

# **Material Specifications**

City of New Port Richey  
6132 Pine Hill Road  
Port Richey, Florida 34668



## Material Specifications

# MATERIAL SPECIFICATION MANUAL



City of New Port Richey  
6132 Pine Hill Road  
Port Richey, FL 34668

Created Date: 01/25/15  
Last Revised Date: 04/20/19

## Material Specifications

All contractors and suppliers shall actively follow The City of New Port Richey Construction Services's published material specification manual. Construction Services reserves the right to terminate and the approval of products, without notice, based upon poor performance, inadequate support or failure to meet specification.

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- O 7 Multi-Component; Urethane/ Epoxy, Polyurea Liner System/ Sanitary Sewer
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**Section A:  
PIPE**



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### A 1 — PVC PIPE SCHEDULE 40 :

**Material/ Specification:**

- Pipe shall meet or exceed the performance specifications of:
- Schedule 40 Polyvinyl Chloride, PVC, pipe.
- Shall conform to ASTM D1785 or latest revision thereof.
- Pipe shall be made from clean, new NSF approved Type 1, Grade 1 PVC.

**Connections:**

- Plain end X plain end.
- Plain end X solvent weld bell.

**Color-coded:**

- White— potable water.
- Blue— potable water.
- Purple— reclaimed water.

**Potable water requirement:**

- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".

**Dimensions:**

- Twenty (20') foot standard joint length.

**Restrictions:**

- Use of this product is limited to:
  - Customer side of meter
  - Irrigation systems
  - Service casings

**Manufacturer:**

- CHARLOTTE PIPE AND FOUNDRY
- COLONIAL
- DIAMOND PLASTICS
- FREEDOM PLASTICS
- J-M EAGLE
- NAPCO
- NATIONAL PIPE & PLASTICS



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## Material Specifications

### A 2 – PVC PIPE (SCHEDULE 80):

**Material/ Specification:**

- Schedule 80 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D1785, dimensional requirements, minimum burst and sustained pressure requirements, maximum operating pressure, and test procedures for determining pipe quality with respect to workmanship and materials .
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or “NSF-pw”.
- ASTM D1784, manufactured from compounds with Cell Classification 12454B (Type 1, Grade 1 material).

**Connection:**

- Plain end X plain end
- Plain end X solvent weld bell

**Color-coded:**

- Blue– potable water
- Green– sanitary sewer/ force main
- Purple– reclaimed water
- White– all services
- Gray– all services

**Dimensions:**

- 20' standard joint length

**Sizes:**

- Three quarter (3/4") inch
- One (1") inch
- One & one half (1 1/2") inch
- Two (2") inch

**Restrictions:**

- Solvent-cement weld pipe will NOT be accepted in a pressurized application on the county side of the meter.

**Manufacturer:**

- CHEMTROL
- CHARLOTTE PIPE AND FOUNDRY
- COLONIAL
- ESLON THERMOPLASTICS
- FREEDOM PLASTICS
- NATIONAL PIPE & PLASTIC
- WORLD OF PLASTICS, INC.



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## Material Specifications

### A 3 – POLYETHYLENE SERVICE TUBING:

#### **Specification/ Material:**

- PE-3408 High Density Polyethylene, HDPE, tubing shall meet or exceed the performance specifications of:
- PE-3408 Resin listed in Plastic Pipe Institute TR4
- Cell classification per ASTM Standards D3350 = 345444 or 345464.
- ASTM Standards D2737 dimensional standard, Copper Tubing Size, CTS, controlled outside diameter.
- AWWA C901
- MFG. Shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements for pipe in this classification.

#### **Potable water requirement:**

- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".

#### **Pressure Rating:**

- 200-psi. operating pressure @ 73.4 F

#### **Color-coded:**

- Blue - potable water
- Purple/ Lavender (magenta) - reclaimed water

#### **Dimensions:**

- Copper tubing size, C.T.S. O.D. controlled
- DR-9

#### **Sizes:**

- Three quarter (3/4") inch, ( **Potable Water Only**)
- One (1") inch
- One & one half (1-1/2") inch
- Two (2")

#### **Restrictions:**

- Use of this product is limited to:
  - Service lines



#### **Manufacturer:**

- ARNCO CORP. PERMA-GUARD/ PW TUBING
- ARNCO CORP. PERMA-GUARD/RW TUBING
- CHARTER PLASTICS/ BLUE ICE
- CHARTER PLASTICS/ LAV ICE
- ENDOPURE
- ENDOT/ ENDOCORE RWT



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### A 3.1 – POLYETHYLENE 2” POTABLE WATER MAIN TUBING:

**Specification/ Material:**

- PE-3408 High Density Polyethylene, HDPE, tubing shall meet or exceed the performance specifications of:
- PE-3408 Resin listed in Plastic Pipe Institute TR4
- Cell classification per ASTM Standards D3350 = 345444 or 345464E.
- ASTM Standards D3035 dimensional standard, Iron Pipe Size, IPS, controlled outside diameter.
- AWWA C901
- MFG. Shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements for pipe in this classification.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or “NSF-pw”.

**Pressure Rating:**

- 200-psi. operating pressure @ 73.4 F

**Color-coded:**

- Blue - potable water
- Black with minimum of three (3) evenly spaced blue stripes– potable water

**Dimensions:**

- Iron pipe size, I.P.S. O.D. controlled
- DR-9

**Sizes:**

- Two (2”) ( Potable Water Mains Only)

**Restrictions:**

- Use of this product is limited to:
  - Two-inch water mains

**Manufacturer:**

- CHARTER PLASTICS/ BLUE STRIPE PIPE
- ENDOPURE/ BLUE WITH CLEAR CORE
- LAMSON VYLON/ PRESSURE FLEX WATER



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### A 3.2 – HIGH DENSITY POLYETHYLENE PIPE (HDPE) :

#### Material/ Specification:

- PE-3408 High Density Polyethylene, HDPE, pipe shall meet or exceed the performance specifications of:
- PE-3408 Resin listed in Plastic Pipe Institute TR4.
- Cell classification per ASTM D3350 = 345444C or 345464C for black **OR**
- 345444E or 345464E for non-black & color.
- ASTM F 714, minimum wall values.
- AWWA C906.
- MFG. Shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements for pipe in this classification.

#### Potable water requirements:

- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".

#### Color– coded:

- Blue– potable water.
- Purple/ Lavender– reclaim water.
- Green– sanitary sewer/ force main.

#### Dimensions:

- Ductile iron pipe size O.D., D.I.P.S.
- DR-9, DR-11.

#### Pressure Rating:

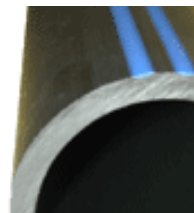
- 160-psi. operating pressure @ 73.4 F for DR-11.
- 200-psi. operating pressure @ 73.4 F for DR-9.

#### Joining Restrictions:

- Compression type connections are not acceptable in new installations.
- Pipe joints shall be butt fusion.
- No electro fusion coupling joints will be accepted.
- Flange or mechanical joint adapters shall be used for pipe and fitting transitions.

#### Fire Main Pressure Rating & Requirements:

- Dimension Ratio (DR) DR-9, pressure class 200 for fire mains.
- Factory Mutual Approved (FM) pipe.



#### Manufacturer:

- CHARTER PLASTICS/ STRIPE PIPE
- CP CHEMICAL/ PERFORMANCE PIPE– DRISCO PLEX 4000, 1600
- J-M EAGLE PE PIPE
- LAMSON VYLON/ PRESSURE FLEX WATER
- RINKER MATERIALS– POLY PIPE



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### A 3.3 – HIGH DENSITY POLYETHYLENE PIPE (HDPE) GRAVITY SANITARY SEWER:

**Material/ Specification:**

- PE-3408 High Density Polyethylene, HDPE, pipe shall meet or exceed the performance specifications of:
- PE-3408 Resin listed in Plastic Pipe Institute TR4.
- Cell classification per ASTM D3350 = 345444E or 345464E for non-black & color.
- ASTM F 714, minimum wall values.
- AWWA C906.
- MFG. Shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements for pipe in this classification.
- Shall be colored gray, gray pipe is especially suited for TV inspection, reflects enough light for excellent viewing.

**Color– code:**

- Gray W/ green stripe– gravity sanitary sewer.

**Dimensions:**

- Ductile iron pipe size O.D., D.I.P.S.
- DR-11, DR-17.

**Pressure Rating:**

- 160-psi. operating pressure @ 73.4 F for DR-11.
- 100-psi. operating pressure @ 73.4 F for DR-17.

**Restrictions:**

- Use of this product is limited to:
  - Gravity sanitary sewer mains.

**Manufacturer:**

- CP CHEMICAL/ PERFORMANCE PIPE– DRISCO PLEX 4700, "PLEXVUE"
- J-M EAGLE PE PIPE



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## Material Specifications

### A 4 – PVC Pipe ( 2” SDR 21):

**Material/ Specification:**

- Two inch (2”) SDR 21 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D2241 or latest revision thereof.
- ASTM D1784, manufactured from compounds with cell classification 12454B.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or “NSF-pw”.
- Push-on integral bell type supplied with elastomeric gaskets installed.
- Joints per ASTM D3139 testing requirements.
- Gaskets per ASTM F477.
- Pipe shall be clean and ends shall be tarped during shipment.
- Standard Dimension Ratio (SDR) 21.
- No solvent-cement weld pipe or fittings will be accepted.

**Pressure Rating:**

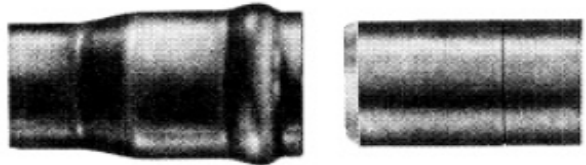
- 200 psi. at 23 Degrees C (73.4 Degrees F)

**Color-coded:**

- Blue- potable water
- Purple/ Lavender– reclaim water
- Green– sewer

**Dimensions:**

- Iron pipe size (IPS) Outside diameter controlled
- 20’ standard joint length

**Manufacturer:**

- CHARLOTTE PIPE AND FOUNDRY
- DIAMOND PLASTICS
- FREEDOM PLASTICS
- J-M EAGLE
- NAPCO
- NATIONAL PIPE & PLASTICS



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## Material Specifications

### A 4.1 – PVC PIPE RESTAINED JOINT PIPE & FITTINGS ( 2” SDR 17):

**Material/ Specification:**

- Two inch (2”) SDR 17 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM Standards D2241 for Poly ( Vinyl Chloride) (PVC), pressure rated pipe (SDR Series) or latest revision thereof.
- ASTM Standards D1784, manufactured from compounds with cell classification 12454B.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or “NSF-pw”.
- Joined using separate couplings or integral bell that have built in sealing gaskets (O-rings) and restraining grooves.
- Joints per ASTM Standards D3139 testing requirements.
- Gaskets per ASTM Standards F477.
- Restraining spline shall be manufactured from Nylon 101.
- Pipe shall be clean and ends shall be tarped during shipment.
- Standard Dimension Ratio (SDR) 17.
- Fittings shall be PVC push-on joint and installed with joint restrainers.
- No solvent-cement weld pipe or fittings will be accepted.

**Pressure Rating:**

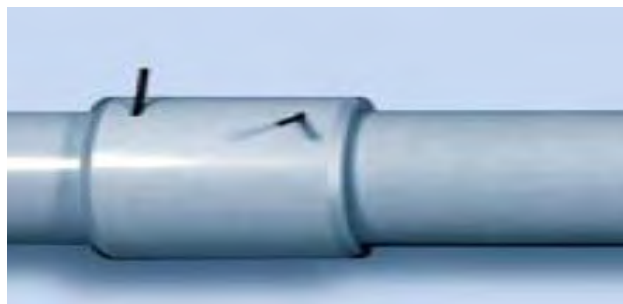
- 250 psi. at 23 Degrees C (73.4 Degrees F)
- Minimum wall thickness of 0.140”

**Color-coded:**

- Blue- potable water
- Purple/ Lavender– reclaim water
- Green– sanitary sewer/ force main
- Fittings can be yellow or match service type

**Dimensions:**

- Iron pipe size (IPS) Outside diameter controlled
- 20’ standard joint length



**Manufacturer:**

- CERTAINTEED– CERTA-LOK/ YELLOMINE



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## Material Specifications

### A 5 – PVC PIPE ASTM D-3034 (4" THRU 15") - GRAVITY SEWER PIPE:

**Material/ Specification:**

- Pipe shall meet or exceed the performance specifications of:
- Polyvinyl chloride sewer pipe shall conform to ASTM Standards D-3034.
- Cell classification 12454B or 12364C as defined under ASTM Standards D1784.
- Push-on integral bell type supplied with a elastomeric gasket installed.
- Joint per ASTM Standards D3212 sewer plastic pipe using elastomeric gaskets.
- Gasket per ASTM F477 for joining plastic pipe.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in sanitary sewer.

**Color– coded:**

- Green– sanitary sewer

**Dimensions:**

- SDR-26, Heavy wall.
- SDR-35, Standard wall, minimum requirement.
- Thirteen (13') foot standard joint length.

**Manufacturer:**

- DIAMOND PLASTICS
- FREEDOM PLASTICS
- HAWK PLASTICS
- J-M EAGLE
- NAPCO
- NATIONAL PIPE & PLASTICS
- HAWK PLASTICS



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## Material Specifications

### A 6 – PVC PIPE C-900 (4" THRU 12") - POTABLE WATER:

#### Material/ Specification:

- AWWA C-900 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D1784, manufactured from compounds with cell classification 12454A or 12454B.
- Push-on integral bell type joints per ASTM D3139 testing requirements, supplied with elastomeric gaskets installed.
- Gaskets per ASTM F477.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".
- Pipe shall be clean and ends shall be tarped during shipment.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

#### Color– coded:

- Blue– potable water

#### Dimensions:

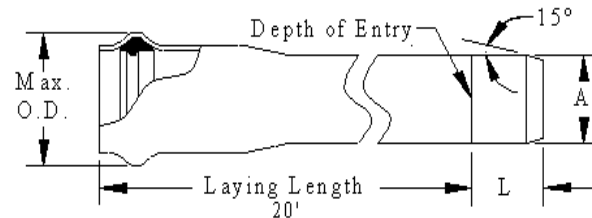
- Ductile iron pipe size O.D., D.I.P.S.
- DR-14, DR-18
- 20' standard joint length

#### Pressure Rating:

- 235-psi. operating pressure @ 73 F for DR-18.
- 305-psi. operating pressure @ 73 F for DR-14.

#### Fire Main Pressure Rating & Requirements:

- Dimension Ratio (DR) 14, pressure class 200 for fire mains.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) required on DR 14 pipe.
- No solvent-cement weld pipe or fittings will be accepted.



#### Manufacturer:

- DIAMOND PLASTICS
- FREEDOM PLASTICS
- J-M EAGLE/ BLUE BRUTE
- NAPCO
- NATIONAL PIPE & PLASTICS



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## Material Specifications

### A 6.1 – PVC PIPE C-900 (4" THRU 12") - SEWER & RECLAIM WATER:

#### Material/ Specification:

- AWWA C-900 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D1784, manufactured from compounds with cell classification 12454A or 12454B.
- Push-on integral bell type joints per ASTM D3139 testing requirements, supplied with a elastomeric gaskets installed.
- Gaskets per ASTM F477
- Pigment stabilizers and ultraviolet inhibitors shall be used to prevent fading for a period of six (6) months after delivery.
- Pipe shall be clean and ends shall be tarped during shipment.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

#### Color– coded:

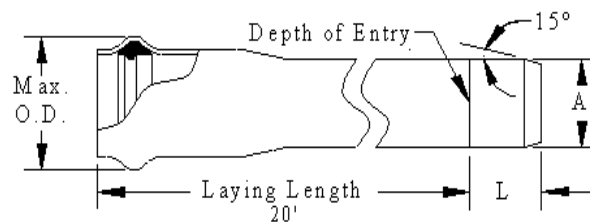
- Green– sanitary sewer
- Purple/ Lavender– reclaim water

#### Dimensions:

- Ductile iron pipe size O.D., D.I.P.S.
- DR-14, DR-18
- 20' standard joint length
- 13' joints acceptable for sewer only

#### Pressure Rating:

- 235-psi. operating pressure @ 73 F for DR-18.
- 305-psi. operating pressure @ 73 F for DR-14.



#### Manufacturer:

- DIAMOND PLASTICS
- FREEDOM PLASTICS
- J-M EAGLE/ BLUE BRUTE
- NAPCO
- NATIONAL PIPE & PLASTICS



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## Material Specifications

### **A 6.2 – PVC PIPE RESTRAINED JOINT PIPE & COUPLINGS C-900 (4" THRU 12")** **- POTABLE WATER, SEWER & RECLAIM WATER:**

#### **Material/ Specification:**

- AWWA C-900, Pipe shall meet or exceed the performance specifications of:
- ASTM D1784, manufactured from compounds with cell classification 12454A or 12454B.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw" for all blue pipe (potable water installation).
- Joined using separate couplings that have built in sealing gaskets (O-rings) and restraining grooves.
- Shall be joined using high-strength flexible plastic splines inserted into mating precision-machine grooves, which align when the pipe is fully inserted, providing a full 360° restraint with evenly distributed loading.
- Joints per ASTM D3139 testing requirements.
- Gaskets per ASTM F477.
- Pipe shall be clean and ends shall be tarped during shipment.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

#### **Color– coded:**

- Blue– potable water
- Green– sanitary sewer/ force main
- Purple/ Lavender– reclaim water

#### **Dimensions:**

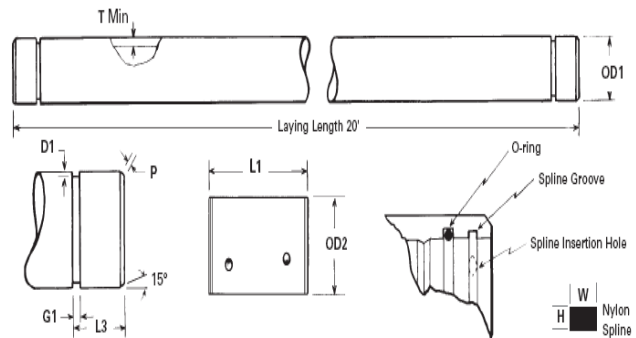
- Ductile iron pipe size O.D., D.I.P.S.
- DR-14, DR-18.
- 20' standard joint length.

#### **Pressure Rating:**

- 235-psi. operating pressure @ 73 F for DR-18.
- 305-psi. operating pressure @ 73 F for DR-14.

#### **Fire Main Pressure Rating & Requirements:**

- Dimension Ratio (DR) 14, pressure class 200 for fire mains.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) required on DR 14 pipe.



#### **Manufacturer:**

- CERTAINTEED– CERTA-LOK



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## Material Specifications

### A 6.3 – PVC PIPE C-905 (14" THRU 24") - POTABLE WATER, SEWER, FORCE MAIN & RE-CLAIMED WATER:

#### Material/ Specification:

- AWWA C-905 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D1784, manufactured from compounds with cell classification 12454A or 12454B.
- Push-on integral bell type joints per ASTM D3139 testing requirements, supplied with elastomeric gaskets installed.
- Gaskets per ASTM F477.
- Pipe shall be clean and ends shall be tarped during shipment.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

#### Potable water requirements:

- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".

#### Color– coded:

- Blue– potable water
- Green– sewer/ force main
- Purple/ Lavender– reclaim water

#### Dimensions:

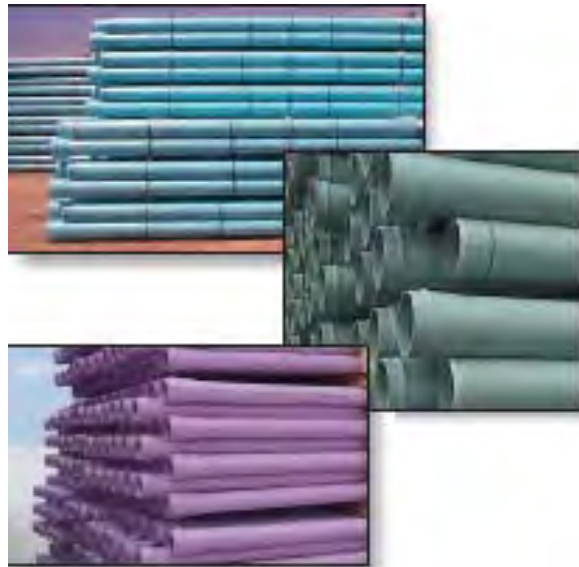
- Ductile iron pipe size O.D., D.I.P.S.
- DR-25, DR-18
- 20' standard joint length

#### Pressure Rating:

- 165-psi. operating pressure @ 73.4 F for DR-25.
- 235-psi. operating pressure @ 73.4 F for DR-18.

#### Restrictions:

- Use of this material shall be approved by the Director of Engineering prior to project design.



#### Manufacturer:

- DIAMOND PLASTICS
- FREEDOM PLASTICS
- J-M EAGLE/ BLUE BRUTE
- NAPCO
- NATIONAL PIPE & PLASTICS



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## Material Specifications

### A 6.4 – PVC PIPE FUSIBLE C-900 (4" THRU 12") - POTABLE WATER:

#### **Material/ Specification:**

- Fusible AWWA C-900 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D1784, manufactured from compounds with cell classification 12454.
- Manufacture shall be listed with the Plastic Pipe Institute (PPI) as meeting the recipe and mixing requirements for pipe in this classification.
- Extruded with a unique formulation, for fusible pipe, that meets all requirements of PPI TR-2 "PPI PVC Range Composition Listing of Qualified Ingredients".
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61 or NSF-pw.
- Pipe shall be clean and ends shall be tarped during shipment.
- Pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer.
- Fusible pipe shall be joined per the manufacture's recommendation.
- Installation shall not exceed manufacture's bending radius and safe pulling force.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

#### **Color– coded:**

- Blue - potable water

#### **Dimensions:**

- Ductile iron pipe size O.D., D.I.P.S.
- DR-14, DR-18
- 20', 30 or 40' standard joint length.

#### **Pressure Rating:**

- 235-psi. operating pressure @ 73 F for DR-18.
- 305-psi. operating pressure @ 73 F for DR-14.



#### **Manufacturer:**

- UNDERGROUND SOLUTIONS



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## Material Specifications

### A 6.4.1 – PVC PIPE FUSIBLE C-900 (4" THRU 12") - SEWER FORCE MAIN & RECLAIM WATER:

#### Material/ Specification:

- Fusible AWWA C-900 Polyvinyl Chloride, PVC, Pipe shall meet or exceed the performance specifications of:
- ASTM D1784, manufactured from compounds with cell classification 12454.
- Manufacture shall be listed with the Plastic Pipe Institute (PPI) as meeting the recipe and mixing requirements for pipe in this classification.
- Extruded with a unique formulation, for fusible pipe, that meets all requirements of PPI TR-2 "PPI PVC Range Composition Listing of Qualified Ingredients".
- Pipe shall be clean and ends shall be tarped during shipment.
- Pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer.
- Fusible pipe shall be joined per the manufacture's recommendation.
- Installation shall not exceed manufacture's bending radius and safe pulling force.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

#### Color– coded:

- Purple/ Lavender - reclaim water
- Green - sewer force main

#### Dimensions:

- Ductile iron pipe size O.D., D.I.P.S.
- DR-14, DR-18
- 20', 30' or 40' standard joint length.

#### Pressure Rating:

- 235-psi. operating pressure @ 73 F for DR-18.
- 305-psi. operating pressure @ 73 F for DR-14.



#### Manufacturer:

- UNDERGROUND SOLUTIONS



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## Material Specifications

### A 7 – PVCO PIPE C-909 (6" THRU 12") - POTABLE WATER:

**Material/ Specification:**

- Pipe shall meet or exceed the performance specifications of:
- AWWA C-909 molecular oriented pipe.
- ASTM D1784, manufactured from compounds with cell classification 12454.
- Push-on integral bell type joints per ASTM D3139 testing requirements, supplied with a elastomeric gaskets installed.
- Gaskets per ASTM F477
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".
- Pipe shall be clean and ends shall be tarped during shipment.
- No solvent-cement weld pipe or fittings will be accepted.
- Affidavit of compliance to this specification shall be available upon request.

**Color– coded:**

- Blue– potable water

**Dimensions:**

- Ductile iron pipe size O.D., D.I.P.S.
- 20' standard joint length

**Pressure Rating:**

- 150-psi. at 23 degrees C (73.4 Degrees F).

**Manufacturer:**

- JM EAGLE "ULTRA-BLUE"



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## Material Specifications

### A 8 – DUCTILE IRON PIPE/ PUSH-ON JOINT/ CLASS 350 (4" THRU 36"):

#### Material/ Specification:

- Pipe shall conform with AWWA C151 (ANSI-A21.51), asphaltic outside coating and pipe weight.
- Gaskets shall be furnished in accordance with AWWA C111 (ANSI- A21.11).
- Pipe supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes four (4") thru twelve (12") inch.
- Affidavit of compliance to this specification shall be available upon request.

#### Coating & Lining:

##### Potable and Reclaimed Water:

- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C151 (ANSI-A21.51) asphaltic coating.

##### Sanitary Sewer and Force Mains:

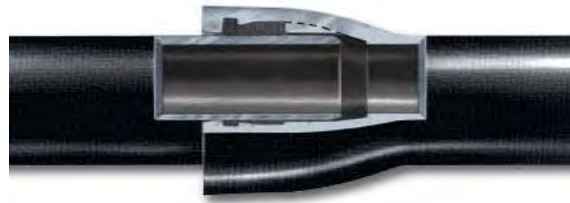
- Exterior coating per AWWA C151 (ANSI-A21.51) asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) or approved equal:
  - with an amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick) **OR**.
  - with an calcium aluminate mortar and aggregate lining, Kerneos "SEWPERCOAT ®". An optional seal coat may be applied. The lining thickness shall be a minimum of the following (equivalent to DCL):
    - 125 mils (1/8") for 6" - 12" pipe
    - 188 mils (3/16") for 14" - 36" pipe
- The inside of the bell socket including a portion of the gasket cavity and a portion of the pipe barrel are coated with 8-mils (minimum) of epoxy.

#### Dimensions:

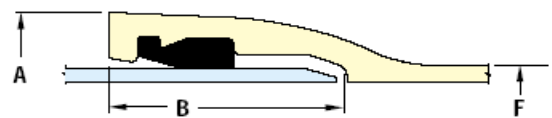
- Eighteen (18') or twenty (20') foot standard joint length.

#### Pressure Rating:

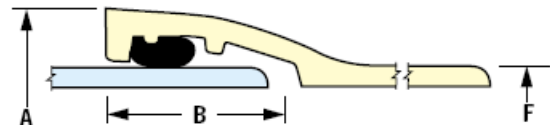
- Class 350- psi. for sizes four (4") thru twenty-four(24") inch pipe.
- Class 250- psi for sizes thirty (30") thru thirty- six (36") inch pipe.



FASTITE JOINT Pipe 4" - 36"



TYTON JOINT Pipe 4" - 36"



#### Manufacturer:

- AMERICAN CAST IRON- FASTITE
- CLOW- TYTON (14"– 24" ONLY)
- CLOW- FASTITE (30"- 36")
- GRIFFIN PIPE- TYTON
- Mc WANE, INC.- TYTON (14"– 24" ONLY)
- Mc WANE, INC.- FASTITE (30"- 36")
- PACIFIC STATES CIP CO.- TYTON/ FASTITE
- US PIPE & FOUNDRY- TYTON



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## Material Specifications

### A 8.1 – DUCTILE IRON PIPE/ FLANGE JOINT/ CLASS 350:

#### Material/ Specification:

- Flange pipe shall meet or exceed the performance specifications of:
- Pipe shall conform with AWWA C151 (ANSI-A21.51), asphaltic outside coating and pipe weight.
- Flanges shall conform to the chemical and physical properties specified for ductile iron fittings in ANSI/AWWA C 110/A21.10.
- Shall conform to AWWA C115 (ANSI-A21.15) flange pipe and fitting joints.
- Shall be drilled and faced to conform with ANSI B16.1 Class 125 flanges.
- Gaskets shall be ring type and produced from one of the following materials:
  - EPDM (Ethylene Propylene Diene Monomer)
  - Nitrile Buna-N (NBR) (Acrylonitrile Butadiene)
  - Viton; Fluorel (FKM) (Fluorocarbon)
- Pipe supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Affidavit of compliance to this specification shall be available upon request.

#### Coating & Lining:

##### Potable and Reclaimed Water:

- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C151 (ANSI-A21.51) asphaltic coating.

##### Sanitary Sewer and Force Mains:

- Exterior coating per AWWA C151 (ANSI-A21.51) asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) or approved equal:
  - with an amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick) **OR**.

- with an calcium aluminate mortar and aggregate lining, Lafarge "SEWPERCOAT ®". An optional seal coat may be applied. The lining thickness shall be a minimum of the following (equivalent to DCL):
  - 125 mils (1/8") for 6" - 12" pipe
  - 188 mils (3/16") for 14" - 24" pipe

#### Dimensions:

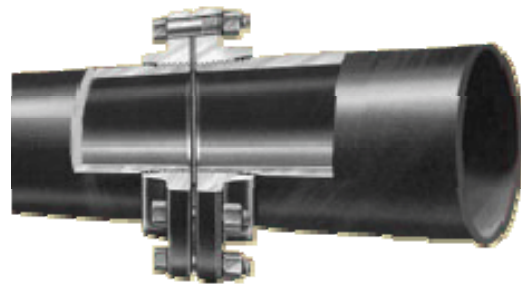
- Ductile iron pipe size O.D., D.I.P.S.
- Eighteen (18') or twenty (20') foot standard joint length or as specified for project.

#### Pressure Rating:

- Class 350-psi. for sizes four (4") thru twelve (12") inch pipe.
- Class 250-psi. for sizes fourteen (14") thru twenty-four (24") inch pipe.

#### Restrictions:

- Flange pipe is for use in aboveground or unburied service applications.



#### Manufacturer:

- AMERICAN CAST IRON
- CLOW
- GRIFFIN PIPE
- Mc WANE, INC.
- PACIFIC STATES CIP CO.
- US PIPE & FOUNDRY



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## Material Specifications

### A 8.2 – DUCTILE IRON PIPE/ RESTRAINED PUSH-ON JOINT/ TR FLEX JOINT (4" THRU 36"):

#### Material/ Specification:

- Restrained pipe shall meet or exceed the performance specifications of:
- Shall conform with AWWA C150 (ANSI– A21.50) thicknesses and strength.
- Shall conform with AWWA C151 (ANSI-A21.51), asphaltic outside coating and pipe weight.
- Gaskets shall be furnished in accordance with AWWA C111 (ANSI– A21.11).
- Shall use a standard size Tyton gasket.
- Shall use ductile iron locking segments, inserted through a slot (or slots) in the bell face, to provide a positive axial lock between the bell interior surface and a retainer weldment on the spigot end of the pipe.
- Pipe supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes four (4") thru twelve (12") inch.
- Affidavit of compliance to this specification shall be available upon request.

#### Coating & Lining:

##### Potable and Reclaimed Water:

- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C151 (ANSI-A21.51) asphaltic coating.

##### Sanitary Sewer and Force Mains:

- Exterior coating per AWWA C151 (ANSI-A21.51) asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick).

#### Dimensions:

- Ductile iron pipe size O.D., D.I.P.S.
- Eighteen (18') or twenty (20') foot standard joint length.

