT / NEW INSTALLATIONS ONLY / (AWWA C-900) PVC PIPE:		Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
<p><u>SPECIFICATION:</u> Restraint devices for nominal pipe sizes 4” thru 12” shall consist of one solid ring and one split or solid ring with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on the spigot pipe to the bell of the other, shall meet or exceed the performance specifications of:</p> <ul style="list-style-type: none"> • Material supplied must have ISO 9001 or later certification. or poured in a foundry located in the U.S.A. • Affidavit of compliance to this specification shall be available upon request. • Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe. <p><u>MATERIAL:</u></p> <ul style="list-style-type: none"> • Ductile Iron- ASTM Standards A536. Grade 65-45-12. • T -bolts, rods and hex nuts- 316 SS. <p><u>DESIGN:</u></p> <ul style="list-style-type: none"> • Restraint devices for PVC pipe shall consist of one split ring or two solid rings with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on one pipe to the retainer on the next pipe. • Shall be capable of installation on new installation pipelines. 	<p><u>INCLUDE:</u></p> <ul style="list-style-type: none"> • Two (2) - Split grip ring halves or One solid ring. • One (1) - Solid behind the bell ring. • Two (2) - Side clamping bolts and nuts, if required. <p>Proper number, length and size. T-bolts and nuts or tie rods and nuts.</p> <div style="text-align: center;">  </div>	
<p><u>RESTRICTIONS:</u></p>	<p><u>MANUFACTURER:</u></p> <ul style="list-style-type: none"> • FORD- UNIFLANGE 1350 SERIES- Not for use on DR-14 PVC pipe. • STAR PRODUCTS- PVC STARGRIP-4100P • ROMAC 600 SERIES 	

C 1.3 – JOINT RESTRAINTS / PLAIN END TO MECHANICAL JOINT / (AWWA C-900) PVC PIPE:	Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
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SPECIFICATION:

Restraint devices for nominal pipe sizes 4” thru 12” shall consist of a split ring with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer to the joint, shall meet or exceed the performance specifications of:

- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.

MATERIAL:

- Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- T -bolts, rods and hex nuts- 316 SS.

DESIGN:

- Restraint devices for PVC pipe shall consist of a split ring with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer to the joint.

INCLUDE:

- Two (2) - Split ring halves
- Two (2) - Side clamping bolts and nuts
- Proper number, length and size, T-bolts and nuts or tie rods and nuts.




MANUFACTURER:

- EBAA IRON- 15PFOO SERIES
- FORD- UNIFLANGE 1300 SERIES
- STAR PRODUCTS- 1000C SERIES
- SIGMA- PV-LOK - PWM SERIES
- SMITH-BLAIR- 115 BELL-LOCK

RESTRICTIONS:

- For use in existing, in-service pipelines only.

C 2 – JOINT RESTRAINTS / MULTIPLE WEDGE STYLE MECHANICAL JOINT / (AWWA C-900) PVC PIPE:		Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
<p><u>SPECIFICATION:</u> Restraint devices for nominal pipe sizes 4” thru 12” shall consist of multiple gripping wedge incorporated into a follower gland shall meet or exceed the performance specifications of:</p> <ul style="list-style-type: none"> • Application requirements of AWWA C110 (ANSI-A21.10) or latest revision thereof. • AWWA C 153 (ANSI-A21.53) or latest revision thereof. • AWWA C111 (ANSI-A21.11) or latest revision thereof. • ASTM Standards F 1674-96 "Standard Test Method for Joint Restraint Products for use with PVC pipe". • Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes through 12”. • Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A. • Affidavit of compliance to this specification shall be available upon request. <p><u>MATERIAL:</u></p> <ul style="list-style-type: none"> • Gland: Ductile iron conforming to the applicable provisions of AWWA C 111 (ANSI - A21.11) and ASTM A536.80. • Wedges: Ductile iron heat treated to a minimum hardness of 370 BHN. <p><u>DESIGN:</u></p> <ul style="list-style-type: none"> • Multiple gripping wedges incorporated within a mechanical joint follower gland, that when actuated, impart increasing resistance to pipe separation as pressure increases restraint nuts must be shear type torque design. • Must include a minimum safety factor of 2:1 in all sizes. 	<p><u>INCLUDE:</u></p> <ul style="list-style-type: none"> • One (1) ductile iron gland • One (1) rubber gasket • Proper number of 316 SS T-bolts and nuts for each MJ pipe fitting face. <div style="text-align: center;">  </div>	
<p><u>RESTRICTIONS:</u></p>	<p><u>MANUFACTURER:</u></p> <ul style="list-style-type: none"> • EBAA IRON- MEGA LUG 2000PV SERIES • FORD- UNIFLANGE 1500 SERIES • SMITH-BLAIR- CAM-LOCK 120 • STAR PIPE PRODUCTS- STARGRIP 4000 AND 4000G2 SERIES • SIGMA ONE LOK SERIES SLCE 	

<p align="center">C 2.1 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ SPLIT GLAND/ EXISTING INSTALLATIONS ONLY/ (AWWA C-900) PVC PIPE:</p>	<p>Effective Date: <u>01-01-20</u> Revision #: <u>2</u></p>
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SPECIFICATION:

Restraint devices for nominal pipe sizes 4” through 12” shall consist of multiple gripping wedge incorporated into a follower gland shall meet or exceed the performance specifications of:

- Application requirements of AWWA C110 (ANSI-A21.10) or latest revision thereof.
- Application requirements of AWWA C153 (ANSI-A21.53) or latest revision thereof.
- Application requirements of AWWA C111 (ANSI-A21.11) or latest revision thereof.
- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.
- Affidavit of compliance to this specification shall be available upon request.