#### Pressure Rating:

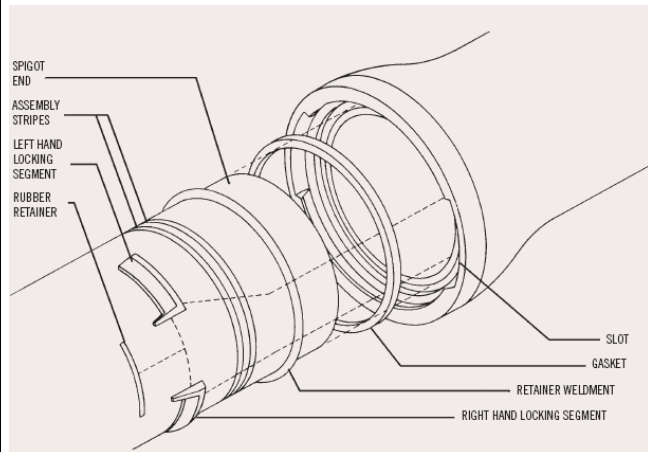
- Class 350-psi. for sizes four (4") thru twenty-four(24") inch pipe.
- Class 250-psi. for sizes thirty (30") thru thirty- six (36") inch pipe.

#### Restrictions for pipe in this category:

- A TR Flex Gripper Ring shall be used for field cut pipe connections, which do not have a factory weldment.
- Field welding of spigot weldments is not allowed.

#### Optional:

- Acceptable for horizontal directional drill (HDD) installations.



#### Manufacturer:

- US PIPE & FOUNDRY– TR FLEX
- Mc WANE, INC.– TR FLEX (16" - 36" ONLY)



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## Material Specifications

### A 8.3 – DUCTILE IRON PIPE/ RESTRAINED PUSH-ON JOINT/ FLEX– RING JOINT (4” THRU 36”):

#### Material/ Specification:

- Restrained pipe shall meet or exceed the performance specifications of:
- Shall conform with AWWA C150 (ANSI– A21.50) thicknesses and strength.
- Shall conform with AWWA C151 (ANSI-A21.51), asphaltic outside coating and pipe weight.
- Gaskets shall be furnished in accordance with AWWA C111 (ANSI– A21.11).
- Shall use a standard size Fastite gasket.
- Pipe supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes four (4”) thru twelve (12”) inch.
- Affidavit of compliance to this specification shall be available upon request.

#### Coating & Lining:

##### Potable and Reclaimed Water:

- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C151 (ANSI-A21.51) asphaltic coating.

##### Sanitary Sewer and Force Mains:

- Exterior coating per AWWA C151 (ANSI-A21.51) asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment “PROTECTO 401” (40 mils thick).

#### Dimensions:

- Ductile iron pipe size O.D., D.I.P.S.
- Eighteen (18’) or twenty (20’) foot standard joint length.

#### Pressure Rating:

- Class 350-psi. for sizes four (4”) thru twenty-four(24”) inch pipe.
- Class 250-psi. for sizes thirty (30”) thru thirty- six (36”) inch pipe.

#### Restrictions for pipe in this category:

- A Field Flex-Ring shall be used for field cut pipe connections, which do not have a factory weldment.
- Field welding of spigot weldments is not allowed.

#### Additional Information:

- Standard Flex-Ring segments are yellow.
- Field Flex-Ring segments are black.

#### Optional:

- Acceptable for horizontal directional drill (HDD) installations.

**4”- 12” Flex-Ring Joint**



**14”- 36” Flex-Ring Joint**



#### Manufacturer:

- AMERICAN CAST IRON– FLEX-RING



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## Material Specifications

### A 8.4 – DUCTILE IRON PIPE/ RESTRAINED PUSH-ON JOINT/ SUPER-LOCK JOINT (14" THRU 30"):

#### **Material/ Specification:**

- Restrained pipe shall meet or exceed the performance specifications of:
- Shall conform with AWWA C150 (ANSI– A21.50) thicknesses and strength.
- Shall conform with AWWA C151 (ANSI-A21.51), asphaltic outside coating and pipe weight.
- Gaskets shall be furnished in accordance with AWWA C111 (ANSI– A21.11).
- Shall use a standard size Tyton gasket for sizes up to 24" and Fastite gasket for 30" size.
- Pipe supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Underwriter Laboratory Listed (UL).
- Affidavit of compliance to this specification shall be available upon request.
- Shall use ductile iron locking solid ring, installed over lugs cast on the bell face, to provide a positive axial lock between the bell exterior surface and a retainer weldment on the spigot end of the pipe.

#### **Coating & Lining:**

##### **Potable and Reclaimed Water:**

- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C151 (ANSI-A21.51) asphaltic coating.

##### **Sanitary Sewer and Force Mains:**

- Exterior coating per AWWA C151 (ANSI-A21.51) asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick).

#### **Dimensions:**

- Ductile iron pipe size O.D., D.I.P.S.
- Eighteen (18') or twenty (20') foot standard joint length.

#### **Pressure Rating:**

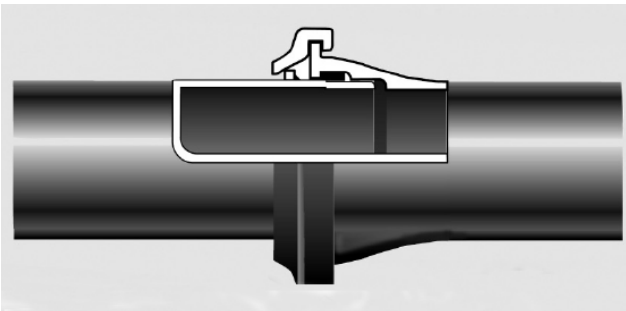
- Class 350-psi. for sizes fourteen (14") thru twenty-four(24") inch pipe.
- Class 250-psi. for size thirty (30") inch pipe.

#### **Restrictions for pipe in this category:**

- Field welding of spigot weldments is not allowed.

#### **Optional:**

- Acceptable for horizontal directional drill (HDD) installations.



#### **Manufacturer:**

- CLOW– SUPER-LOCK (14"- 30" ONLY)



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## Material Specifications

### A 8.5 – DUCTILE IRON PIPE/ RESTRAINED PUSH-ON JOINT/ THRUST-LOCK JOINT (6" THRU 30"):

#### Material/ Specification:

- Restrained pipe shall meet or exceed the performance specifications of:
- Shall conform with AWWA C150 (ANSI– A21.50) thicknesses and strength.
- Shall conform with AWWA C151 (ANSI-A21.51), asphaltic outside coating and pipe weight.
- Gaskets shall be furnished in accordance with AWWA C111 (ANSI– A21.11).
- Shall use a standard size Tyton gasket for sizes up to 24" and Fastite gasket for 30" size.
- Pipe supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes four (4") thru twelve (12") inch.
- Affidavit of compliance to this specification shall be available upon request.
- Shall use ductile iron locking solid ring, inserted through a slot in the bell face, to provide a positive axial lock between the bell interior surface and a retainer weldment on the spigot end of the pipe.

#### Coating & Lining:

##### Potable and Reclaimed Water:

- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C151 (ANSI-A21.51) asphaltic coating.

##### Sanitary Sewer and Force Mains:

- Exterior coating per AWWA C151 (ANSI-A21.51) asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick).

#### Dimensions:

- Ductile iron pipe size O.D., D.I.P.S.
- Eighteen (18') or twenty (20') foot standard joint length.

#### Pressure Rating:

- Class 350-psi. for sizes six (6") thru twenty-four(24") inch pipe.
- Class 250-psi. for thirty (30") inch pipe.

#### Restrictions for pipe in this category:

- A field-cut version of the Thrust-Lock shall be used for field cut pipe connections, which do not have a factory weldment.
- Field welding of spigot weldments is not allowed.

#### Optional:

- Acceptable for horizontal directional drill (HDD) installations.



#### Manufacturer:

- PACIFIC STATES CIP CO.



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## Material Specifications

### A 9 – GALVANIZED PIPE:

**Material/ Specification:**

- Schedule 40, galvanized steel pipe.
- Specifications shall conform to ASTM A-53 grade-A or latest revision thereof.

**Connections:**

- Pipe shall have NPT threads on both ends and a coupling on one end making a full joint, mpt X fipt.

**Dimensions:**

Twenty one (21') foot standard joint length.

**Restrictions:**

- This material is **only** used for temporary sampling and flushing points during pipeline construction .
- Galvanized pipe is not acceptable for any other use.

**Manufacturer:**

- OPEN



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## Material Specifications

# SECTION B: FITTINGS AND ACCESSORIES



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## Material Specifications

### Section B: Fittings and Accessories—Contents

- [B 1 Schedule 40 PVC Fittings](#)
- [B 2 Schedule 80 Fittings \(Nipples & Plugs Only\)](#)
- [B 3 HDPE Flange & MJ Adapters AWWA C 906](#)
- [B 4 High Density Polyethylene Pipe Wall Stiffeners](#)
- [B 5 Plastic Fittings \(SDR-21\)](#)
- [B 6 PVC Fittings- Gasketed PVC \(ASTM D-3034\)](#)
- [B 6.1 PVC Fittings- Gasketed PVC \(AWWA C 900\)](#)
- [B 7 Brass Fittings/ Miscellaneous](#)
- [B 8 Flanged Joint Fittings \( AWWA C 110\)](#)
- [B 8.1 Flange Joint Accessory Kits](#)
- [B 9 Mechanical Joint Fittings \(AWWA C 110 Full Body\), \(4" thru 36"\)](#)
- [B 10 Mechanical Joint Fittings \(AWWA C 153 Compact Body\), \(4" thru 36"\)](#)
- [B 11 Mechanical Joint Accessory Kits](#)
- [B 12 Mechanical Joint Connector](#)
- [B 13 Push-on Joint Fittings \(AWWA C110/ C153\), \(4" thru 24"\)](#)
- [B 14 Push-on Restrained Joint Fittings \(14" thru 36"\) Flex-Ring](#)
- [B 15 Push- on Restrained Joint Fittings \( 14" thru 36"\) TR Flex](#)



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## Material Specifications

### B 1 – SCHEDULE 40 PVC FITTINGS:

**Specification/ Material:**

- Schedule 40 PVC fittings shall meet or exceed the performance specifications of:
- ASTM Standards D2466, this standard covers Schedule 40 PVC threaded and socket pressure fittings. The standard stipulates thread and socket specifications as well as minimum lengths, wall thicknesses, burst pressures, material classification, quality, and requirements for marking identification.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines, when used in a potable water installation.

**Connection:**

- **Adapters**– Male Iron Pipe Thread (MIPT) X Solvent weld (slip)
- Female Iron Pipe Thread (FIPT) X Solvent Weld (slip).
- **Couplings**– Solvent Weld (slip) X Solvent Weld (slip)
- **Reducers**- Solvent Weld (slip) X Solvent Weld (slip)
- **Bends**- Solvent Weld (slip) X Solvent Weld (slip).
- **Tees**- Solvent Weld (slip) X Solvent Weld (slip).
- **Cap**- Solvent Weld (slip) X Solvent Weld (slip).

**Color-coded:**

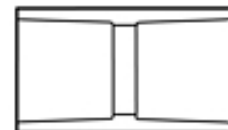
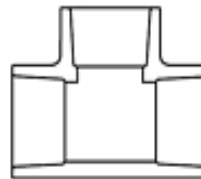
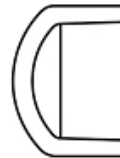
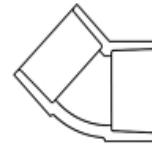
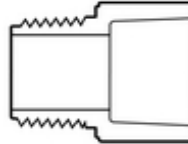
- Blue– potable water
- Green– sanitary sewer/ force main
- Purple– reclaimed water
- White– all services
- Gray– all services

**Sizes:**

- One half (1/2") inch
- Three quarter (3/4") inch
- One (1") inch
- One & one half (1-1/2") inch
- Two (2") inch

**Restrictions:**

- Use of this product is limited to:
  - Customer side of meter
  - Irrigation systems



**Manufacturer:**

- COLONIAL
- LASCO
- SPEARS



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## Material Specifications

### B 2 – SCHEDULE 80 FITTINGS (NIPPLES & PLUGS ONLY):

#### Specification/ Material:

- Schedule 80 fittings (nipples & plugs) shall meet or exceed the performance specifications of:
- ASTM Standards D 2467, threaded pressure fittings, dimensions, thread gauging, minimum wall thickness and burst pressure, material classification, various quality aspects and requirements for marking identification for plugs.
- ASTM Standards D 1784, manufactured from compounds with cell classification 12454B ( type 1, grade 1 material) for nipples & plugs.
- ASTM Standards D 1785, dimensional requirements, minimum burst and sustained pressure requirements, maximum operating pressure, and test procedures for determining pipe quality with respect to workmanship and materials for nipples.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines.

#### Connection:

- Nipples– Male Iron Pipe Thread (MIPT) on both ends.
- Plugs– Male Iron Pipe Thread (MIPT).

#### Color-coded:

- Blue– potable water
- Green– sanitary sewer/ force main
- Purple– reclaimed water
- White– all services
- Gray– all services

#### Sizes:

- Three quarter (3/4") inch
- One (1") inch
- One & one half (1-1/2") inch
- Two (2") inch

#### Restrictions:

- Only male threads will be accepted in this section.



#### Manufacturer:

- CHEMTROL/ NIBCO
- LASCO
- SPEARS



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## Material Specifications

### **B 3 – HIGH DENSITY POLYETHYLENE (HDPE) FLANGE AND MECHANICAL JOINT ADAPTERS AWWA C-906:**

**Specification/ Material:**

- High Density Polyethylene, HDPE, fittings shall meet or exceed the performance specifications of:
- PE-3408 Resin listed in Plastic Pipe Institute TR4.
- Cell classification per ASTM Standards D3350 = 345464C or 345464C (black).
- ASTM Standards D3035, minimum wall values.
- AWWA C906.
- Stainless Steel inserts are not required, but are acceptable, to meet this specification.
- MFG. Shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements for pipe in this classification.

**Potable water requirements:**

- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 14, 61 or "NSF-pw".

**Color– coded:**

- Black– all service

**Dimensions:**

- Ductile iron pipe size O.D., D.I.P.S.
- DR-9, DR-11

**Sizes:**

- Four (4) thru twenty four (24) inch.

**Pressure Rating:**

- 160-psi. operating pressure @ 73.4 F for DR-11.
- 200-psi. operating pressure @ 73.4 F for DR-9.

**Design:**

- Plain end (PE) X mechanical joint (MJ).
- Plain end (PE) X flange joint (FL).

**Include:**

- Ductile iron gland ring.
- Rubber gasket.
- Proper size, length and number of bolts and nuts.

**Restrictions:**

- Mechanical joint adapters for butterfly valves must be specified to ensure proper valve operation.

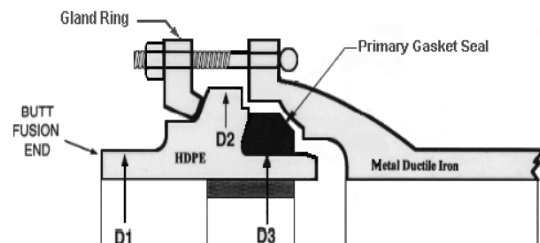
**Fire Main Pressure Rating & Requirements:**

- Dimension Ratio (DR) DR-9, pressure class 200 for fire mains.
- Factory Mutual Approved (FM).
- Stainless Steel insert stiffener required.

#### **FLANGE ADAPTER**



#### **MECHANICAL JOINT ADAPTER**



**Manufacturer:**

- CENTRAL PLASTICS
- CP CHEMICAL/ PERFORMANCE PIPE
- IPEX/ FRIATEC
- INDEPENDENT PIPE PRODUCTS
- ORION ENTERPRISES, INC.
- SPECIFIED FITTINGS



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## Material Specifications

### B 4 – HIGH DENSITY POLYETHYLENE PIPE WALL STIFFENERS:

#### Specification/ Material:

- High Density Polyethylene, HDPE, pipe wall stiffeners shall meet or exceed the performance specifications of:
- Stiffeners shall be suitable for use with HDPE pipe made in accordance with ANSI/AWWA C906, SDR 9 and 11.
- Shall be suitable for use with standard mechanical joint pipe or fittings made in accordance with ANSI/AWWA C111/A21.11, or ANSI/AWWA C153/A21.53 of the latest revision.
- ASTM Standards 240 type 304 or 316 stainless steel.

#### Design:

- Shall be either one or two piece design.
- Shall fit securely in the inside of pipe.

#### Pressure Rating:

- Stiffeners shall be suitable for use at pressures up to 150 psi.

#### Restrictions:

- The use of this product is limited to repairs of existing, in-use, pipelines that can not be de-watered sufficiently to repair by fusion method.



#### Manufacturer:

- CASCADE– CPS-DIPS SERIES
- JCM– 230 & 231 SERIES
- ROMAC STAINLESS STEEL STIFFENER



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## Material Specifications

### B 5 – PLASTIC FITTINGS (SDR-21):

#### Specification/ Material:

- Plastic fittings (SDR-21) shall meet or exceed the performance specifications of:
- ASTM Standards D 1784, manufactured from compounds with cell classification 12454B ( type 1, grade 1 material).
- Joints per ASTM Standards D 3139 testing requirements.
- Gaskets per ASTM Standards F477.
- No solvent-cement weld pipe or fittings will be accepted.
- Standard Dimension Ratio (SDR) 21.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines.

#### Pressure Rating:

- 200 psi. at 23 Degrees C (73.4 Degrees F)

#### Connections:

- Male Iron Pipe Thread (MIPT) X Push-on integral bell type supplied with elastomeric gaskets installed.
- Push-on integral bell X Push-on integral bell supplied with elastomeric gaskets installed.

#### Color-coded:

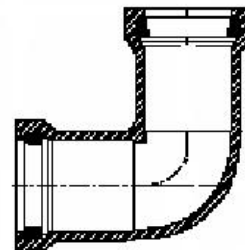
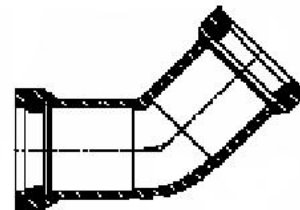
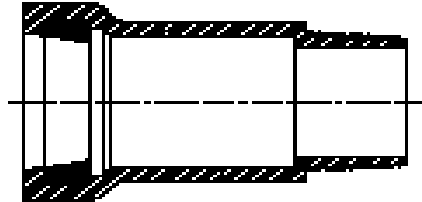
- Blue- potable water
- Purple- reclaim water
- Green- sewer
- White- all services

#### Dimensions:

- Iron pipe size (IPS) Outside diameter controlled.

#### Restrictions:

- Only **male** threads will be accepted in this section.
- Use of this product is limited to two-inch diameter pressure applications.



#### Manufacturer:

- FLO-CONTROL
- HARCO
- MULTI FITTING- CYCLE TOUGH 4000



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## Material Specifications

### B 6 – PVC FITTINGS– GASKETED PVC ASTM D-3034:

#### **Specification/ Material:**

- Plastic fittings (ASTM D-3034) shall meet or exceed the performance specifications of:
- ASTM Standards D-3034 fitting requirements.
- Gaskets per ASTM Standards F477.
- ASTM Standards D 1784, manufactured from compounds with cell classification 12454B ( type 1, grade 1 material).
- No solvent-cement weld pipe or fittings will be accepted.
- Joint per ASTM Standards D3212 sewer plastic pipe using elastomeric gaskets.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in sanitary sewer.

#### **Wall Thickness Dimensions:**

- SDR-35, Standard wall, minimum requirement.
- SDR-26, Heavy wall, exceeds minimum requirements.

#### **Connections:**

- Male Iron Pipe Thread (MIPT) X Push-on integral bell type supplied with elastomeric gaskets installed.
- Female Iron Pipe Thread (FIPT) X Push-on integral bell type supplied with elastomeric gaskets installed.
- Push-on integral bell X Push-on integral bell supplied with elastomeric gaskets installed.
- Spigot X Push-on integral bell supplied with elastomeric gaskets installed.

#### **Color-coded:**

- Green– sewer
- White– sewer



#### **Manufacturer:**

- CERTAINTEED
- FLO-CONTROL
- FREEDOM PLASTICS
- GPK PRODUCTS
- HARCO
- IPEX
- J-M MANUFACTURING
- MULTI-FITTINGS
- TIGRE USA INC.
- SPECIFIED FITTINGS, INC.
- PLASTIC TRENDS, INC.



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## Material Specifications

### B 6.1 – PVC FITTINGS– GASKETED PVC C 900:

#### **Specification/ Material:**

- Plastic fittings (AWWA C 900) shall meet or exceed the performance specifications of:
- Shall be manufactured in one piece of injection molded or fabricated from a PVC compound meeting ASTM Standards D 1784.
- Gaskets per ASTM Standards F477.
- ASTM Standards D 1784, manufactured from compounds with cell classification 12454B ( type 1, grade 1 material).
- No solvent-cement weld pipe or fittings will be accepted on sizes less than or equal to 8”.
- Fabricated fittings are acceptable for sizes equal to and larger than 10”.
- Joint per ASTM Standards D3139 bell joint using elastomeric gaskets.

#### **Wall Thickness Dimensions:**

- C-900 DR18, 150 psi, minimum requirement.

#### **Connections:**

- Male Iron Pipe Thread (MIPT) X Push-on integral bell type supplied with elastomeric gaskets installed.
- Female Iron Pipe Thread (FIPT) X Push-on integral bell type supplied with elastomeric gaskets installed.
- Push-on integral bell X Push-on integral bell supplied with elastomeric gaskets installed.
- Spigot X Push-on integral bell supplied with elastomeric gaskets installed.

#### **Restrictions:**

- Use of this product is limited to:
  - Gravity sewer laterals and mains.



#### **Manufacturer:**

- FREEDOM PLASTICS, INC.
- HARCO
- MACON PLASTICS, INC.
- MULTI-FITTINGS
- PLASTIC TRENDS, INC.
- SPECIFIED FITTINGS, INC.



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## Material Specifications

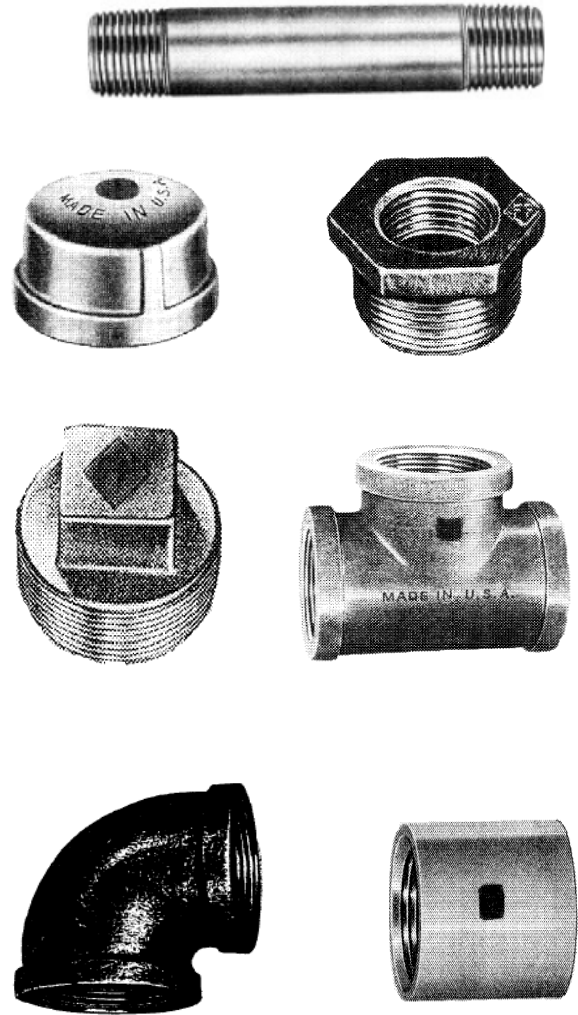
### B 7 – BRASS FITTINGS/ MISCELLANEOUS:

#### **Specification/ Material:**

- Nipples, caps, plugs, tees, bend, and bushings shall meet or exceed the performance specifications of:
- Brass body conforming to AWWA C800 (ASTM Standards B62 85-5-5-5) or the latest revisions thereof.
- All threads shall be standard iron pipe thread.
- All nipples shall conform to ASTM Standards B43 (Red Brass Nipples) or latest revision thereof.

#### **Connections:**

- Male iron pipe thread X male iron pipe thread.
- Female iron pipe thread X female iron pipe thread.
- Male iron pipe thread X female iron pipe thread.



#### **Manufacturer:**

- CAMBRIDGE BRASS
- FORD
- LEE BRASS
- MERIT BRASS



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## Material Specifications

### B 8 – FLANGED JOINT FITTINGS (AWWA C110) :

#### **Specification/ Material:**

- Flanged fittings shall meet or exceed the performance specifications of:
- Fittings shall be ductile iron per ASTM A536 or cast iron per ASTM A126.
- Shall be produced in accordance with laying lengths specified in ANSI/ AWWA C110/ A 21.10.
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- Flange surface shall be faced and drilled in accordance with ANSI Class 125 B16.1.
- Body thickness shall not be less than those specified in ANSI/ AWWA C 153/ A21.53 ( Standards for Ductile Iron Compact Fittings).
- Nuts, bolts and gaskets shall be designed to withstand the design and test pressures of the pipe.
- All fittings shall have distinctly cast upon them the manufacture's identification, pressure rating, nominal diameter and number of degrees or fraction of a circle on all bends.
- Fittings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) **and** Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes four (4") thru twelve (12") inch. Markings must be cast on the fitting at time of manufacture to meet this requirement.
- Affidavit of compliance to this specification shall be available upon request.

#### **Coating & Lining:**

##### **Potable and Reclaimed Water:**

- Exterior coating: asphaltic or red epoxy coating.
- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C116 (ANSI-A21.16) epoxy coating both inside and out.

##### **Sanitary Sewer and Force Mains:**

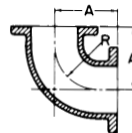
- Exterior coating: asphaltic or red epoxy coating.
- Sewer pipe shall have the interior coated (factory

applied) or approved equal:

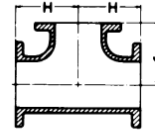
- with an amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick) **OR**.
- with an calcium aluminate aggregate and mortar lining, Lafarge "SEWPERCOAT ®". An optional seal coat may be applied. The lining thickness shall be a minimum of the following (equivalent to double cement lined, DCL):
  - 125 mils (1/8") for 6" - 12" pipe.
  - 188 mils (3/16") for 14" - 24" pipe.

#### **Pressure Rating:**

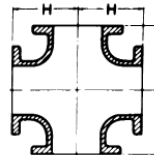
- Minimum of 250-psi. for sizes four (4") thru twenty four (24").



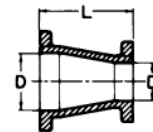
90° Bends (1/4)



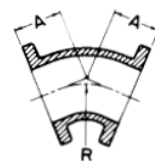
Straight Tees, Reducing on Branch Tees



Straight and Reducing Crosses



Concentric Reducer



45° Bends (1/8)

#### **Approved manufacturer products as modified to meet the above specification:**

- AMERICAN CAST IRON
- CLOW
- MCWANE, INC.
- SIGMA CORP
- STAR PIPE PRODUCTS
- TYLER/ UNION FOUNDRY
- US PIPE



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## Material Specifications

### B 8.1 – FLANGE JOINT ACCESSORY KITS:

**Specification/ Material:**

- Flange Joint Accessory Kits shall meet or exceed the performance specifications of:
- Designed to work with flange pipe and fittings per ANSI/ AWWA C110/ A21.10 and ANSI B16.1 125 pound class .
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- Nuts, bolts and gaskets shall be designed to withstand the design and test pressures of the pipe.
- Flat ring gaskets are preferred, but full face gaskets are acceptable.

**Hex Bolts, Nuts & Lock Washers:**

- Threads per ANSI B1.1 course thread series, Class 2A external and Class 2B internal.
- Stainless steel, A304.

**Gasket:**

- Synthetic red rubber per ASTM 13303.
- SBR– Buna-S.
- EPDM (ethylene propylene).
- NBR- Nitrile Buna-N.
- Viton; Fluorel (FKM).

**Requirements:**

- Each accessory kit shall be a boxed package.

**Include:**

- One (1) rubber gasket.
- Proper number and size of bolts and nuts required for each pipe fitting face.
- Proper number and size lock washers when required.

**Restrictions:**

- The accessory kits, if ordered separate from the fitting, must be palletized for safety.

**Additional Requirements:**

- Lock washers are required when installed as part of a sewer pumping facility.



**Approved manufacturer products as modified to meet the above specification:**

- AMERICAN CAST IRON
- CLOW
- GRIFFIN PIPE PRODUCTS
- MCWANE, INC.
- SIGMA CORP.
- STAR PIPE PRODUCTS
- TYLER/ UNION FOUNDRY
- US PIPE



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## Material Specifications

### **B 9 – MECHANICAL JOINT FITTINGS (AWWA C110 FULL BODY), (4" THRU 36"):**

#### **Specification/ Material:**

- Mechanical joint, full body, fittings shall meet or exceed the performance specifications of:
- Fittings shall be ductile iron per ASTM A536.
- Shall be produced in accordance with laying lengths and body thickness specified in ANSI/ AWWA C110/ A 21.10.
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- All fittings shall have distinctly cast upon them the manufacture's identification, pressure rating, nominal diameter and number of degrees or fraction of a circle on all bends.
- Ductile iron fittings shall have the letters "DI" or "Ductile" cast on them.
- Fittings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Sizes four (4") thru twelve (12") inch Factory Mutual Approved (FM) **or** Underwriter Laboratory Listed (UL) is required. Marking must be cast on the fitting at time of manufacture to meet this requirement.
- Affidavit of compliance to this specification shall be available upon request.

#### **Coating & Lining:**

##### **Potable and Reclaimed Water:**

- Exterior coating: asphaltic coating.
- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C116 (ANSI-A21.16) epoxy coating both inside and out.

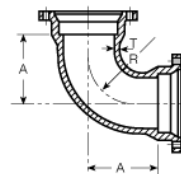
##### **Sanitary Sewer and Force Mains:**

- Exterior coating: asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) or approved equal:
- with an amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick) **OR**

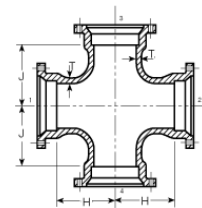
- with an calcium aluminate aggregate and mortar lining, Lafarge "SEWPERCOAT ®". An optional seal coat may be applied. The lining thickness shall be a minimum of the following (equivalent to DCL):
- 125 mils (1/8") for 6" - 12" pipe.
- 188 mils (3/16") for 14" - 24" pipe.

#### **Pressure Rating:**

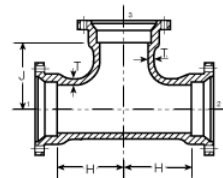
- Minimum of 350-psi. for sizes four (4") thru twenty four (24").
- Minimum of 250-psi. for sizes thirty (30") thru thirty-six (36").



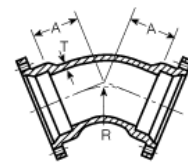
MJ and MJ



All MJ Cross



All MJ Tee



MJ and MJ

#### **Approved manufacturer product as modified to meet the above specification:**

- AMERICAN CAST IRON
- CLOW
- MCWANE, INC.
- SIGMA CORP.
- STAR PIPE PRODUCTS
- TYLER/ UNION FOUNDRY
- US PIPE



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## Material Specifications

### **B 10 – MECHANICAL JOINT FITTINGS (AWWA C153 COMPACT BODY), (4" THRU 36"):**

#### **Specification/ Material:**

- Mechanical joint, compact or short body, fittings shall meet or exceed the performance specifications of:
- Fittings shall be ductile iron.
- Shall be produced in accordance with laying lengths and body thickness specified in ANSI/ AWWA C153/ A 21.53.
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- All fittings shall have distinctly cast upon them the manufacture's identification, pressure rating, nominal diameter and number of degrees or fraction of a circle on all bends.
- Ductile iron fittings shall have the letters "DI" or "Ductile" cast on them.
- Fittings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A..
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Sizes four (4") thru twelve (12") inch Factory Mutual Approved (FM) **or** Underwriter Laboratory Listed (UL) is required. Marking must be cast on the fitting at time of manufacture to meet this requirement.
- Affidavit of compliance to this specification shall be available upon request.

#### **Coating & Lining:**

##### **Potable and Reclaimed Water:**

- Exterior coating: asphaltic coating.
- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C116 (ANSI-A21.16) epoxy coating both inside and out.

##### **Sanitary Sewer and Force Mains:**

- Exterior coating: asphaltic coating.
- Sewer pipe shall have the interior coated (factory applied) or approved equal:
- with an amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick) **OR**

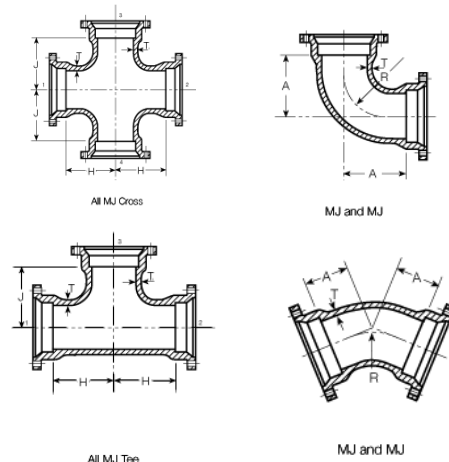
- with an calcium aluminate aggregate and mortar lining, Lafarge "SEWPERCOAT®". An optional seal coat may be applied. The lining thickness shall be a minimum of the following (equivalent to DCL):

- 125 mils (1/8") for 6" - 12" pipe.
- 188 mils (3/16") for 14" - 24" pipe.

The inside of the bell socket including a portion of the gasket cavity and a portion of the pipe barrel are coated with 8-mils (minimum) of epoxy.

#### **Pressure Rating:**

- Minimum of 350-psi. for sizes four (4") thru twenty four (24").
- Minimum of 250-psi. for sizes thirty (30") thru thirty-six (36").



#### **Approved manufacturer product as modified to meet the above specification:**

- AMERICAN CAST IRON
- CLOW
- MCWANE, INC.
- SIGMA CORP.
- STAR PIPE PRODUCTS
- TYLER/ UNION FOUNDRY
- US PIPE



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## Material Specifications

### B 11 – MECHANICAL JOINT ACCESSORY KITS:

#### **Specification/ Material:**

- Mechanical Joint Ductile Iron Pipe Fitting  
Accessory Kits shall meet or exceed the performance specifications of:
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11 and the latest revisions thereto.
- Accessory kits for 4" through 12" sizes shall also conform to ANSI/AWWA C153/A21.53 and the latest revisions thereto.
- Accessory kits for 14" through 36" sizes shall also conform to ANSI/AWWA C110/A21.10 and the latest revisions thereto.
- Nuts, bolts and gaskets shall be designed to withstand the design and test pressures of the pipe.
- Mechanical joint glands shall be ductile iron.
- Tee bolts and nuts shall be Cor-ten.
- Glands supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.

#### **Requirements:**

- Each accessory kit shall be a boxed package.

#### **Gasket Material:**

- SBR- Buna-S.
- EPDM (ethylene propylene).
- NBR- Nitrile Buna-N.
- Viton; Fluorel (FKM).

#### **Include:**

- One (1) ductile iron gland.
- One (1) rubber gasket.
- Proper number of cor-ten bolts and nuts required for each pipe fitting face.

#### **Restrictions:**

- The accessory kits, if ordered separate from the fitting, must be palletized for safety.



#### **Manufacturer:**

- AMERICAN CAST IRON
- CLOW
- GRIFFIN PIPE PRODUCTS
- MCWANE, INC.
- SIGMA CORP.
- STAR PIPE PRODUCTS
- TYLER/ UNION FOUNDRY
- US PIPE



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## Material Specifications

### B 12 – MECHANICAL JOINT CONNECTOR:

#### **Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 24 inch shall consist of joining two mechanical joint fittings or a fitting to a valve, incorporated into a gland that 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..

#### **Material:**

- Ductile iron conforming to ASTM Standards A 80-55-06 and the Latest revision thereto.
- Supplied with an fusion epoxy coating both inside and out in accordance with AWWA C116 (ANSI-A21.16).

#### **Nuts and Bolts:**

- Weathering steel (Corten) T-bolts and nuts conforming to AWWA C111/A21.11 AND ASTM Standards A242.

#### **Gasket:**

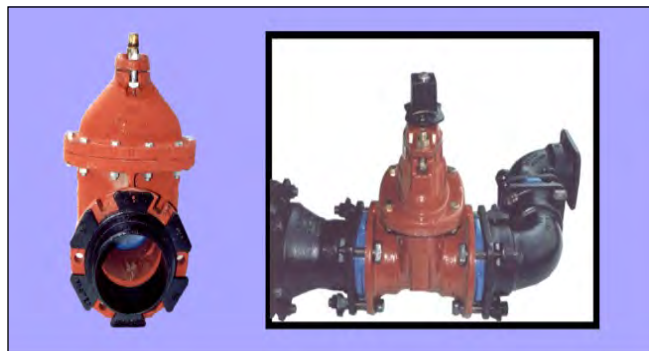
- Standard mechanical joint (MJ) gaskets conforming to AWWA C111/ ASTM Standards F-477, made of:
  - SBR– Buna-S.
  - EPDM– Ethylene Propylene.
  - NBR– Nitrile Buna-N.

#### **Include:**

- 1 each – Foster Adaptor.
- 2 each – Proper size MJ Gaskets.
- Proper number and size cor-ten bolts and nuts.

#### **Restrictions:**

- NOT FOR USE ON HYDRANT SHOES.
- MAY NOT FIT BOTH “RUN” AND “BRANCH” ON COMPACT TEES OR CROSSES.
- **MUST HAVE EPOXY COATING** (NOT VISABLE IN ALL PHOTOS).



#### **Manufacturer:**

- INFACOT CORPORATION– FOSTER ADAPTER



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## Material Specifications

### **B 13 – PUSH-ON JOINT FITTINGS (AWWA C110/ C153), (4" THRU 24"):**

**Specification/ Material:**

- Push-on fittings shall meet or exceed the performance specifications of:
- Fittings shall be ductile iron, per ASTM A536, and have either Tyton Joint or Fastite Joint socket connections.
- Shall be produced in accordance with principals specified in ANSI/ AWWA C110/ A 21.10 and ANSI/AWWA C153/ A21.53.
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- All fittings shall have distinctly cast upon them the manufacture's identification, pressure rating, nominal diameter and number of degrees or fraction of a circle on all bends.
- Fittings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Sizes four (4") thru twelve (12") inch Factory Mutual Approved (FM) **or** Underwriter Laboratory Listed (UL) is required. Marking must be cast on the fitting at time of manufacture to meet this requirement.
- Affidavit of compliance to this specification shall be available upon request.

**Pressure Rating:**

- Minimum of 350-psi. for sizes four (4") thru twenty-four (24").

**Coating & Lining:**

**Potable and Reclaimed Water:**

- Exterior coating: asphaltic or red epoxy coating.
- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C116 (ANSI-A21.16) epoxy coating both inside and out.

**Sanitary Sewer and Force Mains:**

- Exterior coating: asphaltic or red epoxy coating.
- Sewer fittings shall have the interior coated (factory applied) or approved equal:
  - with an amine cured novolac epoxy, containing at

least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick).

**Restrictions for fittings in this category:**

- Shall only be installed with approved restraining type gaskets.
- Shall only be installed on ductile iron pipe.
- Plain end fitting are not allowed.



**Approved manufacturer product as modified to meet the above specification:**

- AMERICAN CAST IRON– FASTITE
- SIGMA CORP.– TYTON
- STAR PIPE PRODUCTS– TYTON
- TYLER/ UNION FOUNDRY– TYTON
- US PIPE– TYTON



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## Material Specifications

### B 14 – PUSH-ON JOINT RESTRAINED FITTINGS (14"THRU 36")

#### FLEX-RING:

##### **Specification/ Material:**

- Push-on restrained fittings shall meet or exceed the performance specifications of:
- Fittings shall be ductile iron, per ASTM A536, and have a modified Fastite Joint socket connection.
- Shall provide a bolt-less field adaptable restrained joint bell fitting connection.
- Shall be produced in accordance with principals specified in ANSI/ AWWA C110/ A 21.10 and ANSI/AWWA C153/ A21.53.
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- All fittings shall have distinctly cast upon them the manufacture's identification, pressure rating, nominal diameter and number of degrees or fraction of a circle on all bends.
- Fittings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Affidavit of compliance to this specification shall be available upon request.

##### **Pressure Rating:**

- Minimum of 350-psi. for sizes fourteen (14") thru twenty four (24").
- Minimum of 250-psi. for sizes thirty (30") thru thirty-six (36").

##### **Coating & Lining:**

##### **Potable and Reclaimed Water:**

- Exterior coating: asphaltic or red epoxy coating.
- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C116 (ANSI-A21.16) epoxy coating both inside and out.

##### **Sanitary Sewer and Force Mains:**

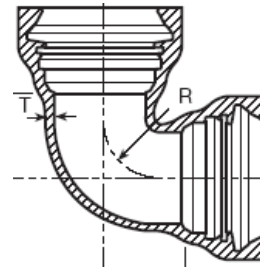
- Exterior coating: asphaltic or red epoxy coating.
- Sewer fittings shall have the interior coated (factory applied) amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick).

##### **Restrictions for fittings in this category:**

- A Field Flex-Ring shall be used for field cut pipe connections, which do not have a factory weldment.
- Shall only be installed on ductile iron pipe.
- Plain end fitting are not allowed.

##### **Additional Information:**

- Standard Flex-Ring segments are yellow.
- Field Flex-Ring segments are black.



**Flex-Ring socket W/ standard Segments**



##### **Manufacturer:**

- AMERICAN CAST IRON– FLEX-RING



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## Material Specifications

### B 15 – PUSH-ON JOINT RESTRAINED FITTINGS (14"THRU 36")

#### TR FLEX:

##### **Specification/ Material:**

- Push-on restrained fittings shall meet or exceed the performance specifications of:
- Fittings shall be ductile iron, per ASTM A536, and have a modified Tyton Joint socket connection.
- Shall use ductile iron locking segments, inserted through a slot (or slots) in the bell face, to provide a positive axial lock between the bell interior surface and a retainer weldment on the spigot end of the pipe.
- Shall be produced in accordance with principals specified in ANSI/ AWWA C110/ A 21.10 and ANSI/AWWA C153/ A21.53.
- Rubber gasket joints in accordance with ANSI/ AWWA C111/A21.11.
- All fittings shall have distinctly cast upon them the manufacture's identification, pressure rating, nominal diameter and number of degrees or fraction of a circle on all bends.
- Fittings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Affidavit of compliance to this specification shall be available upon request.

##### **Pressure Rating:**

- Minimum of 350-psi. for sizes fourteen (14") thru twenty four (24").
- Minimum of 250-psi. for sizes thirty (30") thru thirty-six (36").

##### **Coating & Lining:**

###### **Potable and Reclaimed Water:**

- Exterior coating: asphaltic or red epoxy coating.
- AWWA C104 (ANSI-A21.4), cement mortar lining and asphaltic coating.
- AWWA C116 (ANSI-A21.16) epoxy coating both inside and out.

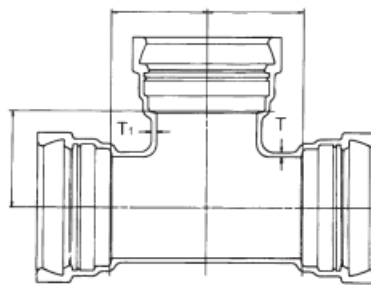
###### **Sanitary Sewer and Force Mains:**

- Exterior coating: asphaltic or red epoxy coating.
- Sewer fittings shall have the interior coated (factory

applied) amine cured novolac epoxy, containing at least 20% by volume of ceramic quartz pigment "PROTECTO 401" (40 mils thick).

##### **Restrictions for fittings in this category:**

- A TR Flex Gripper Ring shall be used for field cut pipe connections, which do not have a factory weldment.
- Shall only be installed on ductile iron pipe.
- Plain end fitting are not allowed.



**TR Flex Gripper Ring Assembly**



##### **Manufacturer:**

- US PIPE & FOUNDRY– TR FLEX



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## Material Specifications

# SECTION C: JOINT RESTRAINTS



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## Material Specifications

### Section C: Joint Restraints—Contents

[C 1     Joint Restraints/ Bell & Spigot Joint/ New & In-Service Installations \(2" IPS PVC Pipe\)](#)

[C 1.1   Joint Restraints/ Bell & Spigot Joint/ New & In-Service Installations \(C-900 PVC Pipe\)](#)

[C 1.1.1 Joint Restraints/ Bell & Spigot Joint/ New & In-Service Installation \(C-900 PVC & DI Pipe\)](#)

[C 1.2   Joint Restraints/ Bell & Spigot Joint/ New Installations Only \(C-900 PVC PIPE\)](#)

[C 1.3   Joint Restraints/ Plain End to Mechanical Joint \(C-900 PVC PIPE\)](#)

[C 2     Joint Restraints/ Multiple Wedge Style Mechanical Joint \(C-900 PVC PIPE\)](#)

[C 2.1   Joint Restraints/ Multiple Wedge/MJ/ Split Gland/ Existing Installations Only \(PVC PIPE\)](#)

[C 3     Joint Restraints/ Flange Adapter \(PVC PIPE\)](#)

[C 3.1   Joint Restraints/ Flange Adapter \(DI PIPE\)](#)

[C 4     Joint Restraints/ Multiple Wedge Style/ Bell & Spigot Joint/ New Installation/ \(DI PIPE\)](#)

[C 4.01 Joint Restraints/ Multiple Wedge Style/ Bell & Spigot Joint/ Existing Installation/ \(DI PIPE\)](#)

[C 4.1   Joint Restraints/ Multiple Wedge Style Mid Span/ New & Existing Installations/ \(DI PIPE\)](#)

[C 4.2   Joint Restraints/ Multiple Wedge Style Mechanical Joint \(DI PIPE\)](#)

[C 4.3   Joint Restraints/ Multiple Wedge Style MJ/ Existing Installations Only \(DI PIPE\)](#)

[C 5     Joint Restraints/ Compression Style Mechanical Joint \(DI PIPE\)](#)

[C 6     Joint Restraint Gaskets/ DI Pipe \(push-on-joint\)](#)



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## Material Specifications

### C 1 – JOINT RESTRAINTS/ BELL/ SPIGOT JOINT/ NEW & IN-SERVICE INSTALLATIONS/ 2" IPS PVC PIPE:

#### 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:

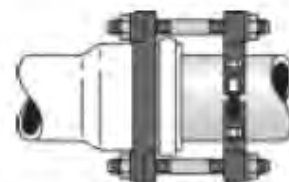
- Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- T-bolts, rods and hex nuts- Low alloy steel per ANSI/AWWA C111/ A21.11

#### Design:

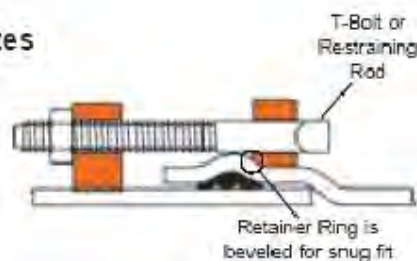
- Restraint devices for PVC pipe shall consist of two split rings a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer on one pipe to the fitting.
- Shall be capable of installation on a new installation and in-service pipelines without disrupting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

#### Include:

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



2"  
Sizes



#### Manufacturer:

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



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## Material Specifications

### C 1.1 – JOINT RESTRAINTS/ BELL/ SPIGOT JOINT/ NEW & IN-SERVICE INSTALLATIONS/ C-900 PVC PIPE:

#### 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:

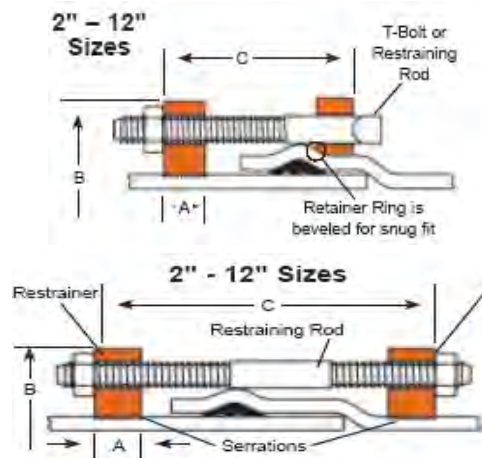
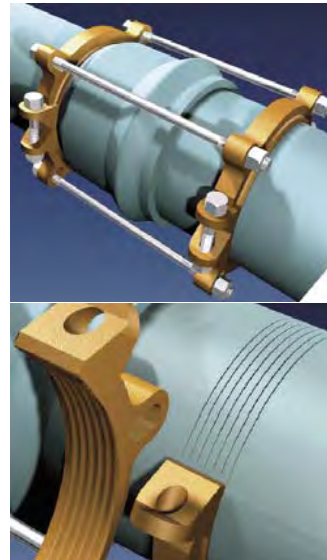
- Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- T-bolts, rods and hex nuts- Low alloy steel per ANSI/AWWA C111/ A21.11

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



#### Manufacturer:

- EBAA IRON- 1500 & 1600 SERIES
- FORD- UNIFLANGE 1390 SERIES
- STAR PRODUCTS- 1100 & 1200 SERIES
- SIGMA- PV-LOK- PVP SERIES
- SMITH-BLAIR- 165 BELL-LOCK



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Port Richey, FL 34668

Created Date: 01/25/15  
Last Revised Date: 04/20/19

## Material Specifications

### C 1.1.1 – JOINT RESTRAINTS/ BELL/ SPIGOT JOINT/ NEW & IN-SERVICE INSTALLATIONS/ C-900 PVC & DI PIPE:

#### Specification:

- Dual use (PVC & DI pipe) bell and spigot restraint devices for nominal pipe sizes 4 inch through 12 inch 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- Low alloy steel per ANSI/AWWA C111/ A21.11

#### 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.

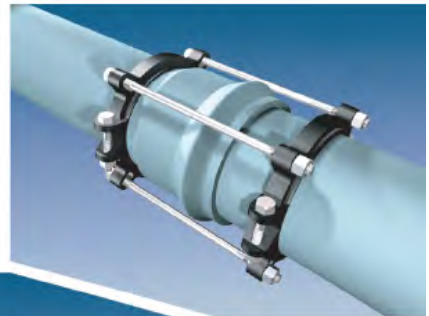
#### Requirements:

- Each accessory kit shall be a boxed package.

#### Include:

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

*Series 1612TD on 12 inch  
PVC (C900) Pipe.*



*Series 1612TD on 12 inch  
Ductile Iron Pipe.*



*Depicts Tru-Dual Inserts*



#### Manufacturer:

- EBAA IRON- 1500TD & 1600TD SERIES



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## Material Specifications

### C 1.2 – JOINT RESTRAINTS/ BELL & SPIGOT JOINT/ NEW INSTALLATIONS ONLY/ C-900 PVC PIPE:

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 12 inch 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:
- 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:

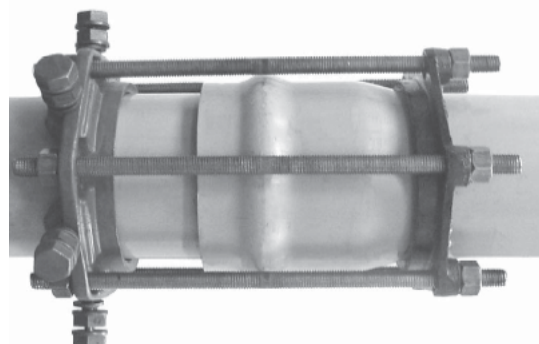
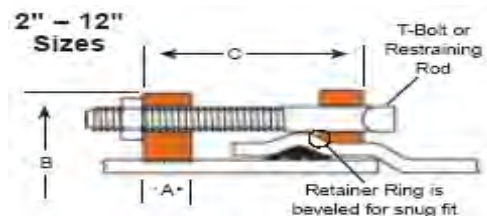
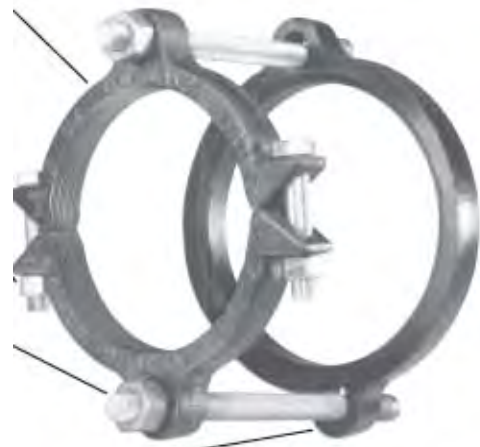
- Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- T-bolts, rods and hex nuts- Low alloy steel per ANSI/AWWA C111/ A21.11.

#### Design:

- 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.

#### Include:

- Two- Split grip ring halves or One solid ring.
- One- Solid behind the bell ring.
- Two- Side clamping bolts and nuts, if required.
- Proper number, length and size, T-bolts and nuts or tie rods and nuts.



#### Manufacturer:

- FORD- UNIFLANGE 1350 SERIES- **Not for use on DR-14 PVC pipe.**
- STAR PRODUCTS- PVC STARGRIP-4100P



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## Material Specifications

### C 1.3 – JOINT RESTRAINTS/ PLAIN END TO MECHANICAL JOINT/ C-900 PVC PIPE:

#### **Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 12 inch 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- Low alloy steel per ANSI/AWWA C111/ A21.11.

#### **Design:**

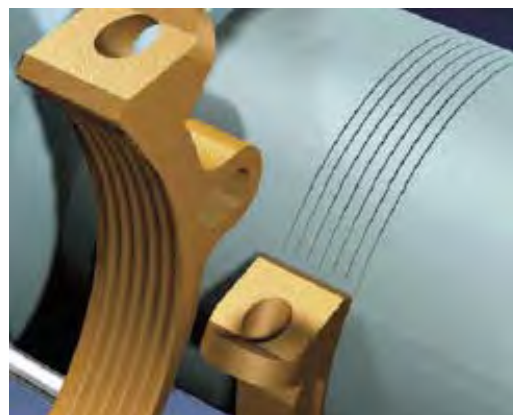
- Restraint devices for PVC pipe shall consist of a split ring with multiple gripping wedges or a series of serrations to grip the pipe in conjunction with a sufficient number of bolts connecting the retainer to the joint.

#### **Include:**

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

#### **Restrictions:**

- FOR USE IN EXISTING, IN-SERVICE PIPELINES ONLY.



#### **Manufacturer:**

- EBAA IRON- 15PF00 SERIES
- FORD- UNIFLANGE 1300 SERIES
- STAR PRODUCTS- 1000C SERIES
- SIGMA- PV-LOK - PMV SERIES
- SMITH-BLAIR- 115 BELL-LOCK



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## Material Specifications

### C 2 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ C-900 PVC PIPE:

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 12 inch 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 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 inch.
- 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 A536.80.
- **Wedges:** Ductile iron heat treated to a minimum hardness of 370 BHN.

#### Design:

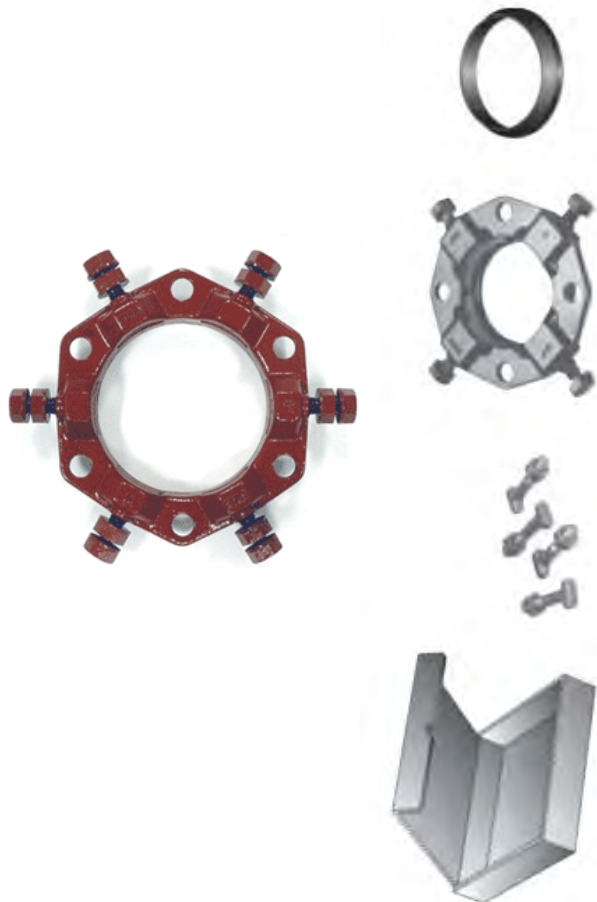
- Multiple gripping wedges incorporated within a mechanical joint follower gland, that when actuated, impart increasing resistance to pipe separation as pressure increases restraint nuts must be shear type torque design.
- Must include a minimum safety factor of 2:1 in all sizes.

#### Requirements:

- Each accessory kit shall be a boxed package.

#### Include:

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



#### Manufacturer:

- EBAA IRON- MEGA LUG 2000PV SERIES
- FORD- UNIFLANGE 1500 SERIES
- SMITH-BLAIR– CAM-LOCK 120
- STAR PIPE PRODUCTS- STARGRIP 4000 SERIES



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## Material Specifications

### C 2.1 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ SPLIT GLAND/ EXISTING INSTALLATIONS ONLY/ C-900 PVC PIPE:

**Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 12 inch 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 C 153 (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.

**Requirements:**

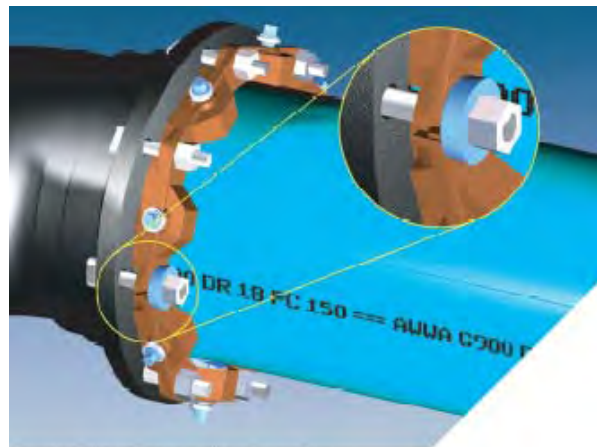
- Each accessory kit shall be a boxed package.

**Include:**

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

**Restrictions:**

FOR USE IN EXISTING, IN-SERVICE PIPELINES ONLY.



*Series 2012SV, for 12" Mechanical Joint Pipe or Fittings*

**Manufacturer:**

- EBAA IRON- MEGA LUG 2000SV SERIES



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## Material Specifications

### C 3 – JOINT RESTRAINTS/ FLANGE ADAPTER/ C-900 PVC PIPE:

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 12 inch shall consist of multiple gripping wedges or a series of serrations incorporated within a follower gland, shall meet or exceed the performance specifications 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.
- Affidavit of compliance to this specification shall be available upon request.

#### Material:

- **Body:** Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- Flange drilling to ANSI B16.1, 125 lbs.
- **Gasket:** Standard mechanical joint gasket made of:
  - SBR- Buna-S
  - EPDM- Ethylene Propylene
  - NBR- Buna-N

#### Design:

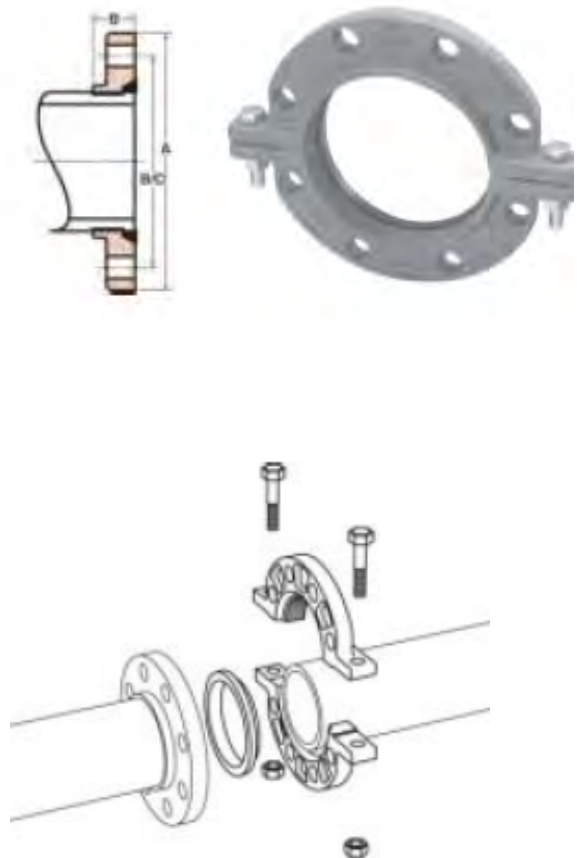
- Multiple gripping wedges or a series of serrations incorporated within a follower gland.
- Must include a minimum safety factor of 2:1 in all sizes.

#### Include:

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

#### Restrictions:

- Application of product shall be approved by the Engineer.



#### Manufacturer:

- FORD- UNIFLANGE 900 SERIES



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## Material Specifications

### C 3.1 – JOINT RESTRAINTS/ FLANGE ADAPTER/ DI PIPE:

**Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 12 inch shall consist of multiple gripping wedges or screws incorporated within a follower gland, shall meet or exceed the performance specifications of:
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes through 12 inch.
- 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.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

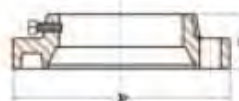
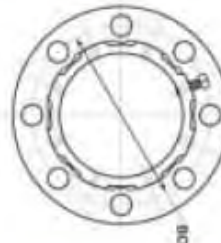
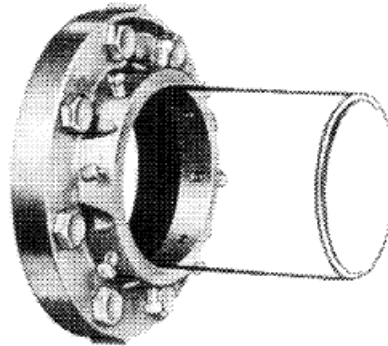
- **Body:** Ductile Iron- ASTM Standards A536. Grade 65-45-12.
- Flange drilling to ANSI B16.1, 125 lbs.
- **Gasket:** Standard mechanical joint gasket made of:
  - SBR- Buna-S
  - EPDM- Ethylene Propylene
  - NBR- Buna-N
- **Set Screws:**
  - Stainless Steel
  - AISI 4140 Steel/ zinc plated
  - Ductile Iron

**Design:**

- Multiple gripping wedges or screws incorporated within a follower gland.
- 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 bolts and nuts for each pipe fitting face.



**Manufacturer:**

- EBAA IRON- 1000 & 2100 SERIES
- FORD- UNIFLANGE 200, 400 & 420 SERIES
- ROMAC- FIELD FLANGE
- SIGMA- ZIP FLANGE/ ZF2 & ZF4 SERIES
- STAR PRODUCTS- 200 SERIES
- TYLER/ UNION- ADAPTER FLANGE



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## Material Specifications

### C 4 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE/ BELL & SPIGOT JOINT/ NEW INSTALLATIONS ONLY/ DI PIPE:

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 24 inch 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 C 153 (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.

#### Requirements:

- Each kit shall be a boxed package.

#### Include:

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

#### Optional:

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



Series 1706 on 6 inch Push-On Pipe Joints

#### Manufacturer:

- EBAA IRON- 1700 SERIES
- FORD- UNIFLANGE 1450 SERIES
- SIGMA- ONE LOK/ SLDH
- STAR PRODUCTS- STAGRIP 3100P SERIES



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## Material Specifications

### C 4.01 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE/ BELL & SPIGOT JOINT/ SPLIT GLANDS/ EXISTING INSTALLATIONS/ DI PIPE:

**Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 24 inch 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 C 153 (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.