MATERIAL:

- Gland: Ductile iron conforming to the applicable provisions of ASTM A 536, Grade 65-45-12.
- Wedges: Ductile iron heat treated to a minimum hardness of 370 BHN.

DESIGN:

- Multiple gripping wedges incorporated within a split mechanical joint follower gland, that when actuated, impart increasing resistance to pipe separation as pressure increases restraint nuts must be shear type torque design.
- Must include a minimum safety factor of 2:1 in all sizes.

RESTRICTIONS:

- For use in existing, in-service pipelines only.

INCLUDE:

- One (1) ductile iron split gland
- One (1) rubber gasket
- Proper number of 316 SS T-bolts and nuts for each mechanical joint pipe fitting face.



MANUFACTURER:

- EBAA IRON - MEGA LUG 2000SV SERIES

C 3 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE/ BELL & SPIGOT JOINT/ NEW INSTALLATIONS ONLY/ DI PIPE:	Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
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SPECIFICATION:

Restraint devices for nominal pipe sizes 4” thru 24” shall consist of multiple gripping wedge incorporated into one or two follower glands and shall meet or exceed the performance specifications of:

- Application requirements of AWWA C110 (ANSI-A21.10) or latest revision thereof.
- AWWA C153 (ANSI-A21.53) or latest revision thereof.
- AWWA C111 (ANSI-A21.11) or latest revision thereof.
- Material supplied must have ISO 9001 or later Certification, or poured in a foundry located in the U.S.A.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.
- Affidavit of compliance to this specification shall be available upon request.

MATERIAL:

- Glands: Ductile iron conforming to the applicable provisions of AWWA C 111 (ANSI-A21.11) and ASTM A536.80.
- Wedges: Ductile iron heat treated to a minimum hardness of 370 BHN.

INCLUDE:

- Two (2) ductile iron glands
- Proper number, length and size, 316 SS T-bolts and nuts or tie rods and nuts.

OPTIONAL:

- May be installed on existing pipelines if product is capable.



MANUFACTURER:

- EBAA IRON- 1700 SERIES
- FORD- UNIFLANGE 1450 SERIES
- SIGMA- ONE LOKI SLDEH
- STAR PRODUCTS- STAGRIP 3100P SERIES

RESTRICTIONS:

<p>C 3.1 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE/ BELL & SPIGOT JOINT/ SPLIT GLANDS/ EXISTING INSTALLATIONS/ DI PIPE:</p>	<p>Effective Date: <u>01-01-20</u> Revision #: <u>2</u></p>
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SPECIFICATION:

Restraint devices for nominal pipe sizes 4” thru 24” shall consist of multiple gripping wedge incorporated into one or two follower split glands and shall meet or exceed the performance specifications of:

- Application requirements of AWWA C110 (ANSI-A21.10) or latest revision thereof.
- Application requirements of AWWA C153 (ANSI-A21.53) or latest revision thereof.
- Application requirements of AWWA C111 (ANSI-A21.11) or latest revision thereof.
- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.
- Affidavit of compliance to this specification shall be available upon request.

MATERIAL:

- Glands: Ductile iron conforming to the applicable provisions ASTM A536, Grade 65-45-12.
- Wedges: Ductile iron heat treated to a minimum hardness of 370 BHN.

INCLUDE:

- Two (2) ductile iron split glands
- Proper number, length and size, 316 SS T-bolts and nuts or tie rods and nuts.

OPTIONAL:

- May be installed on new pipelines if product is capable.



MANUFACTURER:

- EBAA IRON- 1100HD SERIES
- STAR PRODUCTS- STAGRIP 3100S SERIES
- SIGMA ONE LOK SERIES SSLDH

RESTRICTIONS:

C 4 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ DI PIPE:	Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
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SPECIFICATION:

Restraint devices for nominal pipe sizes 4” through 24” shall consist of multiple gripping wedge incorporated into a follower gland shall meet or exceed the performance specifications of:

- Application requirements of AWWA C110 (ANSI-A21.10) or latest revision thereof.
- AWWA C153 (ANSI-A21.53) or latest revision thereof.
- AWWA C111 (ANSI-A21.11) or latest revision thereof.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UUFM) for sizes through 12”.
- Underwriter Laboratory Listed (UL) as noted by (UL) for sizes through 24”.
- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

MATERIAL:

- Gland: Ductile iron conforming to the applicable provisions of AWWA C 111 (ANSI-A21.11) and ASTM A536.B0.
- Wedges: Ductile iron heat treated to a minimum hardness of 370 BHN.