**Requirements:**

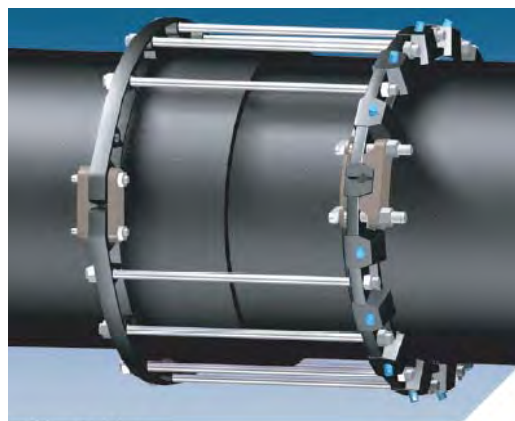
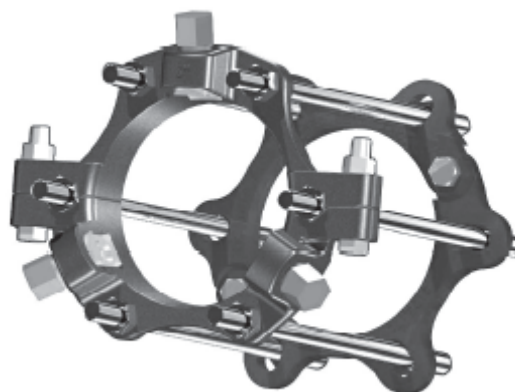
- Each kit shall be a boxed package.

**Include:**

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

**Optional:**

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



*1124HD on 24 inch pipe.*

**Manufacturer:**

- EBAA IRON- 1100HD SERIES
- STAR PRODUCTS- STAGRIP 3100S SERIES



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## Material Specifications

### C 4.1 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE/ MID SPAN/ NEW & EXISTING INSTALLATIONS/ DI PIPE:

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 24 inch shall consist of multiple gripping wedge incorporated into one or two split glands and 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 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 body, Wedges:** Shall be cast from grade 65-45-12 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:

- One (1), ductile iron split gland.
- Proper number of cor-ten T bolts, nuts and appurtenances for each installation.

#### Important Note:

- When used as an anchor within concrete, polyethylene wrap must be used to prevent concrete intrusion into the wedge pocket.



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#### Manufacturer:

- EBAA IRON- 1100SDB SERIES



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## Material Specifications

### C 4.2 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ DI PIPE:

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 24 inch 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 C 153 (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 (UL/FM) for sizes through 12 inch.
- Underwriter Laboratory Listed (UL) as noted by (UL) for sizes through 24 inch.
- 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 A536.80.
- **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.

#### Requirements:

- Each accessory kit shall be a boxed package.

#### Include:

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

#### Restrictions:

- Shall not be used on plain end fittings ( consult manufactures documentation).



#### Manufacturer:

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



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## Material Specifications

### C 4.3 – JOINT RESTRAINTS/ MULTIPLE WEDGE STYLE MECHANICAL JOINT/ SPLIT GLAND/ EXISTING INSTALLATIONS ONLY/ DI PIPE:

**Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 24 inch 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 C111 (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.

**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.

**Requirements:**

- Each accessory kit shall be a boxed package.

**Include:**

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

**Restrictions:**

- FOR USE IN EXISTING, IN-SERVICE PIPELINES ONLY.



112SD on 12 inch pipe.



1124SD on 24 inch pipe.

**Manufacturer:**

- EBAA IRON- MEGA LUG 1100SD SERIES
- STAR PIPE PRODUCTS- STARGRIP 3000S SERIES



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## Material Specifications

### C 5 – JOINT RESTRAINTS/ COMPRESSION STYLE MECHANICAL JOINT/ DI PIPE:

**Specification:**

- Restraint devices for nominal pipe sizes 4 inch through 12 inch mechanical joints consisting of multiple gripping wedges integral to the gasket that are compressed by a special follower gland, using standard T-bolts and nuts, that shall meet or exceed the performance specifications of:
- AWWA C111 (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 inch.
- 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:**

- **Gland:**
  - Ductile Iron per ASTM Standards A536.
- **Gasket:**
  - SBR- Buna-S
  - EPDM- Ethylene Propylene
  - NBR- Buna-N
- **Bolts and Nuts:**
  - Cor-ten T-bolts and nuts

**Design:**

- Restraint devices for nominal mechanical joints, consisting of multiple gripping wedges integral to the gasket that are compressed by a special follower gland, using standard T-bolts and nuts.

**Include:**

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

**Restrictions:**

- **Not approved for use on PVC Pipe**

**\*PHOTO SHOWS BOTH PVC AND DI PIPE GAS-KETS, ONLY THE DI GASKET IS ACCEPTABLE AND ONLY FOR DI PIPE INSTALLATIONS.**

**Manufacturer:**

- UNION FOUNDRY- MJ FIELD LOK
- US PIPE- MJ FIELD LOK
- TYLER PIPE- MJ FIELD LOK
- MUELLER COMPANY– MJ FIELD LOK-DI



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## Material Specifications

### C 6 - JOINT RESTRAINT GASKETS/ DI PIPE (PUSH ON JOINT):

#### Specification:

- Restraint devices for nominal pipe sizes 4 inch through 24 inch 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 C111 (ANSI - A21.11) or latest revision thereof.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) for sizes through 24 inch.
- 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:

- **Gasket:**
  - SBR- Buna-S
  - EPDM- Ethylene Propylene
  - NBR- Buna-N
- **Locking Segments:**
  - Stainless Steel vulcanized into the gasket.

#### Design:

- Restrained gaskets are for use only in push-on joints. Both American Pipe, Fast Grip Gaskets and US Pipe, Field Lok 350 gaskets are acceptable.

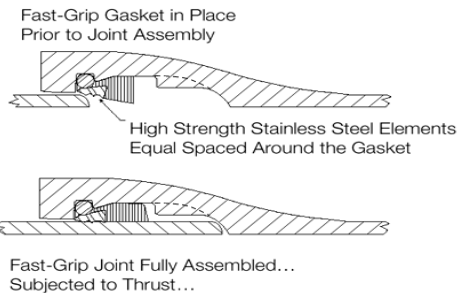
#### Include:

- One- Restraint push-on joint gasket.

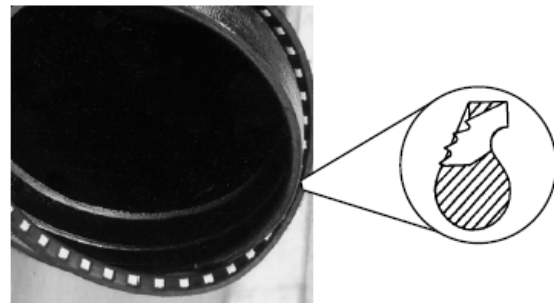
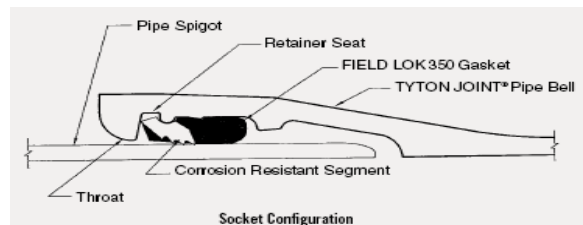
#### Restrictions:

- Fast Grip gaskets shall only be installed in Fastite bell joints.
- Field Lok 350 & Sure Stop 350 gaskets shall only be installed in Tyton bell joints.

#### AMERICAN FAST GRIP JOINT



#### FIELD LOK 350 JOINT/ GASKET



#### Manufacturer:

- AMERICAN CAST IRON- FAST GRIP GASKET
- GRIFFIN PIPE PRODUCTS- FIELD LOK 350 GASKET
- Mc WANE, INC.- SURE STOP 350 GASKET
- US PIPE- FIELD LOK 350 GASKET



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## Material Specifications

# SECTION D: VALVES AND ACCESSORIES



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## Material Specifications

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[D 1.1 Valves- Bronze Body Hose Bibb \( Temporary sample faucets only\)](#)

[D 2 Valves- Resilient Seat/ 2" \(FIPT XFIPT\)](#)

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[D 2.1.1 Valves- AWWA C515/ Resilient Seat/ 4" Thru 12" \(MJ X MJ\)](#)

[D 2.2 Tap Valves- AWWA C509/ Resilient Seat/ 4" Thru 12" \(FLG X MJ\)](#)

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[D 2.3 OS&Y Valves- Resilient Seat/ 3" Thru 12" \(FLG X FLG\)](#)

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[D 2.5 Valves- Resilient Seat/ 14" Thru 36" \(MJ X MJ\)](#)

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[D 3 Check Valve- Resilient Seat/ Potable Water \(FLG X FLG\)](#)

[D 4 Swing Check Valves- Potable Water \(FLG X FLG\)](#)

[D 4.1 Swing Check Valves- Sanitary Sewer \(FLG X FLG\)](#)

[D 4.2 Swing Check Valves/ Resilient Seat- Sanitary Sewer \(FLG X FLG\)](#)

[D 5 Combination Air Valves- Stainless Steel/ Sanitary Sewer/ For 2" Thru 12" Mains](#)

[D 5.1 Combination Air Valves- Stainless Steel/ Sanitary Sewer/ For 12" And Larger Mains](#)

[D 5.2 Combination Air Valves- Reclaimed Water](#)

[D 6 Air Release Valves- Short Body/ Sanitary Sewer](#)

[D 6.1 Air Release Valves- Stainless Steel/ Sanitary Sewer](#)



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[D 7     Air Release Valves \(UL/FM\)- Potable & Reclaimed Water](#)

[D 8     Air Release Valves \(2"\)- Potable & Reclaimed Water](#)



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## Material Specifications

### D 1 – VALVES- BRONZE BODY GATE :

#### Specification:

- Bronze body gate valves shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- Federal specification WW-V-541, Class A, Type 1, wedge disc.
- Non-rising stem gate valve.
- Manufactured for buried service.
- Turn counterclockwise to OPEN.
- Equipped with malleable iron hand wheel.
- Manufactures initials and pressure rating shall be cast on the valve body.

#### Material:

- **Body:** ASTM Standards B62 (85-5-5-5) brass.
- **Handle:** Malleable iron or bronze.

#### Pressure Rating:

- 125-psi. steam working pressure (SWP) and
- 200-psi. cold water rating (WOG).
- Shall be hydrostatic or pneumatic pressure tested at least twice the rated working pressure.

#### Connections:

- Female screw ends threaded according to ANSI B2.1 for pipe threads.

#### Requirements:

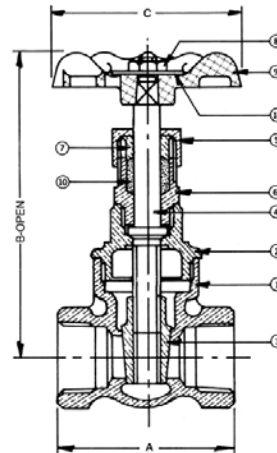
- Replacement hand wheels must be available.
- Provide catalog illustrations and parts schedule giving the material of which parts are made.

#### Sizes:

- Two-inch (2").

#### Restrictions:

- This material is **only** used for temporary sampling and flushing points during pipeline construction.



#### Manufacturer:

- HAMMOND IB645
- AMERICAN 3FG
- NIBBCO T-113
- GRINNELL 3000
- RED & WHITE
- JAMES JONES J-372 SERIES



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## Material Specifications

### D 1.1 – VALVES- BRONZE BODY HOSE BIBB :

**Specification:**

- Bronze body hose bibbs shall meet or exceed the performance specifications of:
- Manufactured from heavy duty brass components for commercial service applications.
- Shall provide positive shut off.
- Turn counterclockwise to OPEN.
- Equipped with malleable iron or bronze handle.
- Manufactures initials and pressure rating shall be cast on the valve body.

**Material:**

- **Body:** ASTM Standards B584-C85700 brass.
- **Handle:** Malleable iron or bronze.
- **Disk Seal:** Nitrile Buna-N or EPDM (ethylene-propylene) rubber.

**Pressure Rating:**

- 125-psi. minimum non-shock cold working pressure.

**Connections:**

- **Inlet:** 3/4" male pipe thread according to ANSI B2.1 for pipe threads.
- **Outlet:** 3/4" male hose thread according to ANSI B2.4 for loose fitting hose threads.

**Requirements:**

- Replacement handles must be available.
- Provide catalog illustrations and parts schedule giving the material of which parts are made.

**Sizes:**

- Three quarter-inch (3/4").

**Restrictions:**

- This material is **only** used for temporary sampling and flushing points during pipeline construction.

**Manufacturer:**

- OPEN



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## Material Specifications

### D 2 – VALVES- RESILIENT SEAT/ 2" (FIPT X FIPT):

**Specification:**

- Resilient seat or wedge (RW) line valves shall meet or exceed the performance specifications of:
- AWWA C509 (standard wall thickness) or AWWA C515 (standard for reduced wall thickness) for resilient seat gate valves with non-rising stems (NRS).
- Both ends shall have Female Iron Pipe Threads (FIPT).
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Wedge:** cast iron or ductile iron fully encapsulated ( no exposed iron) or bronze vulcanized with EPDM (ethylene-propylene) rubber.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Stem:** bronze per ASTM Standards B584 or stainless steel per AISI 430F.
- **Hex head nuts and bolts:** Stainless steel.

**Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise)
- Both ends shall have female iron pipe threads (FIPT).
- Pressure rated for 200 psi minimum.
- Two-inch (2") square operating nut.

**Size:**

- Two-inch (2").



**Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AFC-2500 SERIES
- AMERICAN AVK 03-063-39
- CLOW VALVE 2639 & 2640
- KENNEDY VALVE KS-RW 8057 or 7057
- M & H VALVE COMPANY 4067-07
- MUELLER A-2360 SERIES
- U.S. PIPE A-USP0-8



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## Material Specifications

### D 2.1 – VALVES– AWWA C509/ RESILIENT SEAT/ 4” thru 12” (MJ X MJ):

#### **Specification:**

- Resilient seat or wedge (RW) line valves shall meet or exceed the performance specifications of AWWA C509 (standard wall thickness) for resilient seat gate valves with non-rising stems (NRS) and meet the following specific provisions:.
- Both ends shall be mechanical joint in accordance with ANSI/ AWWA C111/A21.11.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM).
- Shall have UL, FM mark displayed visibly and permanently on the valve.
- Affidavit of compliance to this specification shall be available upon request.

#### **Material:**

- **Body:** cast or ductile iron conforming to ASTM Standards A126 or A536.
- **Wedge:** cast or ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon “EPDM” or the formula designation such as “EDK-70”.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** cast or ductile iron conforming to ASTM Standards A126 or A536.
- **Stem:** copper alloy/ bronze.
- **Hex head nuts and bolts:** 304/ 316 Stainless steel.

#### **Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise)
- Both ends shall be mechanical joint (MJ).
- Pressure rated for 250 psi minimum.
- Two-inch (2”) square operating nut.

#### **Size:**

- Four-inch (4”) thru twelve-inch (12”).

#### **Include:**

- Two– properly sized mechanical joint accessory kits.



#### **Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AVK 25 (CI) & 45 (DI) SERIES
- CLOW VALVE 2639 & 2640 SERIES
- KENNEDY VALVE KS-RW 8571 SERIES
- M & H VALVE COMPANY 4067 SERIES
- MUELLER A-2360 SERIES
- US PIPE A-USPO-23 SERIES



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## Material Specifications

### D 2.1.1 – VALVES– AWWA C515/ RESILIENT SEAT/ 4” thru 12” (MJ X MJ):

#### **Specification:**

- Resilient seat or wedge (RW) line valves shall meet or exceed the performance specifications of AWWA C515 (standard for reduced wall thickness) for resilient seat gate valves with non-rising stems (NRS) and meet the following specific provisions:.
- Both ends shall be mechanical joint in accordance with ANSI/ AWWA C111/A21.11.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM).
- Shall have UL, FM mark displayed visibly and permanently on the valve.
- Affidavit of compliance to this specification shall be available upon request.

#### **Material:**

- **Body:** ductile iron conforming to ASTM Standards A536.
- **Wedge:** cast or ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon “EPDM”.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** ductile iron conforming to ASTM Standards A536.
- **Stem:** copper alloy/ bronze.
- **Hex head nuts and bolts:** 304/ 316 Stainless steel.

#### **Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise)
- Both ends shall be mechanical joint (MJ).
- Pressure rated for 250 psi minimum.
- Two-inch (2”) square operating nut.

#### **Size:**

- Four-inch (4”) thru twelve-inch (12”).

#### **Include:**

- Two– properly sized mechanical joint accessory kits.



#### **Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AFC-2500 SERIES
- CLOW VALVE 2638 SERIES
- KENNEDY VALVE KS-RW 7571 SERIES
- M & H VALVE COMPANY 7000 SERIES
- MUELLER A-2361 SERIES



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## Material Specifications

### D 2.2 – TAP VALVES-AWWA C509/ RESILIENT SEAT/ 4" THRU 12" (FLG X MJ):

**Specification:**

- Resilient seat or wedge (RW) tap valves shall meet or exceed the performance specifications of:
- AWWA C509 (standard wall thickness) for resilient seat gate valves with non-rising stems (NRS).
- One end shall be mechanical joint in accordance with ANSI/ AWWA C111/A21.11.
- One end shall be flange design with a raised tapping alignment centering ring and conform to MSS SP-60 standard.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM).
- Shall have UL, FM mark displayed visibly and permanently on the valve.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Wedge:** cast iron or ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon "EPDM" or the formula designation such as "EDK-70".
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** ductile iron conforming to ASTM Standards A536.
- **Stem:** copper alloy/ bronze.
- **Hex head nuts and bolts:** 304/ 316 Stainless steel.

**Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise).
- Pressure rated for 250 psi minimum.

- Two-inch (2") square operating nut.

**Size:**

- Four-inch (4") thru twelve-inch (12").

**Include:**

- One– properly sized mechanical joint accessory kit.
- One– properly sized flange joint accessory kit.

**Additional Requirement:**

- Shall have a laying length sufficient to allow complete retraction of A.P. Smith Tapping Machine when valve is in fully closed position.



**Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AVK 45 (DI) SERIES
- CLOW VALVE 2639 & 2640 SERIES
- KENNEDY VALVE KS-RW 8950 SERIES
- M & H VALVE COMPANY 4751 SERIES
- MUELLER A-2360 SERIES
- US PIPE T-USPO-19 SERIES



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## Material Specifications

### D 2.2.1 – TAP VALVES-AWWA C515/ RESILIENT SEAT/ 4” THRU 12” (FLG X MJ):

**Specification:**

- Resilient seat or wedge (RW) tap valves shall meet or exceed the performance specifications of:
- Valves shall be ductile iron.
- AWWA C515 (standard for reduced wall thickness) for resilient seat gate valves with non-rising stems (NRS).
- One end shall be mechanical joint in accordance with ANSI/ AWWA C111/A21.11.
- One end shall be flange design with a raised tapping alignment centering ring and conform to MSS SP-60 standard.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM).
- Shall have UL, FM mark displayed visibly and permanently on the valve.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** ductile iron conforming to ASTM Standards A536.
- **Wedge:** ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon “EPDM”.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** ductile iron conforming to ASTM Standards A536.
- **Stem:** copper alloy/ bronze.
- **Hex head nuts and bolts:** 304/ 316 Stainless steel.

**Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise).

- Pressure rated for 250 psi minimum.
- Two-inch (2”) square operating nut.

**Size:**

- Four-inch (4”) thru twelve-inch (12”).

**Include:**

- One– properly sized mechanical joint accessory kit.
  - One– properly sized flange joint accessory kit.
- Additional Requirement:**
- Shall have a laying length sufficient to allow complete retraction of A.P. Smith Tapping Machine when valve is in fully closed position.



**Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AFC-2500 SERIES
- CLOW VALVE 2638 SERIES
- KENNEDY VALVE KS-RW 7950 SERIES
- M & H VALVE COMPANY 7590 SERIES
- MUELLER A-2361 SERIES



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## Material Specifications

### D 2.3 – OS&Y VALVES- RESILIENT SEAT/ 3” THRU 12” (FLG X FLG):

#### Specification:

- Resilient seat or wedge (RW), outside screw-and-yoke (OS&Y) valves shall meet or exceed the performance specifications of:
- AWWA C509 (standard wall thickness) or AWWA C515 (standard for reduced wall thickness) for resilient seat gate valves with rising stems.
- Both ends shall be flanged, faced and drilled in accordance with ANSI Class 125 B16.1.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM).
- Shall have UL, FM mark displayed visibly and permanently on the valve.
- Affidavit of compliance to this specification shall be available upon request.

#### Material:

- **Body:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Wedge:** cast iron or ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon “EPDM” or the formula designation such as “EDK-70”.
- **Seal, packing & O-rings:** Nitrile Buna-N or EPDM rubber, lubricated fiber/ Teflon.
- **Stuffing box & operating wheel:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Stem:** copper alloy/ bronze.
- **Pipe Plugs:** if equipped shall be brass/ bronze or stainless steel.
- **Nuts & bolts:** 304/ 316 stainless steel, brass nuts required on packing gland bolts if required.

#### Design:

- Resilient seat gate valve, OSY, open left (counter-clockwise)
- Pressure rated for 250 psi minimum.
- Hand wheel operator.

#### Size:

- Three-inch (3”) thru twelve-inch (12”).

#### Include:

- Two– properly sized flange joint accessory kit.



#### Approved manufacturer products as modified to meet the above specifications:

- AMERICAN AFC-2500 SERIES
- AMERICAN AVK 25 (CI) & 45 (DI) SERIES
- CLOW VALVE 2638, 2639 & 2640 SERIES
- KENNEDY VALVE KS-RW
- M & H VALVE COMPANY 4068 SERIES
- MUELLER R-2360 SERIES



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## Material Specifications

### D 2.4 – VALVES- RESILIENT SEAT/ 4” thru 12” (FLG X FLG):

**Specification:**

- Resilient seat or wedge (RW) control valves shall meet or exceed the performance specifications of:
- AWWA C509 (standard wall thickness) or AWWA C515 (standard for reduced wall thickness) for resilient seat gate valves with non-rising stems (NRS).
- Both ends shall be flanged, faced and drilled in accordance with ANSI Class 125 B16.1.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by \*(UL/FM).
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Wedge:** cast iron or ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon “EPDM” or the formula designation such as “EDK-70”.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Stem:** copper alloy/ bronze.
- **Hex head nuts and bolts:** 304/ 316 Stainless steel.

**Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise)
- Both ends shall be flange joint (FLG).
- Pressure rated for 250 psi minimum.
- Operated by a ductile or cast iron hand wheel.

**Size:**

- Four-inch (4”) thru twelve-inch (12”).

**Include:**

- Two— properly sized flange joint accessory kit.



**Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AFC-2500 SERIES
- AMERICAN AVK 25 (CI) & 45 (DI) SERIES
- CLOW VALVE 2638, 2639 & 2640 SERIES
- KENNEDY VALVE KS-RW
- M & H VALVE COMPANY
- MUELLER A-2360 SERIES
- US PIPE A-USPO-6 SERIES



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## Material Specifications

### D 2.5 – VALVES- RESILIENT SEAT/ 14” thru 36” (MJ X MJ):

**Specification:**

- Resilient seat or wedge (RW) line valves shall meet or exceed the performance specifications of:
- Valves shall be ductile iron.
- AWWA C509 (standard wall thickness) or AWWA C515 (standard for reduced wall thickness) for resilient seat gate valves with non-rising stems (NRS).
- Both ends shall be mechanical joint in accordance with ANSI/ AWWA C111/A21.11.
- ANSI/ AWWA C550, all interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** ductile iron conforming to ASTM Standards A536.
- **Wedge:** ductile iron fully encapsulated ( no exposed iron) with EPDM (ethylene-propylene) rubber and have raised colophon “EPDM”.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Stuffing box & operating nut:** ductile iron conforming to ASTM Standards A536.
- **Stem:** copper alloy in accordance with AWWA C515 Standards.
- **Bonnet hex head nuts and bolts:** 304/ 316 Stainless steel (no socket head bolts allowed).

**Design:**

- Resilient seat gate valve, NRS, open left (counter-clockwise)
- Both ends shall be mechanical joint (MJ).
- Pressure rated for 150 psi minimum.
- Two-inch (2”) square operating nut.

**Size:**

- Fourteen-inch (14”) thru thirty-six inch (36”).

**Additional Requirements:**

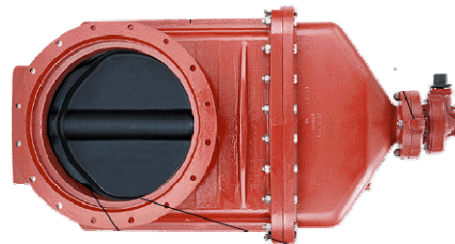
- Valves 24” and larger require a gear operator.

- Valves shall be installed vertical when used in raw sewer or sludge applications.

**NRS with Spur Gearing**



**NRS with Bevel Gearing**



**Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AFC-2500 SERIES
- MUELLER A-2361 SERIES
- US PIPE A-USP1-23 SERIES



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## Material Specifications

### D 2.6 – VALVES- ECCENTRIC PLUG/ 4” thru 6” (FLG X FLG):

**Specification:**

- Eccentric plug valves shall meet or exceed the performance specifications of:
- Shall be designed and manufactured to have a minimum wall thickness per AWWA C504 (rubber-seated butterfly valves).
- Interior ferrous metal surfaces shall be epoxy coated to comply with AWWA C550.
- Port area shall be a minimum 80% of full pipe area.
- Shall be non-lubricating type.
- Bearings shall be sintered, oil impregnated type 316 stainless steel.
- Stem packing seals shall be repackable while under pressure without removing the bonnet from the valve.
- Both ends shall be flanged, faced and drilled in accordance with ANSI Class 125 B16.1.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Plug:** cast iron or ductile iron encapsulated with Nitrile Buna-N or EPDM (ethylene-propylene) rubber.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.

**Design:**

- Both ends shall be flange joint (FLG).
- Pressure rated for 175 psi minimum.
- Shall rotate 90 degrees (quarter turn) from full-open to full-closed position.
- Operated by a ductile or cast iron lever.

**Size:**

- Four-inch (4”) thru six-inch (6”).

**Additional Requirements:**

- Shall be capable of passing “pigging” cleaning equipment in either direction without the use of special equipment.

**Restriction:**

- Use of this product is limited to air release and combination air valves.



**Approved manufacturer products as modified to meet the above specifications:**

- CLOW VALVE F-5412 SERIES
- DEZURIK
- HENRY PRATT CO.
- MILLIKEN VALVE CO.
- VAL-MATIC
- OPEN



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## Material Specifications

### D 3 – CHECK VALVES- RESILIENT SEAT/ POTABLE WATER ( 4” THRU 12” ) (FLG X FLG):

#### Specification:

- Check valves shall meet or exceed the performance specifications of:
- ANSI/AWWA C508 standards.
- Shall have resilient seat.
- Shall be manufactured from ductile iron per ASTM Standards A536 65-45-12 or cast iron per ASTM Standards A126 grade B.
- Shall be pressure rated for 250 psi. (minimum) working pressure.
- Both ends shall be flanged, faced and drilled in accordance with ANSI B16.1, Class 125.
- All ferrous interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating in compliance with ANSI/AWWA C550.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- A mechanical indicator shall be provided to provide disc position.
- Affidavit of compliance to this specification shall be available upon request.

#### Material:

- **Body:** Ductile iron, ASTM Standards A536 grade 65-45-12, or cast iron, ASTM Standards A126 grade B.
- **Disc:** Ductile iron, encapsulated with:
  - EPDM (ethylene-propylene) rubber
  - Buna- N rubber
- **Shaft:** Stainless steel.



#### Approved manufacturer products as modified to meet the above specifications:

- AMERICAN FLOW CONTROL
- APCO VALVE & PRIMER CORP.
- VAL MATIC VALVE & MFG. CORP.



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## Material Specifications

### D 4 – SWING CHECK VALVES– POTABLE WATER ( 4” THRU 12”) (FLG X FLG):

#### Specification:

- Check valves shall meet or exceed the performance specifications of:
- AWWA C508, swing check valves.
- Shall be manufactured from ductile iron per ASTM Standards A536 65-45-12, cast iron per ASTM Standards A126 Class B.
- Shall be pressure rated for 175 psi. (minimum) working pressure.
- Both ends shall be flanged, faced and drilled in accordance with ANSI B16.1, Class 125.
- All ferrous interior and exterior body and bonnet surfaces shall be coated with a fusion boded epoxy coating in compliance with ANSI/AWWA C550.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by \*(UL/FM).
- Affidavit of compliance to this specification shall be available upon request.

#### Material:

- **Body:** Ductile iron, ASTM Standards A536 grade 65-45-12, cast iron, ASTM Standards A126 Class B.
- **Disc:** Bronze with EPDM (ethylene-propylene) rubber facing and a stainless steel shaft.



#### Approved manufacturer products as modified to meet the above specifications:

- AMERICAN FLOW CONTROL
- GA INDUSTRIES
- KENNEDY VALVE
- M&H VALVE
- MUELLER



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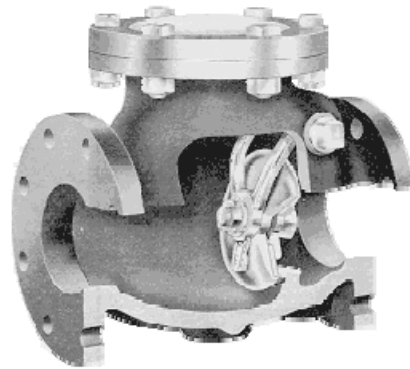
### D 4.1 – SWING CHECK VALVES– SANITARY SEWER ( 4” THRU 12”) (FLG X FLG):

**Specification:**

- Check valves shall meet or exceed the performance specifications of:
- AWWA C508, swing check valves.
- Shall be manufactured from ductile iron per ASTM Standards A536 65-45-12, cast iron per ASTM Standards A126 Class B.
- Shall be pressure rated for 175 psi. (minimum) working pressure.
- Both ends shall be flanged, faced and drilled in accordance with ANSI B16.1, Class 125.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall be furnished with a outside lever and weight.
- Affidavit of compliance to this specification shall be available upon request.

**Material:**

- **Body:** Ductile iron, ASTM Standards A536 grade 65-45-12, cast iron, ASTM Standards A126 Class B.
- **Disc:** Cast or ductile iron with bronze seat and a stainless steel shaft.

**Manufacturer:**

- AMERICAN FLOW CONTROL
- GA INDUSTRIES
- KENNEDY VALVE
- M&H VALVE
- MUELLER



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## Material Specifications

### D 4.2 – SWING CHECK VALVES/ RESILIENT SEAT– SANITARY SEWER ( 4” THRU 12”) (FLG X FLG):

#### Specification:

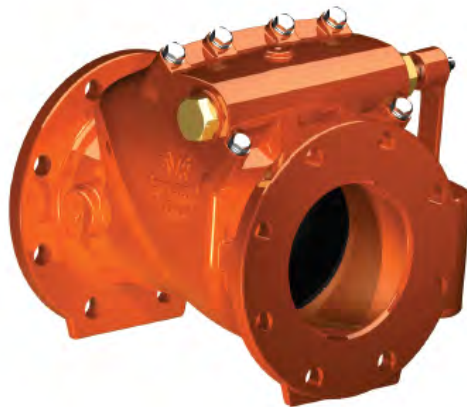
- Check valves shall meet or exceed the performance specifications of:
- AWWA C508, swing check valves.
- Shall be manufactured from ductile iron per ASTM Standards A536 65-45-12.
- Body and bonnet shall have fusion bonded epoxy coating on interior and exterior complying with AWWA C550.
- Shall be pressure rated for 175 psi. (minimum) working pressure.
- Both ends shall be flanged, faced and drilled in accordance with ANSI B16.1, Class 125.
- Shall have a resilient seat that is drop tight, even at low pressure.
- Shall have no obstructions in the flow path for a 100% clear waterway.
- Valves supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall be furnished with a outside lever and weight.
- Affidavit of compliance to this specification shall be available upon request.

#### Design:

- Shall be designed such that the disc, hinge, and bonnet can be removed as one assembly.
- Can be mounted vertically or horizontally.
- All internal exposed metal is stainless steel.

#### Material:

- **Body:** Ductile iron, ASTM Standards A536 grade 65-45-12.
- **Disc:** Shall be a carbon steel core completely encapsulated with EPDM.
- **Bonnet bolts:** 304/ 316 stainless steel.
- **Hinge and hinge pin:** 316 stainless steel, hinge on 10”-12” is ductile iron.
- **O-Rings:** acrylonitrile-butadiene rubber (NBR).



#### Manufacturer:

- AMERICAN AVK SERIES 41/ 42-43X



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## Material Specifications

### D 5 - COMBINATION AIR VALVES– STAINLESS STEEL/ SANITARY SEWER/ 2" thru 12" MAINS:

**Specification:**

- Combination air valves for sewage shall meet or exceed the performance specifications of:
- Shall be specially designed to operate with liquids carrying solid particles such as sewage and effluent.
- Shall release accumulated air from the system while the system is under pressure.
- The valve must discharge air at high velocity during the filling of the system and admit air during its drainage.
- The valve shall be a double or triple float design.
- Shall be pressure rated for at least 75 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Threaded connection shall be National Pipe Thread (NPT).
- Shall be equipped with a gauge or relief port.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A..
- Affidavit of compliance to this specification shall be available upon request.

**Connections:**

**Inlet:**

- 2" Standard Male Iron Pipe Threads (MNPT).

**Outlet:**

- Stainless Steel screen mesh & cover.
- Flushing connection.

**Material:**

- **Body:** 304 or 316 Stainless Steel.
- **Outer metal parts:** 304, 316 Stainless Steel and epoxy coated ductile iron.
- **Inner metal parts:** 304 or 316 Stainless Steel.
- **Floats :** Plastic materials/ Foamed Polypropylene or High Density Polyethylene.
- **O-Rings & Seals:** Nitrile Buna-N or EPDM (ethylene-propylene) rubber.

**Restrictions:**

- **For force main sizes up and including twelve (12") inch.**



**Approved manufacturer products as modified to meet the above specifications:**

- ARI USA, INC.– MODEL D-025
- VENT-O-MAT– SERIES RGX (SHORT PAT-TERN)



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## Material Specifications

### D 5.1 – COMBINATION AIR VALVES– STAINLESS STEEL/ SANITARY SEWER/ 12” AND LARGER MAINS:

#### Specification:

- Combination air valves for sewage shall meet or exceed the performance specifications of:
- Shall be specially designed to operate with liquids carrying solid particles such as sewage and effluent.
- Shall release accumulated air from the system while the system is under pressure.
- The valve must discharge air at high velocity during the filling of the system and admit air during its drainage.
- The valve shall be a double or triple float design.
- Shall be pressure rated for at least 150 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Flange surface shall be faced and drilled in accordance with ANSI Class 125 B16.1.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### Connections:

##### Inlet:

- 4” Flange for mains up to and including 24” mains.
- 6” Flange for mains larger than 24”.

##### Outlet:

- Stainless Steel screen mesh & cover.
- Flushing connection.

#### Material:

- **Body:** 316 Stainless Steel.
- **Outer metal parts:** 316 Stainless Steel
- **Inner metal parts:** 316 Stainless Steel.
- **Floats:** Plastic materials/ Foamed Polypropylene, High Density Polyethylene or 316 Stainless Steel.
- **O-Ring:** Nitrile Buna-N or EPDM (ethylene-propylene) rubber.

#### Restrictions:

- For force main sizes twelve (12”) inch and larger.



#### Approved manufacturer products as modified to meet the above specifications:

- ARI USA, INC.– Model D -025, D -020
- VENT-O-MAT– SERIES RGX



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## Material Specifications

### D 5.2 – COMBINATION AIR VALVES - RECLAIMED WATER :

**Specification:**

- Air release valves for reclaim water shall meet or exceed the performance specifications of:
- Shall be automatic float operated designed to release accumulated air from the piping system while the system is in operation and under pressure. The valve must discharge air at high velocity during filling of the system and admit air during its drainage.
- The valve body shall be threaded with National Pipe Thread (NPT) inlets.
- Shall be pressure rated for at least 150 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

**Connections:**

**Inlet:**

- 2" Standard male National Pipe Threads (NPT).

**Outlet:**

- 1-1/2" Standard female National Pipe Threads (NPT).

**Material:**

- **Body:** Reinforced Nylon.
- **Drain Elbow:** Polypropylene.
- **Internal Screw:** Stainless Steel.
- **Rolling Seal:** EPDM.
- **Clamping Stem:** Reinforced Nylon.
- **Float:** Foamed Polypropylene.
- **O-Ring:** BUNA-N.
- **Base:** ASTM B124 Brass.

**Restrictions/ Optional Use:**

- Acceptable for use on all sizes of reclaimed water mains.



D-040 B 2"

**Approved manufacturer products as modified to meet the above specifications:**

- A.R.I.- D-040 B 2"
- OPEN



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## Material Specifications

### D 6 – AIR RELEASE VALVES– SHORT BODY/ SANITARY SEWER :

#### Specification:

- Air release valves for sewage shall meet or exceed the performance specifications of:
- Shall be specially designed to operate with liquids carrying solid particles such as sewage and effluent.
- Shall release accumulated air from the system while the system is under pressure.
- The valve shall be a float operated design.
- Shall be pressure rated for at least 150 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Short body sanitary sewer air release valves overall height shall not exceed 12 1/4".
- Threaded connection valves shall have National Pipe Threads (NPT).
- Shall be equipped with backwash accessory kit.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### Connections:

##### Inlet:

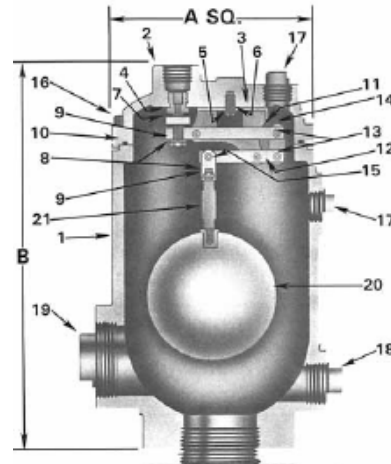
- 2" Standard National Pipe Threads (NPT).

#### Material:

- **Body:** Stainless Steel or AWWA C550 Fusion-Bonded Epoxy covered A126 Class B Cast Iron.
- **Cover bolts:** Stainless Steel.
- **Outer metal parts:** Stainless Steel
- **Inner metal parts:** Stainless Steel.
- **Float:** Stainless Steel.
- **O-Rings & Seals:** Buna-N or EPDM (ethylene-propylene) rubber.

#### Restrictions:

- Shall be equipped with a backwash kit.
- For use in existing, in service, shallow main applications only.



1. BODY - Cast Iron A126 Class B
2. COVER - Cast Iron A126 Class B
3. LEVERAGE BRACKET - 302/304 Stainless Steel
4. ORIFICE - 303 Stainless Steel
5. BRACKET SCREWS - 18-8 Stainless Steel
6. BRACKET LOCKWASHER - 18-8 Stainless Steel
7. ORIFICE BUTTON - Buna-N/18-8 Stainless Steel
8. HEX NUT - 18-8 Stainless Steel
9. LOCKWASHER - 81-8 Stainless Steel
10. O-RING - Buna-N
11. LEVER ARM - 303 Stainless Steel
12. FLOAT ARM - 303 Stainless Steel
13. COILED SPRING PIN - 302 Stainless Steel
14. VALVE LINK (Air Release) - 302/304 Stainless Steel
15. PIVOT LINK - 302/304 Stainless Steel
16. COVER BOLTS - Steel Grade 2
17. PIPE PLUG 1/2" NPT - Steel (Commercial)
18. PIPE PLUG 1" NPT - Malleable Iron
19. PIPE PLUG 2" NPT - Cast Iron
20. FLOAT BALL - 304 Stainless Steel
21. FLOAT ROD - 303 Stainless Steel

| VALVE<br>(INLET) | VALVE<br>(OUTLET) | A<br>(SQUARE) | B<br>(HEIGHT) | WEIGHT<br>(LBS.) |
|------------------|-------------------|---------------|---------------|------------------|
| 2" NPT           |                   | 6-3/8"        | 12"           | 40               |
| 3" NPT           | 1/2" NPT          |               |               |                  |

#### Approved manufacturer products as modified to meet the above specifications:

- GA INDUSTRIES– 929 F



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## Material Specifications

### D 6.1 – AIR RELEASE VALVES– STAINLESS STEEL/ SANITARY SEWER :

#### Specification:

- Air release valves for sewage shall meet or exceed the performance specifications of:
- Shall be specially designed to operate with liquids carrying solid particles such as sewage and effluent.
- Shall release accumulated air from the system while the system is under pressure.
- The valve shall be a double or triple float design.
- Shall be pressure rated for at least 150 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Threaded connection valves shall have National Pipe Threads (NPT).
- Flange surface shall be faced and drilled in accordance with ANSI Class 125 B16.1.
- Shall be equipped with backwash accessory kit.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### Connections:

##### Inlet:

- 2" Standard Male Iron Pipe Threads (MNPT) for up to 12" mains.
- 4" Flange for mains up to and including 24" mains.
- 6" Flange for mains larger than 24".

#### Material:

- **Body:** 316 Stainless Steel.
- **Outer metal parts:** 316 Stainless Steel
- **Inner metal parts:** 316 Stainless Steel.
- **Upper Float:** Plastic materials/ Foamed Polypropylene.
- **Lower Float:** 316 Stainless Steel.
- **O-Ring:** Buna-N or EPDM (ethylene-propylene) rubber.

#### Restrictions:

- Shall be equipped with backwash kit.



#### Approved manufacturer products as modified to meet the above specifications:

- ARI USA, INC.– Model S-020



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## Material Specifications

### D 7 – AIR RELEASE VALVES (UL/FM)- POTABLE & RECLAIMED WATER :

#### Specification:

- Air release valves for potable water shall meet or exceed the performance specifications of:
- Shall be automatic float operated designed to release accumulated air from the piping system while the system is in operation and under pressure.
- AWWA C512.
- Shall be Underwriters Laboratories Listed (UL) and Factory Mutual Approved (FM) as noted by (UL/FM).
- Shall have a screened hood.
- The valve body shall be threaded with National Pipe Thread (NPT) inlets and outlets.
- Shall be pressure rated for at least 175 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### Connections:

##### Inlet:

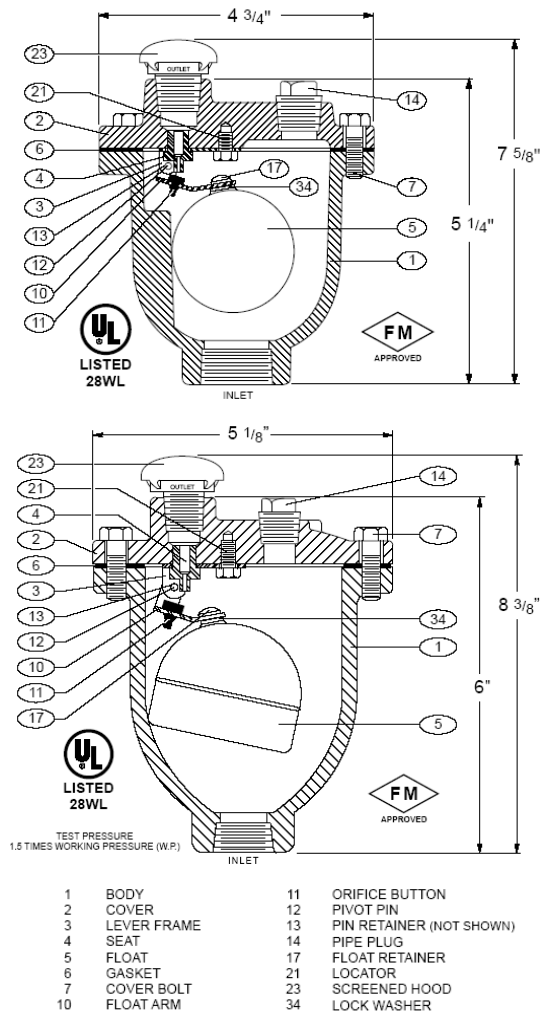
- 1" Standard Female Iron Pipe Threads (FNPT).

#### Material:

- **Body & Cover:** Cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Coating:** Fusion bonded epoxy.
- **Outer trim:** Stainless Steel.
- **Inner metal parts:** 316 Stainless Steel.
- **Inner rubber parts:** Nitrile Buna-N, EPDM (ethylene-propylene) or Viton rubber.

#### Restrictions/ Optional Use:

- **UL/FM is required on valves installed on potable mains in sizes 12" and smaller.**
- **Acceptable for use on reclaimed water mains.**
- **Acceptable for use on all sizes of potable and reclaimed mains.**



#### Approved manufacturer products as modified to meet the above specifications:

- VALVE MATIC MFG. CORP.– VM-15AH
- VALVE MATIC MFG. CORP.– VM-22H
- OPEN



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## Material Specifications

### D 8 – AIR RELEASE VALVES (2") - POTABLE & RECLAIMED WATER :

#### Specification:

- Air release valves for potable water shall meet or exceed the performance specifications of:
- Shall be automatic float operated designed to re-release accumulated air from the piping system while the system is in operation and under pressure.
- AWWA C512.
- Shall have a screened hood ( not shown in detail).
- The valve body shall be threaded with National Pipe Thread (NPT) inlets and outlets.
- Shall be pressure rated for at least 150 psi..
- Shall be test pressure rated for at least 1.5 times working pressure.
- Valves supplied must have ISO 9001 or later certification, or manufactured in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### Connections:

##### Inlet:

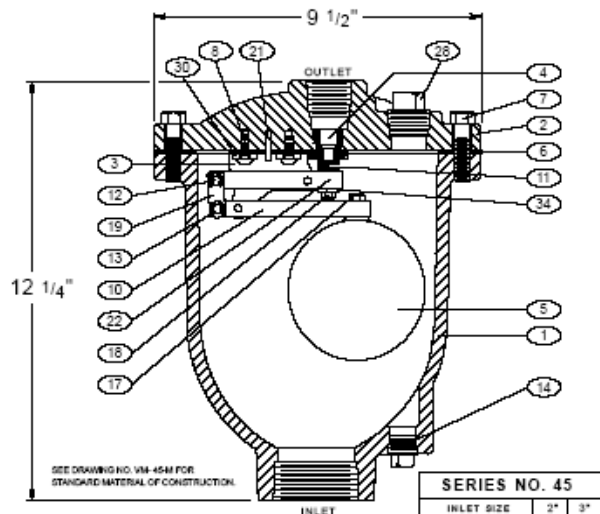
- 2" Standard Female National Pipe Threads (FNPT).

#### Material:

- **Body & Cover:** Cast iron or ductile iron conforming to ASTM Standards A126 or A536.
- **Coating:** Exterior shall have universal alkyd primer.
- **Outer trim:** Stainless Steel.
- **Inner metal parts:** 316 Stainless Steel.
- **Inner rubber parts:** Nitrile Buna-N, EPDM (ethylene-propylene) or Viton rubber.

#### Restrictions/ Optional Use:

- Acceptable for use on potable main sizes over 12" only.
- Acceptable for use on all sizes of reclaimed water mains.



|               |                   |                       |
|---------------|-------------------|-----------------------|
| 1 BODY        | 8 RETAINING SCREW | 18 LOCK NUT           |
| 2 COVER       | 10 FLOAT ARM      | 19 LINK               |
| 3 LEVER FRAME | 11 ORIFICE BUTTON | 21 LOCATING PIN       |
| 4 SEAT        | 12 PIVOT PIN      | 22 ORIFICE BUTTON ARM |
| 5 FLOAT       | 13 RETAINING RING | 28 PIPE PLUG          |
| 6 GASKET      | 14 PIPE PLUG      | 30 WASHER             |
| 7 COVER BOLT  | 17 FLOAT RETAINER | 34 LOCK WASHER        |

#### Approved manufacturer products as modified to meet the above specifications:

- VALVE MATIC MFG. CORP.– VM-45
- OPEN



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## Material Specifications

# SECTION E: FIRE HYDRANTS



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## Material Specifications

### Section E: Fire Hydrants—Contents

#### [E 1 Fire Hydrants](#)



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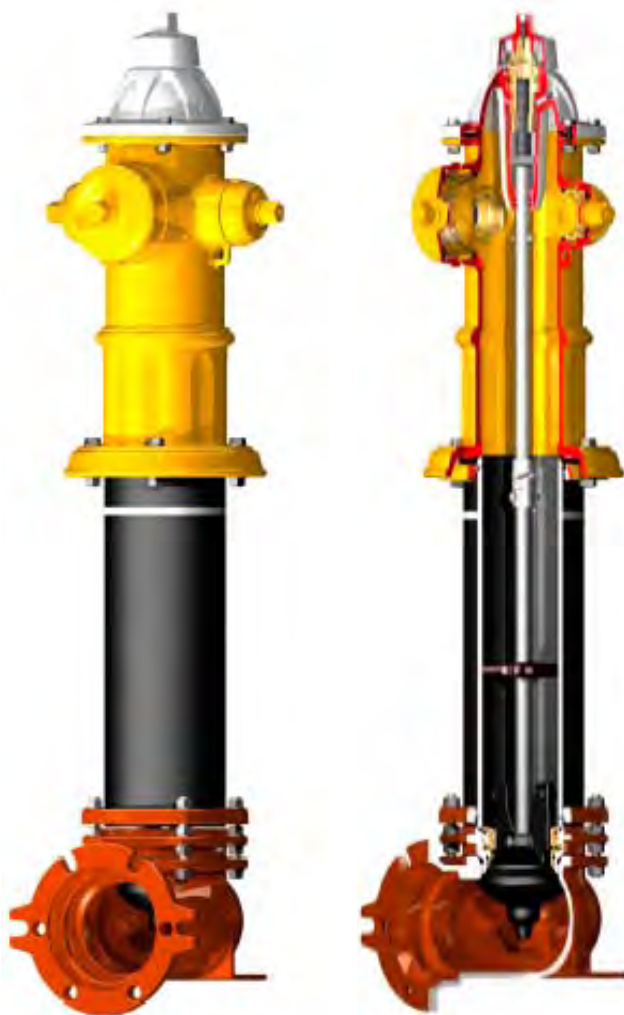
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## Material Specifications

### E 1 – FIRE HYDRANTS:

#### **Specification/ Material:**

- All fire hydrants shall fully comply with all provisions of American Water Works Association C-502 (Dry Barrel Fire Hydrants) latest revision thereof, Factory Mutual Approved (FM) and Underwriter Laboratory Listed (UL) as noted by (UL/FM) (AWWA, U.L. and F.M. COLOPHONS MUST BE CAST IN UPPER BARREL OF EACH HYDRANT) and meet the following specific provisions:
- It will be compression type, opening counterclockwise, against the pressure and closing with the pressure.
- Drain outlets shall be omitted.
- Hydrant bonnet assembly shall be provided with a grease or oil reservoir and lubrication system that automatically circulates lubricant to all operating stem threads and bearing surfaces each time the hydrant is operated. The system shall be completely sealed from the waterway and from external contaminants.
- The grease or oil used for lubrication shall be non-toxic and safe for use in potable water systems.
- All hydrants will be of the traffic “breakaway” type with safety stem coupling and breakable flange that permits full 360° rotation of the nozzle section. Cut down bolts are not acceptable for this requirement.
- Main valve opening of the hydrant will not be less than 5-1/4” and open against the pressure.
- Hydrant nozzles will consist of two (2) hose nozzles and one (1) pumper nozzle. Threads on these nozzles will conform to N.F.P.A. # 1963 standard for screw threads and gaskets for fire hose couplings.
- All nozzles shall be field replaceable with non-corrosive locking devices.
- Caulked nozzles are prohibited.
- Nozzle chains shall be omitted.
- The hydrant will be designed to permit the removal of all working parts, by one person, from the hydrant up through the barrel without disturbing the earth around the hydrant.
- An all bronze hydrant valve seat ring shall thread directly into an all bronze ring and shall be located



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## Material Specifications

### E 1 – FIRE HYDRANTS/ SPECIFICATIONS CONT.:

between the lower hydrant barrel and base securely retained in this position.

- Upper valve plate must be B62 bronze, or epoxy coated, if used.
- The hydrant will be designed with an anti-friction bearing, so located that it will reduce the torque required to operate the hydrant.
- All internal stem pins or bolts and nuts shall be stainless steel.
- The safety stem coupling shall be of either Cast Iron, Bronze, or Stainless Steel.
- The operating stem, safety stem coupling and main valve assembly shall be capable of withstanding an application of 200 ft-lbs. of torque against either the full open or closed position with no damage to components. Downward stem travel shall be limited by a travel stop location in the upper housing of the hydrant or a stop in the shoe assembly.
- Operating nut and nozzle cap wrench nuts shall conform to existing specifications for this utility.
- The opening between the operating nut and dome shall have a weather shield or seal.
- The ferrous waterway of the hydrant's shoe must be epoxy coated.
- The shoe assembly must be designed to allow all of the MJ gland tee bolts to be inserted from the shoe body side.
- Centerline of pumper connection shall be a minimum of seventeen-inches (17") above ground line.
- Ground line shall be three-inches (3") or less below break flange.
- Main rubber valve shall be EPDM (ethylene-propylene) rubber.

**Color:**

- Hydrant shall be painted chrome yellow with white bonnet dome.

**Inlet size and type:**

- Inlet shall be six-inch (6") Mechanical Joint (MJ).

**Bury length:**

- Fire hydrant length, also known as the bury length,

shall be as measured from the bottom of the connecting pipe to the ground line of the hydrant in six-inch (6") increments, from thirty-inches (30") to sixty-inches (60") inclusive. The bury length shall be clearly indicated on the upper six-inches (6") of the lower barrel of each hydrant.

**Additional requirements:**

- Only factory authorized repair parts and extensions will be acceptable.
- All shipments shall be palletized.
- Affidavit of compliance to this specification shall be available upon request.

**Approved manufacturer products as modified to meet the above specifications:**

- AMERICAN AVK NOSTALGIC 2780 SERIES
- AMERICAN FLOW CONTROL B-84-B
- AMERICAN FLOW CONTROL WATEROUS PACER
- CLOW MEDALLION
- KENNEDY GARDIAN K81-D
- MUELLER SUPER CENTURION A-423
- US PIPE METROPOLITAN M-94



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## Material Specifications

# SECTION F: SERVICE SADDLES AND TAPPING DEVICES



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## Material Specifications

### Section F: Service Saddles and Tapping Devices—Contents

F 1 NOT USED

[F 2 Service Saddles/ Hinged Type for 2" PVC](#)

[F 2.1 Service Saddles/ Brass Alloy/ Stainless Steel Straps for Cast, Ductile & PVC Pipe](#)

[F 2.2 Service Saddles/ Ductile Iron/ Stainless Steel Straps for Cast, Ductile & PVC Pipe](#)

[F 2.3 Service Saddles/ Ductile Iron/ Stainless Steel Straps for HDPE Pipe](#)

[F 2.4 Service Saddles/ Hinged Type for 2" HDPE](#)

[F 3 Tap Sleeves 4" Thru 24", Flange Connection \(Fabricated Steel/ Epoxy Coated\)](#)

[F 3.1 Tap Sleeves 4" Thru 24", Mechanical Joint Connection \(Fabricated Steel/ Epoxy Coated\)](#)

[F 4 Tap Sleeves 4" Thru 12", Flange Connection \(Fabricated Stainless Steel\)](#)

[F 4.1 Tap Sleeves 4" Thru 12", Mechanical Joint Connection \(Fabricated Stainless Steel\)](#)

[F 5 Tap Device 16" Thru 60"](#)

[F6 Sewer Service Saddles/ Ductile Iron/ Stainless Steel Straps/ Non-Pressure](#)

[F 6.1 Sewer Service Lateral Connection Hub/ Non-Pressure](#)



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## Material Specifications

### F 2 – SERVICE SADDLE, BRASS/ ALLOY/ HINGED TYPE/ 2" PVC:

#### Specification:

- Brass alloy service saddles shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- ASTM Standards D2000 gaskets seals.
- Strap shall be a single hinged strap.
- Strap shall have a curvature accurately formed to meet the diameter of the pipe.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

#### Material:

- **Body:**
  - Brass per ASTM Standards B62
- **Straps:**
  - Brass per ASTM Standards B62
- **Bolts & Nuts:**
  - Brass per ASTM Standards B62
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene- (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Brass = None

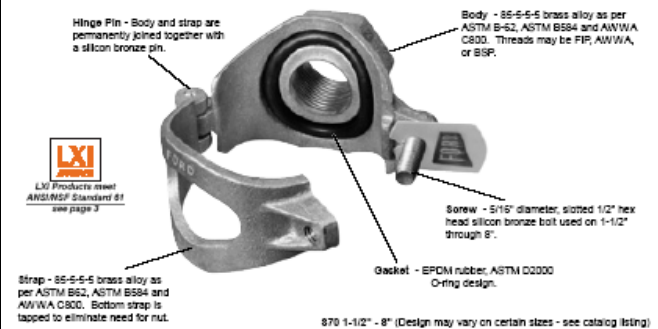
#### Design:

- For iron pipe size, two-inch (2") PVC pipe.

#### Outlets:

- 3/4" & 1" shall be female AWWA CC taper female threads.

#### Hinged S70



#### Manufacturer:

- A.Y. MCDONALD MODEL- 3891
- CAMBRIDGE BRASS- 3/4"= 800-0238-A3, 1"= 800-0238-A4
- FORD MODEL- S70
- MUELLER MODEL- S13420



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## Material Specifications

### **F 2.1 – SERVICE SADDLES/ BRASS ALLOY/ STAINLESS STEEL STRAPS FOR CAST IRON, DUCTILE IRON & PVC PIPE:**

**Specification:**

- Brass alloy service saddles shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- ASTM Standards D2000 gaskets seals.
- 18-8 type 304 stainless steel.
- Strap shall be multiple straps or a single strap three-inches or more wide.
- Welds shall be fully passivated for corrosion resistance.
- Straps shall have a curvature accurately formed to meet the diameter of the pipe.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

**Material:**

- **Body:**
  - Brass per ASTM Standards B62
- **Straps:**
  - Stainless steel, 18-8 type 304.
- **Nuts & Washers:**
  - Stainless steel, 18-8 type 304
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Brass = None

**Design:**

- For cast iron, ductile iron and PVC pipe.

**Outlets:**

- 3/4" & 1" shall be female AWWA CC taper female threads.
- 1-1/2" & 2" shall be female iron pipe threads.

**Manufacturer:**

- A.Y. MCDONALD– 3845, 3846 & 3855, 3856 SERIES
- CAMBRIDGE BRASS- 811 & 812 SERIES
- FORD– 202BS STYLE
- MUELLER– BR2S SERIES
- POWER SEAL–3409 SERIES
- ROMAC– 202BS SERIES
- SMITH BLAIR– 325, 393 SERIES



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## Material Specifications

### F 2.2 – SERVICE SADDLES/ DUCTILE IRON/ STAINLESS STEEL STRAPS FOR CAST IRON, DUCTILE IRON & PVC PIPE:

**Specification:**

- Ductile iron service saddles shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- ASTM Standards D2000 gaskets seals.
- 18-8 type 304 stainless steel.
- Strap shall be multiple straps or a single strap three-inches or more wide.
- Welds shall be fully passivated for corrosion resistance.
- Straps shall have a curvature accurately formed to meet the diameter of the pipe.
- Fusion nylon or fusion epoxy coating, minimum 12 mils thick.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

**Material:**

- **Body:**
  - Ductile iron per ASTM Standards A536
- **Straps:**
  - Stainless steel, 18-8 type 304.
- **Nuts & Washers:**
  - Stainless steel, 18-8 type 304
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Ductile iron= fusion epoxy or nylon.

**Design:**

- For ductile iron, cast iron, and PVC pipe.

**Outlets:**

- 3/4" & 1" shall be female AWWA CC taper female threads.
- 1-1/2" & 2" shall be female iron pipe threads.



**Manufacturer:**

- A.Y.MCDONALD- 4845A, 4846A, 4855A, 4856A SERIES
- CASCADE– CNS2 STYLE
- DRESSER-291 SERIES per spec.
- FORD– FC202 STYLE
- JCM– 406 SERIES
- MUELLER– DR2S SERIES
- POWER SEAL–3417DI, 3417SW
- ROMAC– 202N SERIES
- SMITH BLAIR– 397, 317 SERIES



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## Material Specifications

### F 2.3 – SERVICE SADDLES/ DUCTILE IRON/ STAINLESS STEEL STRAPS FOR HDPE PIPE:

**Specification:**

- Ductile iron service saddles shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- ASTM Standards D2000 gaskets seals.
- 18-8 type 304 stainless steel.
- Strap shall be multiple straps or a single strap three-inches or more wide.
- Welds shall be fully passivated for corrosion resistance.
- Straps shall have a curvature accurately formed to meet the diameter of the pipe.
- Fusion nylon or fusion epoxy coating, minimum 12 mils thick.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

**Material:**

- **Body:**
  - Ductile iron per ASTM Standards A536
- **Straps:**
  - Stainless steel, 18-8 type 304.
- **Nuts & Washers:**
  - Stainless steel, 18-8 type 304
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Ductile iron= fusion epoxy or nylon.

**Design:**

- For High Density Polyethylene (HDPE) pipe.

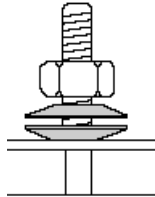
**Outlets:**

- 3/4" & 1" shall be female AWWA CC taper female threads.
- 1-1/2" & 2" shall be female iron pipe threads.

**Additional Requirements:**

- Spring washers may be required for use on HDPE pipe (consult manufactures documentation).

**Spring washers**



**Manufacturer:**

- CASCADE- STYLE CNS2 W/ Spring Washers
- FORD– FCP-202 STYLE W/ Spring Washers
- JCM– 406 SERIES Spring Washers Not Required
- ROMAC– 202N-H SERIES W/ Spring Washers
- SMITH BLAIR– 317 SERIES W/ Spring Washers



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## Material Specifications

### F 2.4 – SERVICE SADDLE, BRASS/ ALLOY/ HINGED TYPE/ 2” IPS HDPE:

**Specification:**

- Brass alloy service saddles shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- ASTM Standards D2000 gaskets seals.
- Strap shall be a single hinged strap.
- Strap shall have a curvature accurately formed to meet the diameter of the pipe.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

**Material:**

- **Body:**
  - Brass per ASTM Standards B62
- **Straps:**
  - Brass per ASTM Standards B62
- **Bolts & Nuts:**
  - Brass per ASTM Standards B62
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene- (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Brass = None

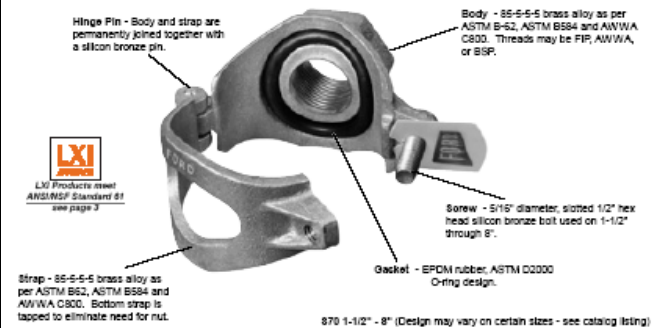
**Design:**

- For iron pipe size, two-inch (2”) HDPE pipe.

**Outlets:**

- 3/4” & 1” shall be female AWWA CC taper female threads.