DESIGN:

- Multiple gripping wedges incorporated within a mechanical joint follower gland, that when actuated, impart increasing resistance to pipe separation as pressure increases restraint nuts must be shear type torque design.
- Must include a minimum safety factor of 2:1 in all sizes.

INCLUDE:

- One (1) ductile iron gland
- One (1) rubber gasket
- Proper number of 316 SS T-bolts and nuts for each MJ pipe fitting face.



MANUFACTURER:

- EBAA IRON- MEGA LUG 1100, 1100SD, 1100SDB
- FORD- UNIFLANGE 1400 SERIES
- GRIFFIN- WEDGE ACTION
- ROMAC- ROMA GRIP! DI PIPE
- SIGMA- ONE LOKI SLDE
- SMITH-BLAIR- CAM-LOCK 111
- STAR PIPE PRODUCTS- STARGRIP 3000 SERIES

RESTRICTIONS:

C 4.1 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ SPLIT GLAND/ EXISTING INSTALLATIONS ONLY/ DI PIPE:

Effective Date: 01-01-20
Revision #: 2

SPECIFICATION:

Restraint devices for nominal pipe sizes 4” through 24” shall consist of multiple gripping wedge incorporated into a mechanical joint follower gland, shall meet or exceed the performance specifications of:

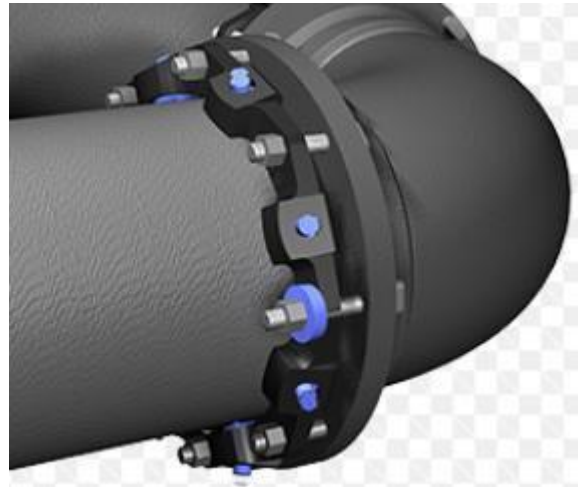
- Application requirements of AWWA C110 (ANSI-A21, 10) or latest revision thereof.
- AWWA C 153 (ANSI-A21.53) or latest revision thereof.
- AWWA C 111 (ANSI-A21.11) or latest revision thereof.
- Shall possess a minimum rating of twice (2:1) the pressure rating of the pipe.
- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

MATERIAL:

- Gland: Ductile iron conforming to the applicable provisions of ASTM A536, Grade 65-45-12.
- Wedges: Ductile iron heat treated to a minimum hardness of 370 BHN.

INCLUDE:

- One (1) ductile iron gland
- One (1) rubber gasket
- Proper number of 316 SS T bolts and nuts for each MJ pipe fitting face.



MANUFACTURER:

- EBAA IRON- MEGA LUG 1100S0 SERIES
- STAR PIPE PRODUCTS- STARGRIP 3000S SERIES
- SIGMA ONE LOK SERIES SSLD

RESTRICTIONS:

- For use in existing, in-service pipelines only.

C 5 – JOINT RESTRAINTS GASKETS/ DI PIPE (PUSH ON JOINT):	Effective Date: <u>01-01-20</u> Revision #: <u>2</u>
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SPECIFICATION:

Restraint devices for nominal pipe sizes 4” through 24” for push-on Tyton Joint or Fastite Joint pipe and fittings, consisting of multiple gripping wedges integral to the gasket that are compressed when the joint is pushed home, that shall meet or exceed the performance specifications of:

- AWWA C 111 (ANSI-A21.11) or latest revision thereof.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes through 12”.
- Material supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Application requirements of AWWA C110 (ANSI – A21.10) or AWWA C 153 (ANSI – A21.53), latest revision thereof.

MATERIAL:

Gaskets:

- SBR- Buna-S
- EPDM-Ethylene Propylene
- NBR-Buna-N

Locking Segments:

- Stainless Steel vulcanized into the gasket

DESIGN:

- Gaskets shall be colored. The color shall be consistent throughout the entire cross section of the gasket. The color shall not be attained by surface coating, it shall be inherent within the rubber.
- Restrained gaskets are for use only in push-on joints.
- Both American’s Amarillo Fast Grip Gaskets and US Pipe, Red Field Lok 350 gaskets are acceptable.

RESTRICTIONS:

- For low profile carrier pipes inside casings with prior approval by CFPUA.
- Amarillo Fast Grip gaskets shall only be installed in Fastite bell joints.
- Red Field Lok 350 & Blue Sure Stop 350 gaskets shall only be installed in Tyton bell joints.

INCLUDE:

- One-Restraint push-on joint gasket.



MANUFACTURER:

- AMERICAN CAST IRON AMARILLO FAST GRIP GASKET
- McWANE, INC. – BLUE SURE STOP 350 GASKET
- US PIPE – RED FIELD LOK 350 GASKET