**Hinged S70**



**Manufacturer:**

- FORD MODEL- S70



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## Material Specifications

### F 3– TAP SLEEVES/ 4" THRU 24", FLANGE CONNECTION/ FABRICATED STEEL/ EPOXY COATED:

#### Specification:

- Tapping sleeves shall meet or exceed the performance specifications of:
- ASTM Standards A36 or A283 Grade C, carbon steel.
- ASTM Standards D2000 gaskets seals.
- 18-8 type 304 stainless steel.
- Body shall have a curvature accurately formed to meet the diameter of the pipe.
- Fusion epoxy coating, minimum 12 mils thick.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the sleeve to ensure a positive seal against the pipe.
- NSF Standards 61.
- Outlet half of sleeve shall be furnished with a three-quarter inch (3/4") NPT test port and bronze or stainless steel plug.

#### Material:

- **Body:**
  - Carbon steel per ASTM Standards A36 or A283 Grade C.
- **Bolts, Nuts & Washers:**
  - Stainless steel, 18-8 type 304 with lubricant treatment to prevent galling.
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Carbon steel= fusion epoxy

#### Design:

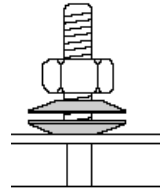
- For ductile iron, cast iron and PVC pipe.

#### Connection:

- Flange shall conform to AWWA C207 Class D, ANSI 150 lb. Drilling and recessed for tapping valve (MSS-SP60).

#### Additional Requirements:

- Spring washers may be required for use on HDPE pipe (consult manufactures documentation).
- This product is for connection of branch lines to existing in-service pipelines.



#### Manufacturer:

- CASCADE CFT-ESS SERIES
- DRESSER 610 per spec.
- FORD FTSC SERIES
- JCM 412 SERIES per spec.
- POWER SEAL 3460 SERIES per spec.
- ROMAC FTS420 SERIES per spec.
- SMITH BLAIR 622 SERIES per spec.



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## Material Specifications

### F 3.1 – TAP SLEEVES 4" THRU 24", MECHANICAL JOINT CONNECTION/ FABRICATED STEEL/ EPOXY COATED:

#### Specification:

- Tapping sleeves shall meet or exceed the performance specifications of:
- AWWA C110 mechanical joint dimensions.
- ASTM Standards A36 or A283 Grade C, carbon steel.
- ASTM Standards D2000 gaskets seals.
- 18-8 type 304 stainless steel.
- Body shall have a curvature accurately formed to meet the diameter of the pipe.
- Fusion epoxy coating, minimum 12 mils thick.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the sleeve to ensure a positive seal against the pipe.
- NSF Standards 61.
- Outlet half of sleeve shall be furnished with a three-quarter inch (3/4") NPT test port and bronze or stainless steel plug.

#### Material:

- **Body:**
  - Carbon steel per ASTM Standards A36 or A283 Grade C.
- **Bolts, Nuts & Washers:**
  - Stainless steel, 18-8 type 304 with lubricant treatment to prevent galling.
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Carbon steel= fusion epoxy

#### Design:

- For ductile iron, cast iron and PVC pipe.

#### Connection:

- Mechanical Joint (MJ).

#### Additional Requirements:

- This product is for connection of branch lines to existing in-service pipelines.



#### Manufacturer:

- POWER SEAL 3460MJ SERIES per spec.
- SMITH BLAIR 622MJ SERIES per spec.



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## Material Specifications

### F 4 – TAP SLEEVES 4" THRU 12" FLANGE CONNECTION/ FABRICATED STAINLESS STEEL:

**Specification:**

- Service saddles shall meet or exceed the performance specifications of:
- ASTM Standards D2000 gaskets seals.
- Outlet branch O-ring seal type gasket.
- ASTM Standards A240, 18-8 type 304 stainless steel.
- Welds shall be fully passivated for corrosion resistance.
- Body shall have a curvature accurately formed to meet the diameter of the pipe.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

**Material:**

- **Body:**
  - Stainless steel, 18-8 type 304.
- **Flange:**
  - Stainless steel, 18-8 type 304.
- **Nuts & Washers:**
  - Stainless steel, 18-8 type 304
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)

**Design:**

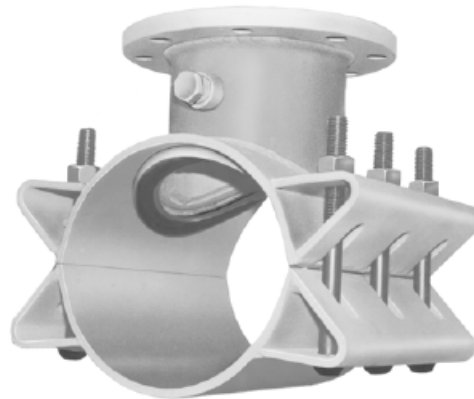
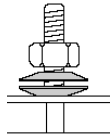
- For ductile iron, cast iron and PVC pipe.

**Connection:**

- Flange shall conform to AWWA C207 Class D, ANSI 150 lb. Drilling and recessed for tapping valve (MSS-SP60).

**Additional Requirements:**

- Spring washers may be required for use on HDPE pipe (consult manufactures documentation).
- This product is for connection of branch lines to existing in-service pipelines.

**Manufacturer:**

- JCM 452 SERIES per spec.
- POWER SEAL 3460AS SERIES per spec.
- ROMAC STS420 SERIES per spec.



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## Material Specifications

### F 4.1 – TAP SLEEVES 4” THRU 12”, MECHANICAL JOINT CONNECTION/ FABRICATED STAINLESS STEEL:

**Specification:**

- Service saddles shall meet or exceed the performance specifications of:
- AWWA C110 mechanical joint dimensions.
- ASTM Standards D2000 gaskets seals.
- Outlet branch O-ring seal type gasket.
- 18-8 type 304 stainless steel.
- Welds shall be fully passivated for corrosion resistance.
- Body shall have a curvature accurately formed to meet the diameter of the pipe.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the clamp to ensure a positive seal against the pipe.
- NSF Standards 61.

**Material:**

- **Body:**
  - Stainless steel, 18-8 type 304.
- **Flange:**
  - Stainless steel, 18-8 type 304.
- **Nuts & Washers:**
  - Stainless steel, 18-8 type 304
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)

**Design:**

- For ductile iron, cast iron and PVC pipe.

**Connection:**

- Mechanical Joint (MJ).

**Additional Requirements:**

- Spring washers may be required for use on HDPE pipe (consult manufactures documentation).
- This product is for connection of branch lines to existing in-service pipelines.



**Manufacturer:**

- JCM 452MJ SERIES per spec.
- POWER SEAL 3460MJ AS SERIES per spec.



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## Material Specifications

### F 5 – TAP DEVICE 16" THRU 60":

#### Specification:

- Tapping device shall meet or exceed the performance specifications of:
- ASTM Standards A36 or A283 Grade C, carbon steel.
- 18-8 type 304 stainless steel.
- ASTM Standards D2000 gaskets seals.
- Straps shall have a curvature accurately formed to meet the diameter of the pipe.
- Lubricant treated strap nuts to prevent galling.
- Fusion epoxy coating, minimum 12 mils thick.
- Gasket shall be securely glued or imbedded in the body of the sleeve to ensure a positive seal against the pipe.
- NSF Standards 61.
- Outlet half of sleeve shall be furnished with a three-quarter inch (3/4") NPT test port and bronze or stainless steel plug.

#### Material:

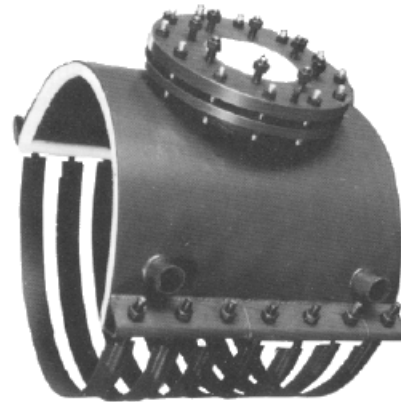
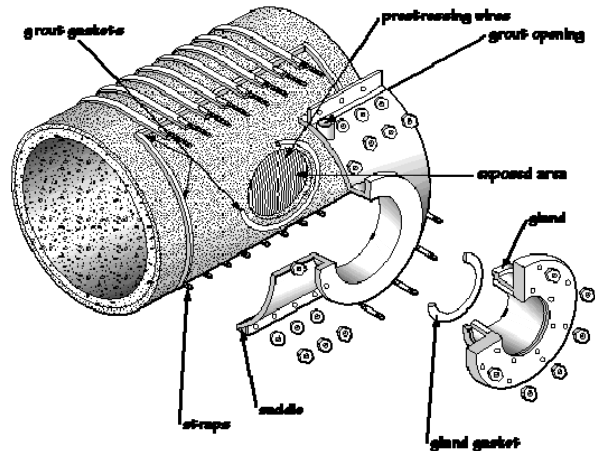
- **Body & Seal Plate:**
  - Carbon steel per ASTM Standards A36 or A283 Grade C.
- **Straps, Nuts & Washers:**
  - Stainless steel, 18-8 type 304.
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Carbon steel= fusion epoxy

#### Design:

- For pre-stressed concrete cylinder pipe.

#### Connection:

- Flange shall conform to AWWA C207 Class D, ANSI 150 lb. Drilling and recessed for tapping valve (MSS-SP60).



#### Manufacturer:

- SMITH-BLAIR 625 per spec.
- JCM-415 per spec.
- PRICE BROS. per spec.



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## Material Specifications

### F 6 – SEWER SERVICE SADDLES/ DUCTILE IRON/ STAINLESS STEEL STRAPS/ NON-PRESSURE:

**Specification:**

- Ductile iron service saddles shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- ASTM Standards D2000 gaskets seals.
- Type 304 stainless steel.
- Strap shall be multiple straps or a single strap three-inches or more wide.
- Welds shall be fully passivated for corrosion resistance.
- Straps shall have sufficient length to fit a wide range of pipe diameters.
- Fusion nylon or fusion epoxy coating, minimum 12 mils thick or shop coat paint finish.
- Lubricant treated nuts to prevent galling.
- Gasket shall be securely glued or imbedded in the body of the clamp or inserted in the body of the pipe.

**Material:**

- **Body:**
  - Ductile iron per ASTM Standards A536 Grade 65-45-12 or Cast Iron per ASTM A126.
- **Straps:**
  - Stainless steel, ASTM A 240 type 304.
- **Bolts, Nuts & Washers:**
  - Stainless steel, ASTM A193, A194, A240 type 304.
- **Gasket:**
  - SBR (Styrene Butadiene).
  - Polyisoprene
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM).
- **Coating:**
  - Ductile iron= fusion epoxy, nylon or shop coat paint finish.

**Design:**

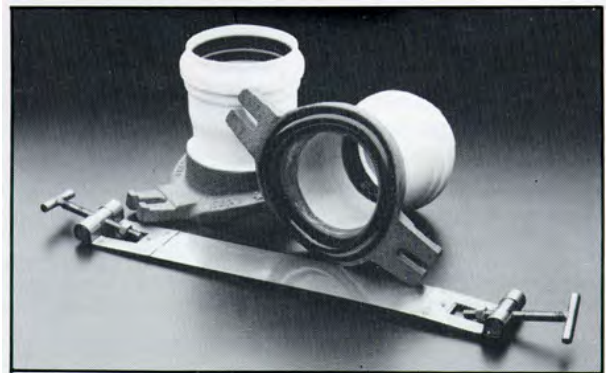
- For ductile iron, cast iron, vitrified clay pipe (VCP) and poly vinyl chloride (PVC) pipe.

**Outlets:**

- Four (4") & six (6") inch.



Patent #44494780



**Manufacturer:**

- ROMAC– STYLE "CB" SEWER SADDLE
- GENECO SEALTITE SEWER PIPE SADDLE



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## Material Specifications

### **F 6.1 – SEWER SERVICE LATERAL CONNECTION HUB/ NON-PRESSURE:**

#### **Specification:**

- Sewer lateral connection hub pipe adapters shall meet or exceed the performance specifications in:
- Service lateral connection shall be accomplished by means of a compression-fit service connection.
- The service lateral connection shall be specifically designed for connection to the sewer main being installed.
- The gasket material shall resistant to ozone, weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.
- Gaskets shall conform to ASTM Standards F477.
- The PVC hub shall conform to ASTM Standards D3034 SDR 35 or SDR 26.
- Bands and screw assembly shall be manufactured from totally non-magnetic series 300 stainless steel.

#### **Restrictions:**

- Shall be used for connections and repairs to existing vitrified clay pipe (VCP) sanitary sewers that have been rehabilitated by cured in place lining (CIPP), HDPE pipe bursting or slip lining.



#### **Manufacturer:**

- INSERT A FITTING COMPANY
- OPEN



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## Material Specifications

# SECTION G: BRASS SERVICE MATERIAL



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## Material Specifications

### Section G: Brass Service Material—Contents

[G 1 Corporation Stops/ Ground Key \(CC X CTS\)](#)

[G 2 Corporation Stops/ Ground Key \(CC X FIPT\)](#)

[G 3 Corporation Stops/ Ball Type \(MIPT X CTS\)](#)

[G 4 Corporation Stops/ Ball Type \(MIPT X FIPT\)](#)

[G 5 Brass Service Line Fittings & Accessories \(CTS O.D.\)](#)

[G 6 Brass Service Line Fittings/ Steel Pipe Adapters \(IPS O.D.\)](#)

[G 6.1 Brass Service Line Fittings/ PVC Pipe Adapters \(IPS O.D.\)](#)

[G 6.2 Brass Service Line Fittings/ 2" HDPE Pipe Adapters \(IPS O.D.\)](#)

[G 7 Brass Service Valves \(FIPT X FIPT\)](#)

[G 8 Brass Service Valves \(CTS X FIPT\)](#)

[G 9 Brass Meter Valves \(CTS X MTR\)](#)

[G 9.1 Brass Meter Valves \(FIPT X MTR\)](#)

[G 10 Meter Couplings ¾" Thru 1"](#)

[G 10.1 Meter Couplings 1 ½" Thru 2"](#)

[G 10.2 Meter Bushings ¾" Thru 1"](#)

[G 11 Meter Resetters \(5/8" X 3/4" Meter\)](#)

[G 11.1 Meter Resetters \(1" Meter\)](#)

[G 12 Insert Stiffeners/ Stainless Steel \(For Brass Service Line Fittings\)](#)

[G 12.1 Insert Stiffeners/ PVC \(For Brass Service Line Fittings\)](#)



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## Material Specifications

### G 1 – CORPORATION STOPS/ GROUND KEY/ (CC X CTS):

**Specification:**

- Ground key or plug type corporation stops shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- AWWA C 800

**Material:**

- **Body:** ASTM Standards B-62 Brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Trim:** Brass or Stainless Steel.

**Design:**

- Ground key or plug type design.
- Must accommodate polyethylene DR 9, CTS tubing.
- Pack joint is the only acceptable type.
- Full port opening design.
- Straight body design.

**Connections:**

- Inlet side shall be AWWA CC taper male threads.
- Outlet side shall be compression type joint with external gripping device (Pack Joint) for copper tubing size (CTS) polyethylene tubing.

**Sizes:**

- Three quarter– inch (3/4")
- One-inch (1")

**Restrictions:**

- Requires insert stiffener or liner in pack joint connection when installed with HDPE pipe.



**Manufacturer:**

- A.Y. MCDONALD 4701-22 SERIES
- CAMBRIDGE BRASS 302-A\_B\_SERIES
- FORD F1000- \_ SERIES
- JAMES JONES J-3401SERIES
- MUELLER P-15008 SERIES



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## Material Specifications

### G 2 – CORPORATION STOPS/ GROUND KEY/ (CC X FIPT):

**Specification:**

- Ground key or plug type corporation stops shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- AWWA C 800

**Material:**

- **Body:** ASTM Standards B-62 brass.

**Design:**

- Ground key or plug type design.
- Full port opening design.
- Straight body design.

**Connections:**

- Inlet side shall be AWWA CC taper male threads.
- Outlet side shall be female iron pipe thread.

**Sizes:**

- Three quarter– inch (3/4").
- One-inch (1").

**Restrictions:**

- For use **only** as chlorine injection point, shall have brass plug installed after use.

**Manufacturer:**

- A.Y. MCDONALD 3148 SERIES
- CAMBRIDGE BRASS 302-A\_F\_SERIES
- FORD F1600-\_SERIES
- JAMES JONES J-51 SERIES
- MUELLER H-1004 SERIES



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## Material Specifications

### G 3 – CORPORATION STOPS/ BALL TYPE/ (MIPT X CTS):

**Specification:**

- Ball type corporation stops shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- AWWA C 800

**Material:**

- **Body:** ASTM Standards B-62 Brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Trim:** Brass or Stainless Steel.

**Design:**

- Ball type design.
- Must accommodate polyethylene DR 9, CTS tubing.
- Pack joint is the only acceptable type.
- Full port opening design.
- Straight body design.

**Connections:**

- Inlet side shall be male iron pipe threads.
- Outlet side shall be compression type joint with external gripping device (Pack Joint) for copper tubing size (CTS) polyethylene tubing.

**Sizes:**

- One and one-half inch (1-1/2")
- Two-inch (2")

**Restrictions:**

- Requires insert stiffener or liner when installed with HDPE pipe.

**Manufacturer:**

- A.Y. MCDONALD 4704B-22 SERIES
- CAMBRIDGE BRASS 301-M\_B\_ SERIES
- FORD FB1100-\_ SERIES
- JAMES JONES J-1935 SERIES
- MUELLER P-25028 SERIES



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## Material Specifications

### G 4 – CORPORATION STOPS/ BALL TYPE/ (MIPT X FIPT):

**Specification:**

- Ball type corporation stops shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- AWWA C 800

**Material:**

- **Body:** ASTM Standards B-62 brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.

**Design:**

- Ball type design.
- Full port opening design.
- Straight body design.

**Connections:**

- Inlet side shall be male iron pipe threads.
- Outlet side shall be female iron pipe thread.

**Sizes:**

- One and one-half inch (1-1/2").
- Two-inch (2").

**Manufacturer:**

- A.Y. MCDONALD 3149B SERIES
- CAMBRIDGE BRASS 301-M\_F\_ SERIES
- FORD FB1700-\_ SERIES
- JAMES JONES J-1931 SERIES



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## Material Specifications

### G 5 – BRASS SERVICE LINE FITTINGS & ACCESSORIES (CTS-O.D.):

**Specification/ Material:**

- Compression type brass fittings & accessories with external gripping devices shall meet or exceed the performance specifications of:
- Brass shall conform to AWWA C-800, ASTM Standards B 62 (85-5-5-5) waterworks brass or latest revision thereof.
- Outside Diameter (O.D.) mechanical compression coupling shall be designed and sized to seal on Type K or L copper tubing or polyethylene ASTM Standards D2737 DR 9 tubing standards.

**Design:**

- Pack Joint is the only expectable design.

**Set screw:**

- Stainless Steel

**Gasket:**

- Nitrile Buna-N
- EPDM

**Connections:****Inlet:**

- Copper Tubing Size (CTS) compression with external gripping device.
- Female copper tube nut thread.

**Outlet:**

- Threaded ends will be standard Male Iron Pipe Threads (MIPT).
- Threaded ends will be standard Female Iron Pipe Threads (FIPT).
- Copper Tubing Size (CTS) compression with external gripping device.

**Restrictions:**

- Requires insert stiffener or liner when installed on PE pipe.

**Manufacturer:**

- A.Y.MCDONALD/ MAC-PAK
- CAMBRIDGE BRASS/ CAMPAK
- FORD/ PACK JOINT
- JAMES JONES/ J2600 SERIES
- MUELLER/ PACK-JOINT



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## Material Specifications

### G 6 – BRASS SERVICE LINE FITTINGS/ STEEL PIPE ADAPTERS (IPS O.D.):

**Specification/ Material:**

- Compression type brass fittings & accessories with external gripping devices shall meet or exceed the performance specifications of:
- Brass shall conform to AWWA C-800, ASTM Standards B 62 (85-5-5-5) waterworks brass or latest revision thereof.
- Outside Diameter (O.D.) mechanical compression coupling shall be designed and sized to seal on galvanized steel pipe.

**Design:**

- Pack Joint is the only expectable design.

**Set screw:**

- Stainless Steel

**Gasket:**

- Nitrile Buna-N
- EPDM

**Connections:****Inlet:**

- Galvanized steel pipe with external gripping device.

**Outlet:**

- Standard Male Iron Pipe Threads (MIPT).
- Standard Female Iron Pipe Threads (FIPT).
- Galvanized steel pipe with external gripping device.

**STEEL PIPE ADAPTERS****Manufacturer:**

- A.Y.MCDONALD/ MAC-PAK
- FORD/ PACK JOINT
- MUELLER/ PACK-JOINT



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## Material Specifications

### G 6.1 – BRASS SERVICE LINE FITTINGS/ PVC PIPE ADAPTERS (IPS O.D.):

**Specification/ Material:**

- Compression type brass fittings & accessories with external gripping devices shall meet or exceed the performance specifications of:
- Brass shall conform to AWWA C-800, ASTM Standards B 62 (85-5-5-5) waterworks brass or latest revision thereof.
- Outside Diameter (O.D.) mechanical compression coupling shall be designed and sized to seal on ASTM Standards D1785 IPS polyvinylchloride (PVC) Schedule 40, 80 and SDR 21 PVC pipe.

**Design:**

- Pack Joint is the only expectable design.

**Set screw:**

- Stainless Steel

**Gasket:**

- Nitrile Buna-N
- EPDM

**Connections:****Inlet:**

- Schedule 40 PVC with external gripping device.
- Schedule 80 PVC with external gripping device.
- SDR 21 PVC with external gripping device.

**Outlet:**

- Standard Male Iron Pipe Threads (MIPT).
- Standard Female Iron Pipe Threads (FIPT).
- Schedule 40 PVC with external gripping device.
- Schedule 80 PVC with external gripping device.
- SDR 21 PVC with external gripping device.

**Interchangeable:**

- Fittings for two-inch (2") PVC and Polyethylene (HDPE) ASTM D3035 DR 9 are interchangeable with the addition of an insert stiffener or liner.

**PVC ADAPTERS****Manufacturer:**

- A.Y.MCDONALD/ MAC-PAK
- FORD/ PACK JOINT
- MUELLER/ PACK-JOINT



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## Material Specifications

### G 6.2 – BRASS SERVICE LINE FITTINGS/ 2" HDPE PIPE ADAPTERS (IPS O.D.):

**Specification/ Material:**

- Compression type brass fittings & accessories with external gripping devices shall meet or exceed the performance specifications of:
- Brass shall conform to AWWA C-800, ASTM Standards B 62 (85-5-5-5) waterworks brass or latest revision thereof.
- Outside Diameter (O.D.) mechanical compression coupling shall be designed and sized to seal on polyethylene ASTM Standards D3035 DR 9, Iron Pipe Size (IPS), controlled outside diameter tubing standards.

**Design:**

- Pack Joint is the only expectable design.

**Set screw:**

- Stainless Steel

**Gasket:**

- Nitrile Buna-N
- EPDM

**Connections:****Inlet:**

- Polyethylene (HDPE) ASTM Standards D3035 DR 9, Iron Pipe Size (IPS), controlled outside diameter tubing standards size compression with external gripping device.

**Outlet:**

- Standard Male Iron Pipe Threads (MIPT).
- Standard Female Iron Pipe Threads (FIPT).
- Polyethylene (HDPE) ASTM D3035 DR 9, Iron Pipe Size (IPS), controlled outside diameter tubing standards size compression with external gripping device.

**Restrictions:**

- Requires insert stiffener or liner when installed on HDPE pipe.

**HDPE ADAPTERS****Manufacturer:**

- A.Y.MCDONALD/ MAC-PAK
- FORD/ PACK JOINT
- MUELLER/ PACK-JOINT



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## Material Specifications

### G 7 – BRASS SERVICE VALVES (FIP X FIP) :

**Specification:**

- Brass service valves shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- Brass ball shall be fluorocarbon coated.
- Valves 3/4" thru 2" shall have a locking wing, capable of allowing standard padlock to swivel.
- All valves must be full port opening.

**Material:**

- **Body:** ASTM Standards B-62 Brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Handle:** Brass or Stainless Steel.
- **Handle trim:** Brass or Stainless Steel.

**Design:**

- Ball valve curb stop, watertight in either directions.
- Full port opening design.
- Straight body design.

**Connections:**

- Female Iron Pipe Thread (FIPT) X Female Iron Pipe Thread (FIPT).

**Sizes:**

- Three quarter– inch (3/4") thru two-inch (2").

**Reclaim water installation Requirements:**

- Shall be equipped with handle.
- Valve and or handle shall be labeled "**Reclaimed Water**" .



**Manufacturer:**

- A.Y. MCDONALD 6101-LW SERIES
- CAMBRIDGE BRASS 212-F\_F\_SERIES
- FORD B-11 "W" SERIES
- JAMES JONES J-1900W SERIES
- MUELLER 300 B-20200 SERIES w/ LOCKWING



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## Material Specifications

### G 8 – BRASS SERVICE VALVE (CTS X FIP) :

#### Specification:

- Brass service valves shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- Brass ball shall be fluorocarbon coated.
- Valves 3/4" thru 2" shall have a locking wing, capable of allowing standard padlock to swivel.
- All valves must be full port opening.

#### Material:

- **Body:** ASTM Standards B-62 Brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Handle:** Brass or Stainless Steel.
- **Handle trim:** Brass or Stainless Steel.

#### Design:

- Ball valve curb stop, watertight in either directions.
- Full port opening design.
- Straight body design.

#### Connections:

- Inlet side shall be compression type joint with external gripping device (Pack Joint) for copper tubing size (CTS) polyethylene tubing.
- Outlet side shall be female iron pipe thread.

#### Sizes:

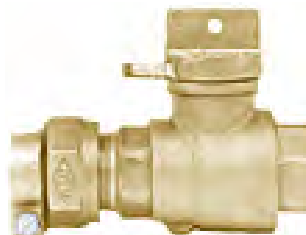
- Three quarter– inch (3/4") thru two-inch (2").

#### Reclaim water installation Requirements:

- Shall be equipped with handle.
- Valve and or handle shall be labeled "Reclaimed Water" .

#### Restrictions:

- Requires insert stiffener or liner when installed on HDPE pipe.



#### Manufacturer:

- A.Y. MCDONALD 6102-W-22 SERIES
- CAMBRIDGE BRASS 212-B\_F\_SERIES
- FORD PACK JOINT B41-\_\_"W" SERIES
- JAMES JONES J-1921W SERIES
- MUELLER P-25170 SERIES



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## Material Specifications

### G 9 – BRASS METER VALVE (CTS X MTR) :

**Specification:**

- Brass service valves shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- Brass ball shall be fluorocarbon coated.
- Valves 3/4" and 1" shall have a locking wing, capable of allowing standard padlock to swivel.
- All valves must be full port opening.

**Material:**

- **Body:** ASTM Standards B-62 Brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Handle:** Brass or Stainless Steel.
- **Handle trim:** Brass or Stainless Steel.

**Design:**

- Ball valve curb stop, watertight in either directions.
- Full port opening design.
- Straight body design.

**Connections:**

- Inlet side shall be compression type joint with external gripping device (Pack Joint) for copper tubing size (CTS) polyethylene tubing.
- Outlet side shall be meter saddle nut.

**Sizes:**

- Three quarter– inch (3/4") and one-inch (1").

**Include:**

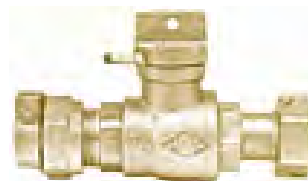
- One eight-inch (1/8") thick Nitrile Buna-N or EPDM rubber meter washer.

**Reclaim water installation Requirements:**

- Shall be equipped with handle.
- Valve and or handle shall be labeled “**Reclaimed Water**”.

**Restrictions:**

- Requires insert stiffener or liner when installed on HDPE pipe.



**Manufacturer:**

- A.Y. MCDONALD 6100-MW-22 SERIES
- CAMBRIDGE BRASS 212-B\_T\_SERIES
- FORD PACK JOINT B-43-\_\_ "W" SERIES
- JAMES JONES J-1925W w/ LW SERIES
- MUELLER P-24350 SERIES w/ LOCKWING



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## Material Specifications

### G 9.1 – BRASS METER VALVE (FIP X MTR) :

**Specification:**

- Brass service valves shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) brass.
- Brass ball shall be fluorocarbon coated.
- Valves 3/4" and 1" shall have a locking wing, capable of allowing standard padlock to swivel.
- All valves must be full port opening.

**Material:**

- **Body:** ASTM Standards B-62 Brass.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Handle:** Brass or Stainless Steel.
- **Handle trim:** Brass or Stainless Steel.

**Design:**

- Ball valve curb stop, watertight in either directions.
- Full port opening design.
- Straight body design.

**Connections:**

- Inlet side shall be Female Iron Pipe Thread (FIPT).
- Outlet side shall be meter nut.

**Sizes:**

- Three quarter– inch (3/4") and one-inch (1").

**Include:**

- One eight-inch (1/8") thick Nitrile Buna-N or EPDM rubber meter washer.

**Reclaim water installation Requirements:**

- Shall be equipped with handle.
- Valve and or handle shall be labeled “**Reclaimed Water**”.

B13-332W



**Manufacturer:**

- A.Y. MCDONALD 6101MW 3/4, 6101MW 1
- CAMBRIDGE BRASS 212-F3T3, 212-F4T4
- FORD PACK JOINT B13-332W, B13-444W
- MUELLER B-24351-3/4, B-24351-1



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## Material Specifications

### G 10 – METER COUPLINGS 3/4" THRU 1":

**Specification/ Material:**

- Meter couplings shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) water works brass or latest revision thereof.
- Meter coupling shall be straight with outside iron pipe threads on tailpiece and meter threads.

**Connections:**

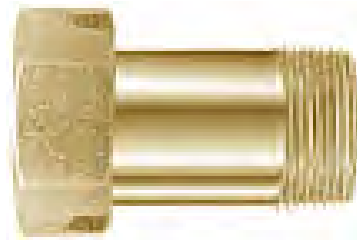
- Three-quarter (3/4") and one (1") inch shall be iron pipe thread X meter nut .

**Design:**

- Three-quarter (3/4") and one (1") inch tailpiece must be machined inside and outside.

**Include:**

- One tail piece
- One meter nut
- Shall be supplied with one-eighth (1/8") inch thick Nitrile Buna-N or EPDM rubber washer.

**Manufacturer:**

- A.Y. MCDONALD 4624, 4626
- CAMBRIDGE BRASS smooth barrel 417-T3M3 & 417-T4M4
- GRAND HAVEN 2002A, 20020A, 2004A
- JAMES JONES J-130-S
- LEE BRASS #87-MLH
- MUELLER H10890, H10896



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## Material Specifications

### G 10.1 – METER COUPLINGS 1 1/2" THRU 2":

#### **Specification/ Material:**

- Meter couplings shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) water works brass or latest revision thereof.
- Meter coupling shall be straight with outside iron pipe threads on tailpiece and meter threads on inside of meter nut.
- Meter bushing shall have male meter threads on outside and female iron pipe threads on inside.
- The meter bushing shall also be brass and have a machined smooth face on the male end to permit proper sealing against gasket material.

#### **Connections:**

- One and one half (1 1/2") and two (2") inch shall be iron pipe thread X meter nut .

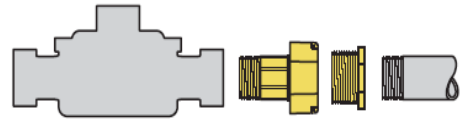
#### **Design:**

- One & one half (1 1/2") and two (2") inch tail-piece must be ribbed on outside and cored on inside.

#### **Include:**

- One tail piece
- One meter nut
- One meter bushing– male meter thread X female iron pipe thread.
- One one-eighth (1/8") inch thick Nitrile Buna-N or EPDM rubber washer.

#### TYPICAL 1 1/2" & 2" METER INSTALLATION



**METER COUPLING**



**METER BUSHING**



#### **Manufacturer:**

- A.Y. MCDONALD 4620-11/2/ 4620BB-11/2, 4620-2/ 4620BB-2
- CAMBRIDGE BRASS 417-T6M6 w/ bushing, 417-T7M7 w/ bushing
- FORD C-38-66/ BBIM66, C-38-77/ BBIM77
- GRAND HAVEN-2008A/ 2008B, 2010A/ 2010B
- JAMES JONES J-134 w/ bushing
- MUELLER H 10891 w/ bushing
- TRUMBALL 368-0608 w/ bushing, 368-0650 w/ bushing



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## Material Specifications

### G 10.2 – METER BUSHING 3/4" THRU 1":

**Specification/ Material:**

- Meter bushings shall meet or exceed the performance specifications of:
- ASTM Standards B62 (85-5-5-5) water works brass or latest revision thereof.
- Shall have a machined smooth face on the male end to permit proper sealing against gasket material.

**Connections:**

- Shall have female iron pipe thread X male meter threads.

**Sizes:**

- Three-quarter (3/4") thru one (1") inch.

**Manufacturer:**

- FORD BBIM-33, BBIM-44
- OPEN



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## Material Specifications

### G 11 – METER RESETTERS/ 5/8" X 3/4" METER:

#### Specification:

- Meter resetters shall meet or exceed the performance specifications of:
- Castings shall be made of ASTM Standards B62 (85-5-5-5) brass.
- Applicable parts of AWWA C800.

#### Material:

- **Body:** ASTM Standards B-62 Brass.
- **Riser:** Copper.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Trim:** Brass or Stainless Steel.
- **Solder:** Lead-free.

#### Design:

- Ball type curb stop valve design.
- Valve shall have padlock wings.
- Full port opening design.
- Shall have swivel meter saddle nut connections for 5/8" X 3/4" water meters.

#### Connections:

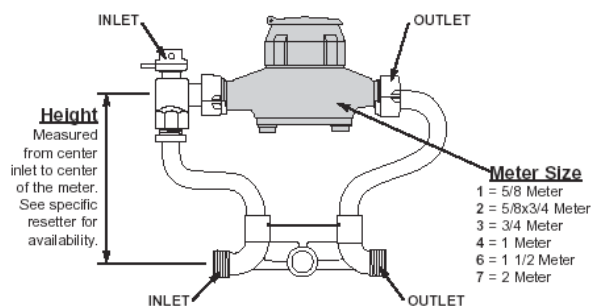
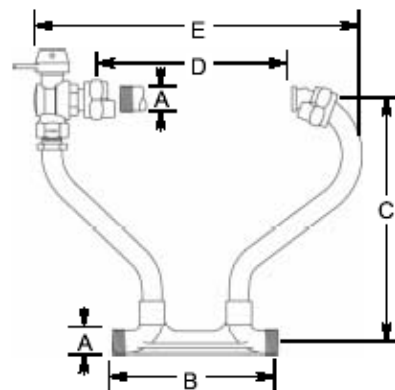
- Both bottom inlet and outlet sides shall be male meter thread.
- Both top inlet and outlet sides shall be meter saddle nut.

#### Sizes:

- **Meter size:** Five-eighths X three-quarter inch (5/8" x 3/4").
- **Setter height:** Seven, nine and twelve inch (7", 9" and 12").

#### Included and delivered with resetters:

- Four eight-inch (1/8") thick Nitrile Buna-N or EPDM rubber meter gaskets. **OR**
- Two eight-inch (1/8") thick Nitrile Buna-N or EPDM rubber and two copper clad resetter meter gaskets.



#### Manufacturer:

- A.Y. MCDONALD 18-2\_\_ JX 5/8" x 3/4") SERIES.
- CAMBRIDGE BRASS 6010-2\_\_ N2N2-UO SERIES, \_\_ = 07=7", 09=9", 12=12".
- FORD VB42-\_\_ W-FP SERIES.
- JAMES JONES J-03AMTMT\_\_ BVMC SERIES.
- MUELLER (5/8" x 3/4")- B2418-\_\_ SERIES.



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## Material Specifications

### G 11.1 – METER RESETTERS/ 1" METER:

#### Specification:

- Meter resetters shall meet or exceed the performance specifications of:
- Castings shall be made of ASTM Standards B62 (85-5-5-5) brass.
- Applicable parts of AWWA C800.

#### Material:

- **Body:** ASTM Standards B-62 Brass.
- **Riser:** Copper.
- **Seal & O-rings:** Nitrile Buna-N or EPDM rubber.
- **Trim:** Brass or Stainless Steel.
- **Solder:** Lead-free.

#### Design:

- Ball type curb stop valve design.
- Valve shall have padlock wings.
- Full port opening design.
- Shall have swivel meter saddle nut connections for 1" water meters.

#### Connections:

- Both bottom inlet and outlet sides shall be male meter thread.
- Both top inlet and outlet sides shall be meter saddle nut.

#### Sizes:

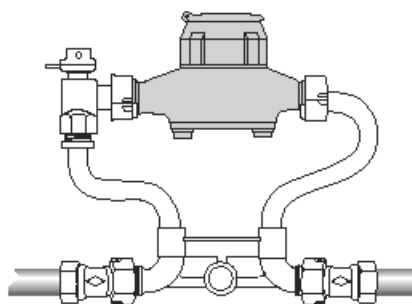
- **Meter size:** One-inch (1").
- **Setter height:** Ten and twelve inch (10" and 12").

#### Included and delivered with resetters:

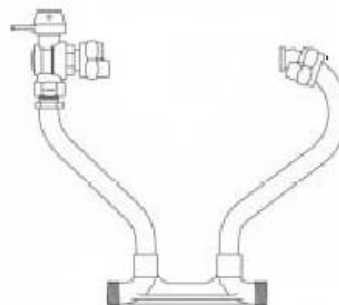
- Four eight-inch (1/8") thick Nitrile Buna-N or EPDM rubber meter gaskets. **OR**
- Two eight-inch (1/8") thick Nitrile Buna-N or EPDM rubber and two copper clad resetter meter gaskets.



BEFORE



AFTER



#### Manufacturer:

- A.Y. MCDONALD 18-4\_\_JX1 SERIES
- CAMBRIDGE BRASS 6010-4\_\_N4N4-OU SERIES.
- FORD VB44-\_\_W-FP SERIES
- JAMES JONES J-03CMTMT\_\_BVMC SERIES
- MUELLER (1")- B-24118-\_\_SERIES



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## Material Specifications

### G 12 – INSERT STIFFENERS/ STAINLESS STEEL (FOR BRASS SERVICE LINE FITTING):

#### Specification/ Material:

- Insert stiffeners or liners shall meet or exceed the performance specifications of:
- Type 304 or 316 Stainless Steel.
- Flare and beveled ends for proper installation.
- Designed for use with potable water.
- Shall be solid stainless steel, manufactured from plate or tube material.
- Shall fit snugly inside tubing or pipe.
- Shall fit the following type pipe or tubing.

#### Pipe or tubing types:

- **CTS** polyethylene (PE) per ASTM Standards D2737 SDR 9, copper tubing size O.D. controlled tubing.
- **IPS** polyethylene (PE) per ASTM Standards D3035 DR9, iron pipe size O.D. controlled tubing.

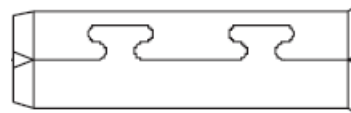
#### Size pipe or tubing:

##### CTS:

- Three quarter (3/4") inch
- One (1") inch
- One & one half (1 1/2") inch
- Two (2") inch

##### IPS:

- Two (2") inch



#### Manufacturer:

- A.Y.MCDONALD
- CAMBRIDGE BRASS
- FORD
- JAMES JONES
- MUELLER
- OPEN



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### G 12.1 – INSERT STIFFENERS/ PVC (FOR BRASS SERVICE LINE FITTING):

**Specification/ Material:**

- Insert stiffeners or liners shall meet or exceed the performance specifications of:
- Flare and beveled ends for proper installation.
- Designed for use with potable water.
- Shall be a solid PVC tube.
- Shall fit snugly inside tubing.
- Shall fit the following type tubing.

**Tubing type:**

- CTS polyethylene (PE) per ASTM Standards D2737 SDR 9, copper tubing size O.D. controlled tubing.

**Size pipe or tubing:****CTS:**

- Three quarter (3/4") inch
- One (1") inch

**Manufacturer:**

- A.Y.MCDONALD
- MARS COMPANY
- OPEN



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## Material Specifications

# **SECTION H: REPAIR SLEEVES, COUPLINGS, CLAMPS & NON-PRESSURE ADAPTERS**



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## Material Specifications

### Section H: Repair Sleeves, Couplings, Clamps & Non-Pressure Adapters—Contents

[H 1    Pipe Adapters, Non Pressure](#)

[H 1.1   Pipe Adapters, Concrete Manhole Adapters \(4" Thru 12"\):](#)

[H 1.2   Pipe Adapters, Concrete Manhole Adapters \(8" AND ABOVE\):](#)

[H 1.3   Pipe Adapters, Concrete Manhole Connection Boots:](#)

H 2    NOT USED

[H 3    Repair Clamps/ Ductile Iron Lugs \(Pipe Savers\)](#)

[H 4    Repair Clamps/ All Stainless Steel \(Pipe Savers\)](#)

[H 5    Repair Clamps/ Coupling Collar \(Pipe Savers\)](#)

[H 6    Full Seal Clamps](#)

[H 7    Bell Joint Leak Clamp](#)

[H 8    Repair Coupling/ Restrained/ DI, CI, PVC, & HDPE \(4" thru 12"\)](#)

H 8.1   Not Used

H 8.2   Not Used

[H 8.3   Repair Coupling/ Non-Restrained/ Transition \(2" thru 12"\)](#)



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## Material Specifications

### H 1 – PIPE ADAPTERS, NON-PRESSURE:

#### Specification:

- Non-pressure pipe adapters shall meet or exceed the performance specifications proscribed in:
- ASTM Standards D 5926 standard specification for Poly Vinyl Chloride (PVC) or manufactured with synthetic rubbers and
- ASTM Standards C 425 standard specification for compression joints of vitrified clay pipe and
- ASTM Standards C1173 standard specification for flexible transition couplings for underground piping systems.
- The connector shall be molded or extruded and vulcanized from materials whose physical/ chemical properties meet or exceed the physical/ chemical resistant properties outline in ASTM C 5926.
- The material shall resistant to ozone, weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.
- Bands and screw assembly shall be manufactured from totally non-magnetic series 300 stainless steel.
- The size and application colophons must be embossed on each adapter.

#### Restrictions:

- For repairs and connections to existing vitrified clay pipe (VCP) facilities.



#### Manufacturer:

- FERNCO INC.
- MISSION RUBBER
- NDS



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## Material Specifications

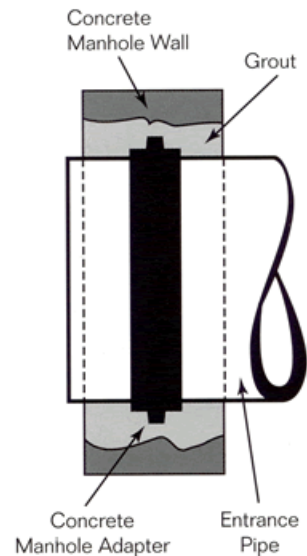
### H 1.1 – PIPE ADAPTERS, CONCRETE MANHOLE ADAPTERS (4" Thru 12"):

#### Specification:

- Concrete manhole pipe adapters shall meet or exceed the performance specifications in:
- Manhole adapters shall create a water stop around pipes entering sanitary manhole walls.
- The material shall resistant to ozone, weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.
- Shall be made of elastomeric Poly Vinyl Chloride (PVC) **OR**.
- Virgin SBR per ASTM D 2000 M2AA 60.
- The size and application colophons must be cast on each adapter.

#### Restrictions:

- Shall be used for connections and repairs to existing brick manholes and repairs to pre-cast manhole only.



#### Manufacturer:

- FERNCO
- ROMAC
- OPEN



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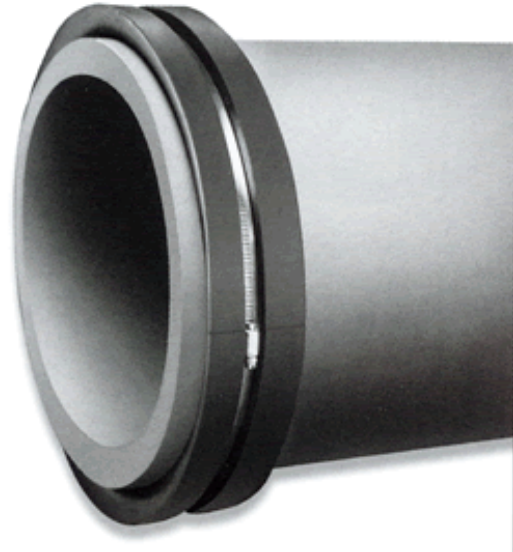
### H 1.2 – PIPE ADAPTERS, CONCRETE MANHOLE ADAPTERS (8" AND ABOVE):

**Specification:**

- Concrete manhole pipe adapters shall meet or exceed the performance specifications in:
- Manhole adapters shall create a water stop around pipes entering sanitary manhole walls.
- The material shall resistant to ozone, weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.
- Shall be made of elastomeric Poly Vinyl Chloride (PVC).
- The size and application colophons must be cast on each adapter.
- Bands and screw assembly shall be manufactured from totally non-magnetic series 304 stainless steel.

**Restrictions:**

- Shall be used for connections and repairs to existing brick manholes and repairs to pre-cast manhole only.

**Manufacturer:**

- FERNCO
- OPEN



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## Material Specifications

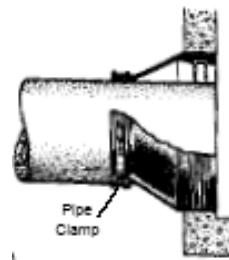
### H 1.3 – PIPE ADAPTERS, CONCRETE MANHOLE CONNECTION BOOTS:

#### Specification:

- Concrete manhole pipe adapters shall meet or exceed the performance specifications in:
- ASTM Standards C 923, Resilient connectors between reinforced concrete manhole structures, pipes and laterals.
- Manhole adapters shall create a watertight flexible seal around pipes entering sanitary manhole walls.
- The material shall resistant to ozone, weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.
- Shall be made of elastomeric Poly Vinyl Chloride (PVC), ethylene propylene (EPDM) or polyisoprene rubber.
- The size and application colophons must be cast on each adapter.
- Bands and screw assembly shall be manufactured from totally non-magnetic series 300 stainless steel.

#### Requirement:

- Shall be used for connections to existing and new pre-cast manhole and structures.



#### Manufacturer:

- A-Lok Products
- Kor-N-Seal (NPS)
- OPEN



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## Material Specifications

### H 3 – REPAIR CLAMPS/ DUCTILE IRON LUGS ( PIPE SAVERS):

**Specification:**

- Leak repair clamps shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- 18-8 type 304 stainless steel.
- Gasket shall be securely glued or imbedded in the band of the clamp to ensure a positive seal against the pipe.
- Gaskets shall have ribbed surface.

**Material:**

- **Lugs:**
  - Ductile iron per ASTM Standards A536
- **Band:**
  - Stainless steel, 18-8 type 304.
- **Bolts, Nuts & Washers:**
  - Carbon steel
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Ductile iron= shop coat.
  - Stainless steel = none.

**Design:**

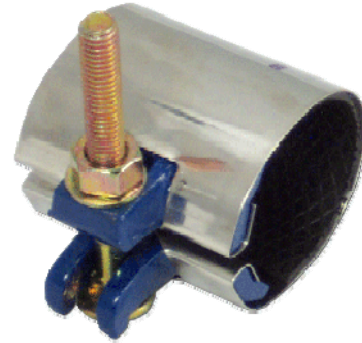
- For patching holes in iron pipe size O.D. pipe.

**Width of clamp/ Number of bolts**

- Three-inch = One bolt
- Six-inch = Two bolts

**Restrictions:**

- For repairs to existing, in-service pipelines only.

**Manufacturer:**

- CASCADE CFC SERIES
- DRESSER STYLE 118
- FORD FSC SERIES
- JCM 110 SERIES
- MUELLER 212 SERIES
- TOTAL PIPING SOLUTIONS 4100 SERIES
- POWER SEAL 3151 SERIES
- ROMAC SC SERIES
- SMITH-BLAIR 245 SERIES



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## Material Specifications

### H 4 – REPAIR CLAMPS/ ALL STAINLESS STEEL ( PIPE SAVERS):

**Specification:**

- Leak repair clamps shall meet or exceed the performance specifications of:
- 18-8 type 304 stainless steel.
- Type 304 cast stainless steel per ASTM Standards A743.
- Gasket shall be securely glued or imbedded in the band of the clamp to ensure a positive seal against the pipe.
- Lubricant treated nuts to prevent galling.
- Gaskets shall have ribbed surface.

**Material:**

- **Lugs:**
  - Type 304 cast stainless steel.
- **Band:**
  - Stainless steel, 18-8 type 304.
- **Bolts, Nuts & Washers:**
  - Stainless steel with lubricant treated nuts to prevent galling.
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Stainless steel = none.

**Design:**

- For patching holes in iron pipe size O.D. pipe.
- Only cast lug design will be accepted.

**Width of clamp/ Number of bolts**

- Three-inch = One bolt
- Six-inch = Two bolts

**Restrictions:**

- For repairs to existing, in-service pipelines only.

**Manufacturer:**

- FORD FLSC
- SMITH-BLAIR 248



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## Material Specifications

### H 5 – REPAIR CLAMPS /COUPLING COLLAR ( PIPE SAVERS):

**Specification:**

- Leak repair clamps shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- 18-8 type 304 stainless steel.
- Gasket shall be securely glued or imbedded in the band of the clamp to ensure a positive seal against the pipe.

**Material:**

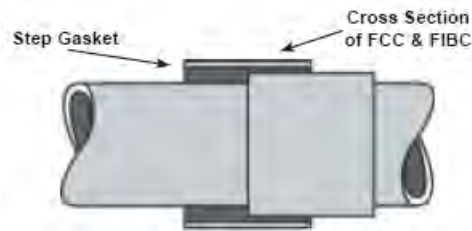
- **Lugs:**
  - Ductile iron per ASTM Standards A536
- **Band:**
  - Stainless steel, 18-8 type 304.
- **Bolts, Nuts & Washers:**
  - Carbon steel
  - Stainless steel with lubricant treated nuts to prevent galling.
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Ductile iron = shop coat.
  - Stainless steel = none.

**Design:**

- For patching holes at joints on iron pipe size O.D. pipe.
- Only cast lug design will be accepted.

**Restrictions:**

- For repairs to existing, in-service pipelines only.

**Manufacturer:**

- FORD FCC
- JCM 105 SERIES
- POWER SEAL 3140 SERIES
- SMITH-BLAIR 229



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## Material Specifications

### H 6 – FULL SEAL CLAMPS:

#### Specification:

- Full circle leak repair clamps shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- 18-8 type 304 stainless steel.
- Gasket shall be securely glued or imbedded in the band of the clamp to ensure a positive seal against the pipe.
- Gaskets shall have ribbed surface.

#### Material:

- **Lugs:**
  - Ductile iron per ASTM Standards A536
- **Band:**
  - Stainless steel, 18-8 type 304.
- **Bolts, Nuts & Washers:**
  - Low alloy steel per AWWA C 111.
- **Gasket:**
  - EPDM (ethylene propylene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Ductile iron = shop coat.
  - Stainless steel = none.

#### Design:

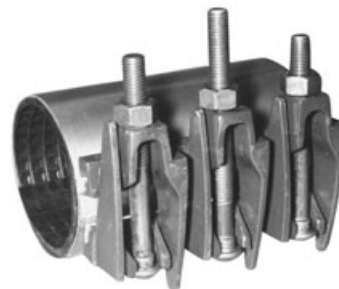
- For patching full circle holes in cast iron pipe size O.D. pipe.

#### Restrictions:

- For repairs to existing, in-service pipelines only.

#### Additional Requirements:

- Spring washers may be required for use on HDPE pipe (consult manufactures documentation).



#### Manufacturer:

- CASCADE CDR1
- DRESSER STYLE 360
- FORD F1 SERIES
- JCM 101 SERIES
- MUELLER 500 SERIES
- POWER SEAL 3121 SERIES
- ROMAC CL1 SERIES
- SMITH-BLAIR 226 SERIES



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## Material Specifications

### H 7 – BELL JOINT LEAK CLAMP:

**Specification:**

- Leak repair clamps shall meet or exceed the performance specifications of:
- ASTM Standards A536 ductile iron.
- Low alloy steel per AWWA C111.
- ASTM Standards D2000 gasket seals.

**Material:**

- **Bell and Spigot Rings:**
  - Ductile iron per ASTM Standards A536.
- **Bolts, Nuts & Washers:**
  - Low alloy steel.
- **Gasket:**
  - EPDM (ethylene propylene).
  - SBR (styrene butadiene)
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM)
- **Coating:**
  - Ductile iron = shop coat.

**Design:**

- For leak repairs in bell joints on cast iron, ductile iron and C-900 PVC pipe.

**Restrictions:**

- For repairs to existing, in-service pipelines only.

**Manufacturer:**

- DRESSER 160 SERIES
- FORD FBC SERIES
- JCM 142 SERIES
- MUELLER PIPE JOINT REPAIR CLAMP
- POWER SEAL 3232 SERIES
- ROMAC STYLE 516



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## Material Specifications

### H 8 – REPAIR COUPLING/ RESTRAINED/ DI, CI, PVC, & HDPE, (4" THRU 12"):

**Specification:**

- Restraining repair sleeves or couplings shall meet or exceed the performance specifications of:
- Shall connect and restrain two plain end pipes of the same or dissimilar materials.
- Shall provide axial restraint by use of multiple gripping wedges incorporated into the follower glands coupled together with threaded rods.
- ASTM Standards A536 ductile iron.
- Low alloy steel per AWWA C111 (ANSI - A21.11) or latest revision thereof.
- ASTM Standards D2000 gasket seals.
- 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:**

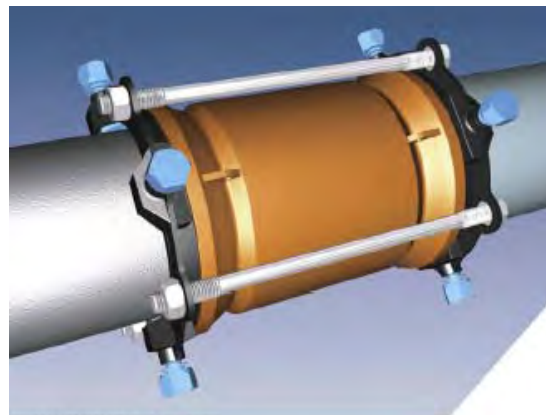
- **End Ring & Sleeve Body:**
  - Ductile iron per ASTM Standards A536, minimum 65-45-12.
- **Bolts, Nuts & Rods:**
  - Low alloy steel per ANSI/ AWWA C111/ A21.11.
- **Gasket:**
  - EPDM (ethylene propylene).
  - SBR (styrene butadiene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM).
- **Coating:**
  - Coupling Body = fusion bonded epoxy.

**Application:**

- For leak repairs to join two plain end pipes of the same or dissimilar material.
- For use on cast iron, ductile iron, HDPE, and C-900 PVC pipe.

**Restrictions:**

- For repairs to existing, in-service pipelines only.
- Insert stiffener is required on HDPE pipe.



MEGA-COUPLING (3806) on 6 inch pipe.

**Manufacturer:**

- EBBA IRON – 3800 SERIES



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## Material Specifications

### H 8.3 – REPAIR COUPLING/ NON-RESTRAINED/ TRANSITION (2" THRU 12"):

#### Specification:

- Non-restraining transmission repair sleeves or couplings shall meet or exceed the performance specifications of:
- Shall connect two plain end pipes of dissimilar or similar diameters.
- Shall join pipes with diameter differences as listed in "Minimum Required Coupling Size Range" in a single coupling kit.
- Shall have a two layer gasket, with a removable layer to allow for pipe diameter range expansion **OR** have separate gaskets included in a boxed kit to cover the required size range.
- NSF-61 for gaskets and coatings.
- Shall be pressure rated for a minimum working pressure of 150psi.
- 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:

- **End Ring & Sleeve Body:**
  - Carbon Steel.
  - Ductile Iron.
- **Bolts, Nuts:**
  - 304 stainless steel with no-gall coating.
- **Gasket:**
  - EPDM (ethylene propylene).
  - SBR (styrene butadiene).
  - Nitrile Buna-N (Acrylonitrile butadiene (NBR) ).
  - Viton; Fluorel (FKM).
- **Coating:**
  - Coupling Body & end rings = NSF-61 fusion bonded epoxy.

#### Application:

- For leak repairs to join two plain end pipes of dissimilar or similar diameters.
- For use on cast iron, ductile iron, AC, and PVC pipe.

#### Restrictions:

- For repairs to existing, in-service pipelines only.
- Shall not be used where joint restraint is required.

#### Minimum Required Coupling Size Range:

- 2"- (2.375" to 2.50")-(IPS thru CIP)
- 3"- (3.50" to 4.13")-(IPS thru AC 200)
- 4"- (4.50" to 5.35")-(IPS thru AC 200)
- 6"- (6.625" to 7.56")-(IPS thru AC 200)
- 8"- (8.625" to 9.74")- (IPS thru AC 200)
- 10"- (10.75" to 11.95")-(IPS thru AC 150)
- 12"- (12.75" to 13.20")-(IPS thru DIP)
- 12"- (13.20" to 14.38")-(DIP thru AC 350)



#### Approved manufacturer products as modified to meet the above specification:

- CASCADE WATERWORK MFG.- OMEGA CRCR
- TOTAL PIPING SOLUTIONS, INC.- HYMAX 2000 SERIES
- OPEN



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## Material Specifications

# SECTION I: CASTINGS & ACCESS COVERS



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## Material Specifications

### Section I: Service Boxes and Castings—Contents

- [I 1     Valve Boxes/ Round Head](#)
- [I 2     Valve Box/ Fixed Risers/ Round Head](#)
- [I 3     Valve Box/ Locking Lid/ Round Head](#)
- [I 4     Valve Boxes/ Square Head](#)
- [I 5     Valve Box/ Fixed Risers/ Square Head](#)
- [I 6     Meter Box/ Iron](#)
- [I 7     Manhole Casting/ Service Clean-out Ring & Cover](#)
- [I 8     Manhole Casting/ Standard Ring and Cover/ 22.375 Clear Opening](#)
- [I 9     Manhole Casting/ Double Ring and Cover/ 35" Clear Opening](#)
- [I 9.1   Manhole Casting/ Double Ring and Cover/ 48" Clear Opening](#)
- [I 10    Manhole Casting/ Hinged Type](#)
- [I 11    Manhole Adjustment Rings](#)
- [I 12    Access Covers/ Aluminum](#)
- [I 12.1   Access Covers/ AASHTO HS-20/ Aluminum](#)



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## Material Specifications

### I 1 – VALVE BOXES/ ROUND HEAD:

#### Specification/ Material:

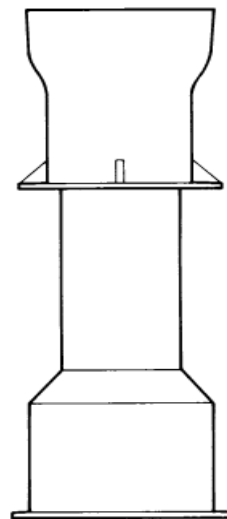
- Valve boxes shall meet or exceed the performance specifications of:
- Valve boxes shall be slip or sliding type.
- Lid shall be marked "WATER" or "SEWER" (to match service type application).
- Produced for gray cast iron.
- ASTM Standards A48, Class 30– 35.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Shall have a paint or seal-coated finish.
- The lid shall fit flush in the top of the box without forcing and shall not rock.
- Shall have a non-tip lid with a minimum skirt of one and one-half (1-1/2"), for a total lid height of three and one-half (3-1/2") inches.
- Shall have a five and one quarter (5 1/4") inch shaft.

#### Requirements:

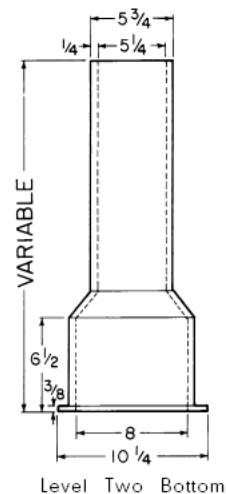
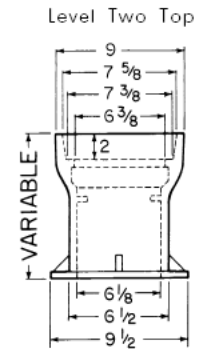
- All castings shall be poured at a foundry located in the U.S.A. or have ISO 9001 or later certification.
- All castings shall be true and free of holes.
- All castings shall have manufactures cast mark and part number clearly visible on each component of the three piece valve box.
- Fixed riser extensions shall be available for the box top section to be considered for approval.
- Riser sections shall be continuously compatible to achieve any desired height in one (1") and two (2") inch increments plus or minus a half (1/2") inch.
- Locking covers shall be available.

#### Minimum Weight Requirements:

- Shall **NOT** be less than 95% of minimum weight.
- Cover- 13 lbs.
- 10" Top section- 22 lbs.
- 16" Top section- 29 lbs.
- 15" Bottom section- 20 lbs.
- 24" Bottom section- 30 lbs.



Box Assembled



#### Approved manufacturer product as modified to meet the above specification:

- BINGHAM & TAYLOR FOUNDRY- 54-S, 55-S, 61-S
- SIGMA CORPORATION- VB-4611X, VB-4621X, VB-4612X, VB-4622
- TYLER PIPE/ UNION FOUNDRY CO.– 6855-SERIES 10T, 16T, 15B



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## Material Specifications

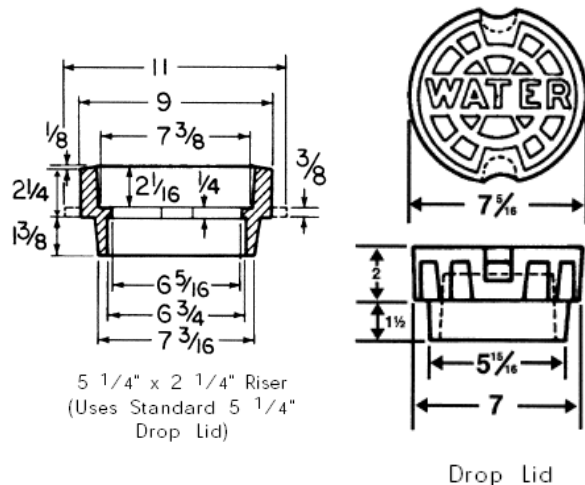
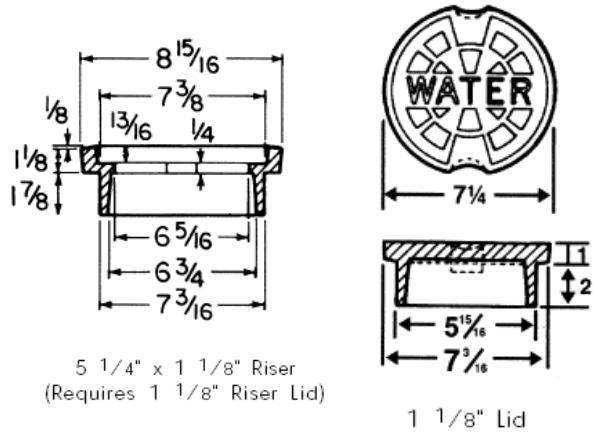
### I 2 – VALVE BOX/ FIXED RISERS/ ROUND HEAD:

#### Specification/ Material:

- Valve box fixed risers shall meet or exceed the performance specifications of:
- Lid shall be marked "WATER" or "SEWER" (designated at time of order).
- Produced for gray cast iron.
- ASTM Standards A48, Class 30– 35.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- The lid shall fit flush in the top of the box without forcing and shall not rock.
- Riser sections shall be continuously compatible to achieve any desired height in one (1") and two (2") inch increments plus or minus a half (1/2").
- All castings shall be true and free of holes.
- All castings shall have manufactures cast mark and part number clearly visible on each component.
- Shall have a paint or seal-coated finish.
- Shall fit all standard 5 1/4" shaft round valve boxes.

#### Minimum Weight Requirements:

- Shall **NOT** be less than 95% of minimum weight.
- 1" thru 1-1/2" Riser- 6 lbs.
- 2" thru 2-1/2" Riser- 9 lbs.



#### Approved manufacturer product as modified to meet the above specification:

- BINGHAM & TAYLOR FOUNDRY
- SIGMA CORPORATION- VB-2601, VB-2602.
- TRUMBULL
- TYLER PIPE/ UNION FOUNDRY CO.
- STAR PRODUCTS



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## Material Specifications

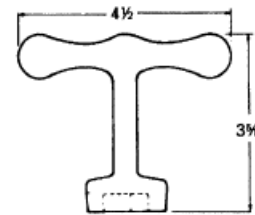
### I 3 – VALVE BOX/ LOCKING LID/ ROUND HEAD:

#### Specification/ Material:

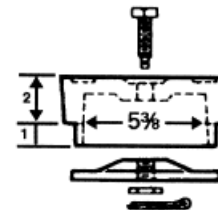
- Locking Valve box lids shall meet or exceed the performance specifications of:
- Lid shall be marked “WATER” or “SEWER” (designated at time of order).
- Produced for gray cast iron.
- ASTM Standards A48, Class 30– 35.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- The lid shall fit flush in the top of the box without forcing and shall not rock.
- All castings shall be true and free of holes.
- Bolt shall have a standard waterworks pentagon head 27/32” and made of brass.

#### Requirements:

- All castings shall be poured at a foundry located in the U.S.A.



Wrench



Lock Lid

#### Manufacturer:

- BINGHAM & TAYLOR FOUNDRY
- TYLER PIPE/ UNION FOUNDRY CO.



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## Material Specifications

### I 4 – VALVE BOXES/ SQUARE HEAD:

#### **Specification/ Material:**

- Valve boxes shall meet or exceed the performance specifications of:
- Valve boxes shall be slip or sliding type.
- Lid shall be marked "RECLAIMED WATER".
- Produced for gray cast iron.
- ASTM Standards A48, Class 30– 35.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Shall have paint or seal-coated finish.
- The lid shall fit flush in the top of the box without forcing and shall not rock.
- Shall have a five and one quarter (5 1/4") inch shaft.
- Head shall be seven and one quarter (7.25") inches square.
- All castings shall have manufactures cast mark and part number clearly visible on each component of the three piece valve box.

#### **Requirements:**

- All castings shall be poured at a foundry located in the U.S.A. or have ISO 9001 or later certification.
- All castings shall be true and free of holes.
- Fixed riser extensions shall be available for the box top section to be considered for approval.
- Riser sections in one (1") inch increments plus or minus a half (1/2") can be achieved by replacing the cover and are not required to be continuously compatible.
- Riser sections shall be continuously compatible to achieve any desired height in two (2") inch increments plus or minus a half (1/2") inch.

#### **Minimum Weight Requirements:**

- Shall **NOT** be less than 95% of minimum weight.
- Cover– 11 lbs.
- 10" Top section– 28 lbs.
- 15" Bottom section– 20 lbs.



#### **Approved manufacturer product as modified to meet the above specification:**

- BINGHAM & TAYLOR FOUNDRY- PC RECLAIM
- SIGMA CORPORATION- VB-2604SQ W/ VB-4612X



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## Material Specifications

### I 5 – VALVE BOX/ FIXED RISERS/ SQUARE HEAD:

#### Specification/ Material:

- Valve box fixed risers shall meet or exceed the performance specifications of:
- Lid shall be marked "RECLAIM" or "RECLAIMED WATER".
- Produced for gray cast iron.
- ASTM Standards A48, Class 30– 35.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- The lid shall fit flush in the top of the box without forcing and shall not rock.
- Riser sections in one (1") inch increments plus or minus a half (1/2") can be achieved by replacing the cover and are not required to be continuously compatible.
- Riser sections shall be continuously compatible to achieve any desired height in two (2") inch increments plus or minus a half (1/2").
- All castings shall be true and free of holes.

#### Requirements:

- All castings shall be poured at a foundry located in the U.S.A. or have ISO 9001 or later certification.
- All castings shall have manufactures cast mark and part number clearly visible on each component of the valve box riser and cover.

#### Minimum Weight Requirements:

- Shall **NOT** be less than 95% of minimum weight.
- Standard cover- 11 lbs.
- 1-1/4" thru 1-1/2" Riser- 9 lbs.
- 2" thru 2-1/4" Riser- 12 lbs.



#### Approved manufacturer product as modified to meet the above specification:

- BINGHAM & TAYLOR FOUNDRY- 6016-SQ 1.25 W/ SPECIAL LID, 6016-SQ 2.25.
- SIGMA CORPORATION- VB-2604SQ15, VB-2604SQ20.



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## Material Specifications

### I 6 – METER BOX/ CAST IRON:

**Specification/ Material:**

- Iron meter boxes shall meet or exceed the performance specifications of:
- Boxes and lids shall be gray cast iron or ductile iron.
- ASTM Standards A48 Class 30B– 35B.
- Boxes and lids supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Box and lid shall be coated with a asphalt based black paint.
- Affidavit of compliance to this specification shall be available upon request.

**Dimensions:**

- Shall be 19" to 20" (length) X 10" to 16" (wide).
- Shall have 2.25" to 4" (wide) X 4.75" to 6" (high) mouse hole centered on each end.
- Overall height of box shall be 10" to 13" (deep).

**Include:**

- Boxes shall be palletized and banded.

**Manufacturer:**

- Crescent Foundry Company
- Russell Pipe & Foundry
- SIGMA CORPERATION
- U.S. Foundry and Manufacturing Corp.
- Open



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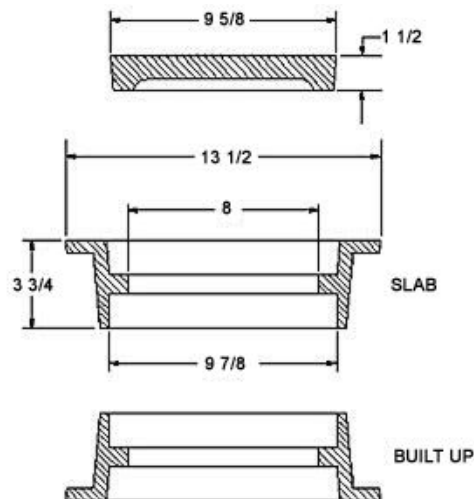
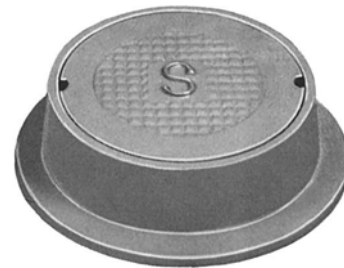
### I 7 – MANHOLE CASTINGS/ SERVICE CLEAN-OUT RING & COVER:

**Specification/ Material:**

- Manhole castings, service clean-out, ring and cover, shall meet or exceed the performance specifications of:
- Ring and covers shall be gray cast iron or ductile iron.
- ASTM Standards A48 Class 30B (gray cast iron).
- ASTM Standards A536 Grade 65-45-12 (ductile).
- Ring and covers supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Bearing surfaces shall be machined to ensure a proper fit and prevent rattling and fit flush without forcing.
- All castings shall be true and free of holes.
- Affidavit of compliance to this specification shall be available upon request.
- Cover shall be labeled with “S” for sanitary sewer.
- Clean-out boxes shall be equal to the standard shown on included drawing.

**Include:**

- Ring and covers shall be palletized and banded.



**Manufacturer:**

- RUSSELL PIPE & FOUNDRY– 7621 RING & COVER
- SIGMA CORPERATION– VB762
- U.S. FOUNDRY & MFG. CORP.- USF “7621” RING & “FE” COVER.
- STAR PRODUCTS



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## Material Specifications

### 18 – MANHOLE CASTINGS/ STANDARD RING & COVER/ 22.375" CLEAR OPENING:

#### Specification/ Material:

- Manhole castings, standard ring and cover, shall meet or exceed the performance specifications of:
- Ring and covers shall be gray cast iron or ductile iron.
- ASTM Standards A48 Class 30B (gray cast iron).
- ASTM Standards A536 Grade 65-45-12 (ductile).
- Ring and covers supplied shall be poured in a foundry located in the U.S.A.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Bearing surfaces shall be machined to ensure a proper fit and prevent rattling and fit flush without forcing.
- All castings shall be true and free of holes.
- Affidavit of compliance to this specification shall be available upon request.
- Cover shall be labeled with:
  - **City of New Port Richey**
  - TYPE OF SERVICE:
    - **SANITARY SEWER**
    - **POTABLE WATER**
    - **RECLAIMED WATER**
  - **YEAR MADE**

#### Requirements:

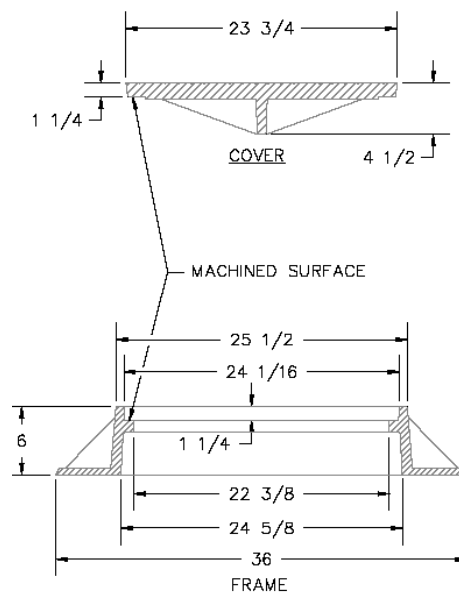
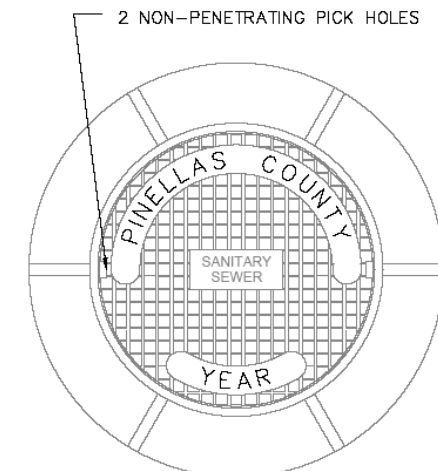
- **All castings shall be poured at a foundry located in the U.S.A.**

#### Dimensions:

- Overall width of ring shall be thirty-six (36") inches.
- Inside clear opening of ring shall be twenty-two point three-seven-five (22.375") inches.
- Overall height of ring shall be six (6") inches.
- Lid diameter shall be twenty-three point seven-five (23.75").

#### Include:

- Ring and covers shall be palletized and banded.



#### Manufacturer:

- U.S. FOUNDRY & MFG. CORP.- USF "195" RING & "W" COVER PER SPEC.



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## Material Specifications

### 19 – MANHOLE CASTINGS/ DOUBLE RING & COVER/ 35" CLEAR OPENING:

#### Specification/ Material:

- Manhole castings, double ring and cover, shall meet or exceed the performance specifications of:
- Ring and covers shall be gray cast iron or ductile iron.
- ASTM Standards A48 Class 30B (gray cast iron).
- ASTM Standards A536 Grade 65-45-12 (ductile).
- Ring and covers supplied shall be poured in a foundry located in the U.S.A.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Bearing surfaces shall be machined to ensure a proper fit and prevent rattling and fit flush without forcing.
- All castings shall be true and free of holes.
- Affidavit of compliance to this specification shall be available upon request.
- Cover shall be labeled with:
  - **City of New Port Richey**
  - TYPE OF SERVICE:
    - **SANITARY SEWER**
    - **POTABLE WATER**
    - **RECLAIMED WATER**
  - **YEAR MADE**

#### Requirements:

- **All castings shall be poured at a foundry located in the U.S.A.**

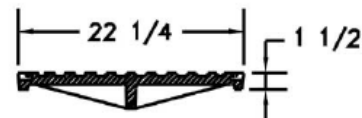
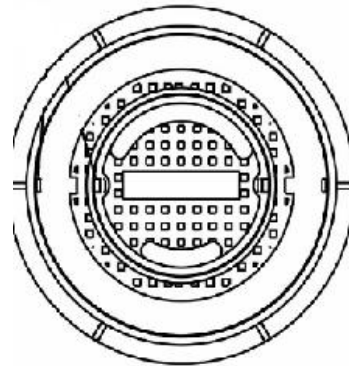
#### Dimensions:

- Overall width of ring shall be forty-four (44") inches.
- Cover clear opening shall be thirty- five (35") inches.
- Access cover clear opening shall be twenty point five (20.5") inches.
- Overall height of ring shall be four (4") inches.

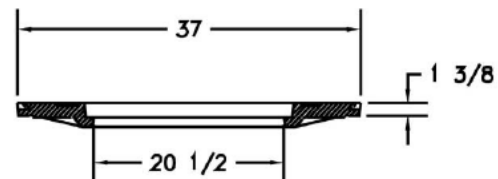
#### Include:

- Ring and covers shall be palletized and banded.

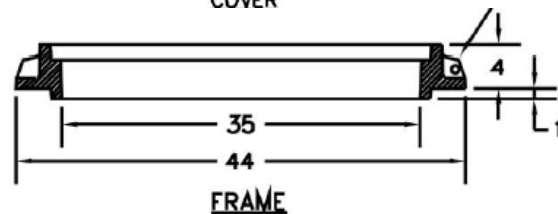
#### Centered Access Lid



**ACCESS COVER**



**COVER**



**FRAME**

#### Manufacturer:

- U.S. FOUNDRY & MFG. CORP.- USF "671" RING & "AF/M" COVER PER SPEC.



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## Material Specifications

### I 9.1– MANHOLE CASTINGS/ DOUBLE RING & COVER/ 48" CLEAR OPENING:

#### Specification/ Material:

- Manhole castings, double ring and cover, shall meet or exceed the performance specifications of:
- Ring and covers shall be gray cast iron or ductile iron.
- ASTM Standards A48 Class 30B (gray cast iron).
- ASTM Standards A536 Grade 65-45-12 (ductile).
- Ring and covers supplied shall be poured in a foundry located in the U.S.A.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Bearing surfaces shall be machined to ensure a proper fit and prevent rattling and fit flush without forcing.
- All castings shall be true and free of holes.
- Affidavit of compliance to this specification shall be available upon request.
- Cover shall be labeled with:
  - **City of New Port Richey**
  - TYPE OF SERVICE:
    - **SANITARY SEWER**
    - **POTABLE WATER**
    - **RECLAIMED WATER**
  - **YEAR MADE**

#### Requirements:

- **All castings shall be poured at a foundry located in the U.S.A.**

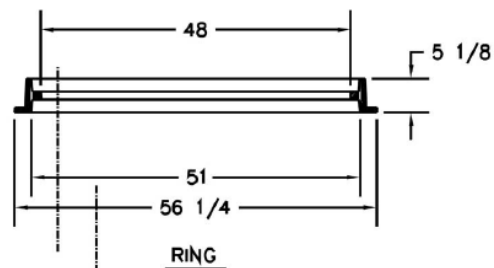
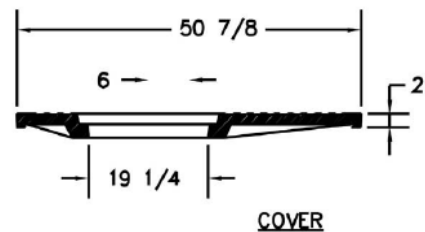
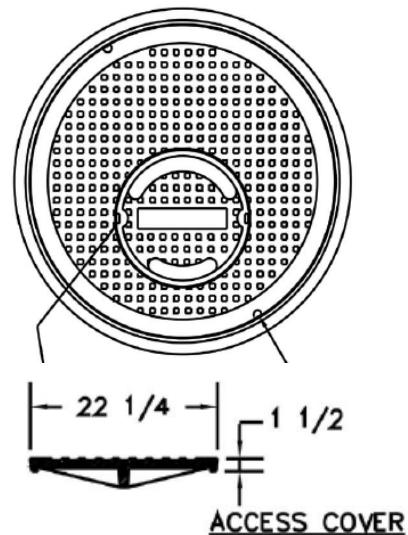
#### Dimensions:

- Overall width of ring shall be fifty-six point twenty-five (56.25") inches.
- Cover clear opening shall be forty-eight (48") inches.
- Access cover clear opening shall be nineteen point twenty-five (19.25") inches.
- Overall height of ring shall be five point one-two-five (5.125") inches.

#### Include:

- Ring and covers shall be palletized and banded.

#### Offset Access Lid



#### Manufacturer:

- U.S. FOUNDRY & MFG. CORP.- USF "691" RING & "AH/M" COVER PER SPEC.



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## Material Specifications

### I 10 – MANHOLE CASTINGS/ HINGED TYPE RING & COVER:

#### Specification/ Material:

- Hinged type manhole castings, ring and cover, shall meet or exceed the performance specifications of:
- Ring and covers shall be ductile iron.
- ASTM Standards A 536 65-45-12 ductile iron or
- ISO 1083 Standards ductile iron.
- Ring and covers supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Bearing surfaces shall be machined to ensure a proper fit and prevent rattling
- Sealing surface shall include an oil resistant gasket.
- All castings shall be true and free of holes.
- Affidavit of compliance to this specification shall be available upon request.
- Cover shall be labeled with:
  - TYPE OF SERVICE:
    - **SANITARY SEWER**
    - **POTABLE WATER**
    - **RECLAIMED WATER**
  - **YEAR MADE**
- Should include county logo.
- Should include label: "**City of New Port Richey**"

#### Dimensions:

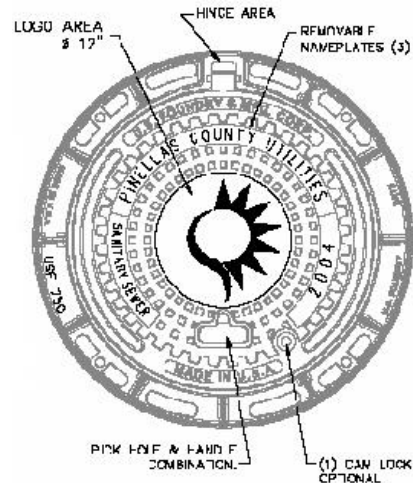
- Overall width of ring shall be thirty-three point five (33.5") inches.
- Inside clear opening of ring shall be 24".
- Overall height of ring shall be 4".

#### Include:

- Ring and covers shall be palletized and banded.

#### Optional:

- Cam lock



#### Manufacturer:

- U.S. FOUNDRY & MFG. CORP.- USF "750" RING & "KI" COVER PER SPEC.
- PAMREX
- OPEN



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## Material Specifications

### I 11 – MANHOLE ADJUSTING RINGS:

#### Specification/ Material:

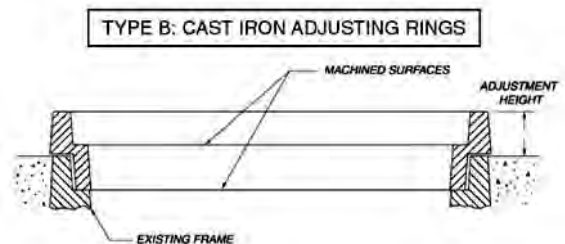
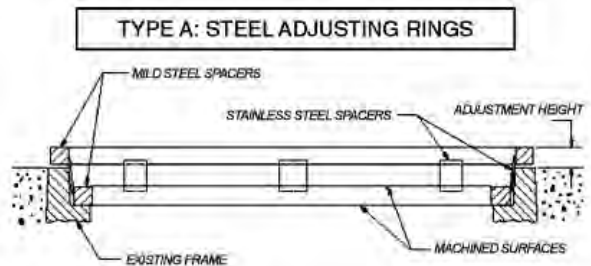
- Manhole adjustment rings, shall meet or exceed the performance specifications of:
- Shall be of one-piece construction.
- Adjusting rings shall be steel, stainless steel, gray cast iron or ductile iron.
- Riser spacers or bands on Type A or II shall be stainless steel or 12 ga. galvanized steel.
- Steel risers shall be manufactured with a oil based primer paint finish.
- ASTM Standards A48 Class 30B (gray cast iron).
- ASTM Standards A536 Grade 65-45-12 (ductile).
- ASTM Standards A36 (carbon structural steel).
- Adjusting rings supplied must have ISO 9001 or later certification, or poured in a foundry located in the U.S.A.
- Shall be designed, constructed and capable of withstanding a minimum H-20 type loading.
- Shall be cleaned according to good foundry practice, chipped and ground as needed to remove fins and rough places on castings.
- Bearing surfaces shall be machined to ensure a proper fit and prevent rattling and fit flush without forcing.
- All adjusting rings shall be true and free of holes.
- Affidavit of compliance to this specification shall be available upon request.

#### Restrictions:

- For adjustments to existing, in-service manholes only.

#### Requirements:

- Type A or Type II steel adjusting rings shall be used when the adjustment height is less than the thickness of the lid plus one (1") inch.
- Type B cast iron adjusting rings shall be used when the adjustment height is greater than the thickness of the lid plus one (1") inch.



#### Manufacturer:

- R.E.L.L. CORP.- TYPE II
- U.S. FOUNDRY & MFG. CORP.
- OPEN



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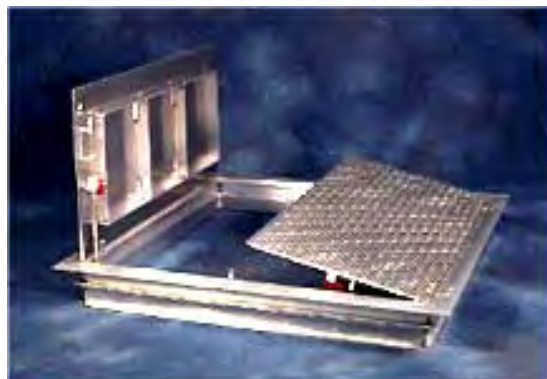
### I 12 – ACCESS COVERS/ ALUMINUM:

#### **Specification/ Material:**

- Aluminum access covers shall meet or exceed the performance specifications of:
- Shall be designed, constructed and capable of withstanding a minimum 300 pound per square foot live load.
- Shall have checkered or diamond pattern finish on cover surface.
- Shall have vandal-proof recessed stainless steel hinges.
- Hasp will be fabricated round bar stock mounted vertically and drilled to accept a padlock.
- A fall prevention system shall be incorporated into the access frame.
- Doors over 50 lbs. in pull-weight shall be torsion bar loaded.
- All covers shall have a locking safety handle to hold them in the open position.
- Shall be cast into top slab of wet well or valve vault.
- Shall be sized to provide a clear opening to allow for service and removal of equipment (including pumps with mix flush valves).
- Access covers supplied must have ISO 9001 or later certification, or manufactured in a factory located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### **Fall Prevention System:**

- Shall be one of two designs; Net or Grate:
- **Net:**
  - Shall be a super strong polyester netting.
  - Hardware components shall be 316 stainless steel.
  - Shall be retractable and removable.
  - Shall comply with OSHA standard 1926.502, Drop test.
- **Grate:**
  - Shall be aluminum with 316 stainless steel components.
  - Shall withstand a 300 pound per square foot load.
  - Shall lock in place and rotate open 90 degrees.
  - Shall be removable.



#### **Approved manufacturer products as modified to meet the above specification:**

- THE BILCO COMPANY
- HALLIDAY PRODUCTS
- U.S.F. FABRICATION INC.
- OPEN



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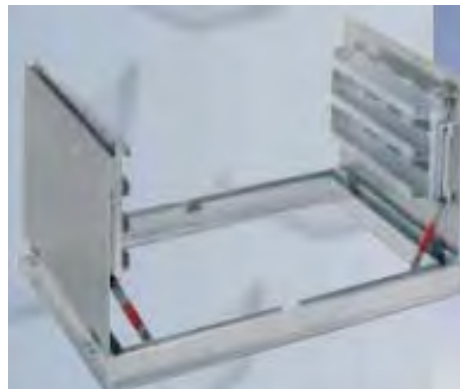
### I 12.1 – ACCESS COVERS/ AASHTO HS-20/ ALUMINUM:

#### **Specification/ Material:**

- Aluminum access covers shall meet or exceed the performance specifications of:
- Shall be designed, constructed and capable of withstanding a minimum AASHTO HS-20 load.
- Shall have checkered or diamond pattern finish on cover surface.
- Shall have vandal-proof recessed stainless steel hinges.
- Hasp will be fabricated round bar stock mounted vertically and drilled to accept a padlock.
- A fall prevention system shall be incorporated into the access frame.
- Doors over 50 lbs. in pull-weight shall be torsion bar loaded.
- All covers shall have a locking safety handle to hold them in the open position.
- Shall be cast into top slab of wet well or valve vault.
- Shall be sized to provide a clear opening to allow for service and removal of equipment (including pumps with mix flush valves).
- Access covers supplied must have ISO 9001 or later certification, or manufactured in a factory located in the U.S.A.
- Affidavit of compliance to this specification shall be available upon request.

#### **Fall Prevention System:**

- Shall be one of two designs; Net or Grate:
- **Net:**
  - Shall be a super strong polyester netting.
  - Hardware components shall be 316 stainless steel.
  - Shall be retractable and removable.
  - Shall comply with OSHA standard 1926.502, Drop test.
- **Grate:**
  - Shall be aluminum with 316 stainless steel components.
  - Shall withstand a 300 pound per square foot load.
  - Shall lock in place and rotate open 90 degrees.
  - Shall be removable.



#### **Approved manufacturer products as modified to meet the above specification:**

- THE BILCO COMPANY
- HALLIDAY PRODUCTS
- U.S.F. FABRICATION INC.
- OPEN



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## Material Specifications

# SECTION J: SERVICE BOXES & ENCLOSURES



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## Material Specifications

### Section J: Service Boxes & Enclosures—Contents

- [J 1     Reclaimed Water Service Box, Un-metered Residential \(1"\)](#)
- [J 2     3/4" Water Meter Box, 11" X 21" \( Green Space Applications\)](#)
- [J 2.1   3/4" Water Meter Box, 11" X 21" \( Parking Area Applications\)](#)
- [J 3     1" Water Meter Box, 13" X 24" \( Green Space Applications\)](#)
- [J 3.1   1" Water Meter Box, 13" X 24" \( Parking Area Applications\)](#)
- [J 4     Backflow & Water Meter Box, 11" X 32" \(Green Space Applications\)](#)
- [J 4.1   Backflow & Water Meter Box, 11" X 32" \(Parking Area Applications\)](#)
- [J 5     Backflow & Water Meter Box, 17" X 30" \(Green Space Applications\)](#)
- [J 5.1   Backflow & Water Meter Box, 17" X 30" \(Parking Area Applications\)](#)
- J 6     Not Used
- [J 7     Potable Water & Reclaim Water Blow-off Box, 17" X 30"](#)
- [J 8     24" X 24" Underground Enclosure](#)
- [J 9     Polyethylene Aboveground Enclosure \(13" X 16" X 32"\)](#)
- [J 9.1   Polyethylene Aboveground Enclosure \(30" X 17" X 20"\)](#)



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## Material Specifications

### J 1 – RECLAIMED WATER SERVICE BOX, NON-METERED RESIDENTIAL (1") :

#### **Specification/ Material:**

- Reclaimed water service box, residential, shall meet or exceed the performance specifications of:
- Boxes and covers shall be tested to meet ASTM Standards C-857 A-8.
- Box and cover shall be made of a Polymer Concrete material.
- All hardware shall be brass or stainless steel.
- A latching device shall be incorporated into the assembly so that a key is required to open cover.
- The entire cover shall be solid and hinged to the box.
- The cover shall be manufactured to open less than 90 degrees.
- The cover and box top shall be purple in color (Pantone 522 C).
- The cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER" along the upper half section of the cover.
- Shall have the international "DO NOT DRINK" symbol embossed on the lower left quadrant of the cover.
- The wording "PCU" shall be embossed along the lower right quadrant of the cover.
- The letter size shall be .75" X .5" minimum and the symbol 3.5" in diameter minimum.
- Boxes to include 1-2.5" X 6" MOUSEHOLE centered each end.
- Box shall have an integral bottom flange at least 1.25" wide per wall to prevent settling.

#### **Dimensions:**

- Shall be a minimum 16" wide X 21" long measured at bottom of inside box.
- Shall have minimum inside dimensions 11" wide X 16" long measured at the cover support.
- Overall height of box shall be 12" deep.

#### **Include:**

- An opening key shall be supplied with each box.
- Boxes shall be palletized and shrink-wrapped.

#### **Application:**

- For one-inch and one and one half-inch RCW residential services.



#### **Approved manufacturer products as modified to meet the above specifications:**

- CDR SYSTEMS CORPORATION
- NEW BASIS



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## Material Specifications

### J 2 – 3/4" WATER METER BOX, 11" x 21" ( GREEN SPACE APPLICATIONS):

#### Specification/ Material:

- 3/4" water meter box 11" X 21", green space applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-8.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall have a hinged 6" X 9" cast iron meter reading access lid centered and shall be cast with wording "WATER METER".
- The cover shall have a lifting slot.
- Boxes to include 1-2.5" X 4" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### Dimensions:

- The cover shall be 2" thick.
- Shall have minimum outside dimensions as follows: 14" wide X 24" long measured at top collar & 12" wide X 22" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### Applications & Application Requirements:

- Acceptable in green space applications only.
- 3/4" metered services.
- 3/4" leak meter.

#### Potable Water:

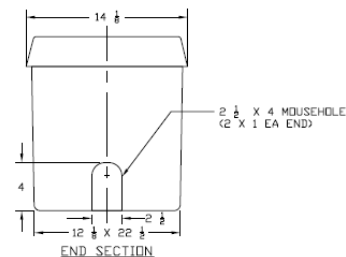
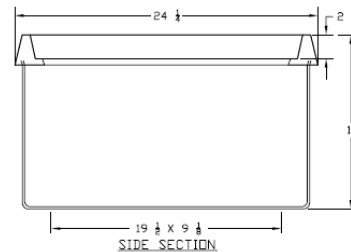
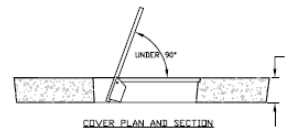
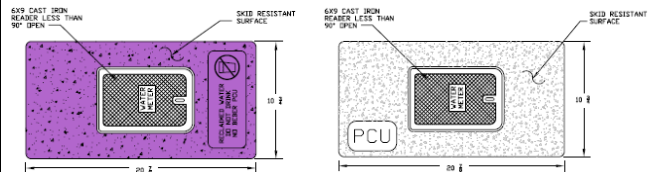
- Cover shall be natural concrete in color.

#### Reclaimed Water:

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".
- Shall have the international "DO NOT DRINK" symbol embossed on the cover.
- The letter size shall be .75" X .5" minimum and the symbol 4" in diameter minimum.

#### Include:

- Boxes shall be palletized and shrink-wrapped.



#### Approved manufacturer products as modified to meet the above specifications:

- ARMORCAST PRODUCT COMPANY
- CDR SYSTEMS CORPORATION
- NEW BASIS



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## Material Specifications

### J 2.1 – 3/4" WATER METER BOX, 11" x 21" ( PARKING AREA APPLICATIONS):

#### Specification/ Material:

- 3/4" water meter box 11" X 21", parking area applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-16 and have labeling to indicate this load rating.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall be a solid design.
- The cover shall have a lifting slot.
- Boxes to include 1-2.5" X 4" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU", "WATER METER" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### Dimensions:

- The cover shall be a minimum 2" thick.
- Shall have minimum outside dimensions as follows: 14" wide X 24" long measured at top collar & 12" wide X 22" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### Applications & Application Requirements:

- Required in parking lot applications and acceptable in green space applications.
- 3/4" metered services.
- 3/4" leak meter.

#### Potable Water:

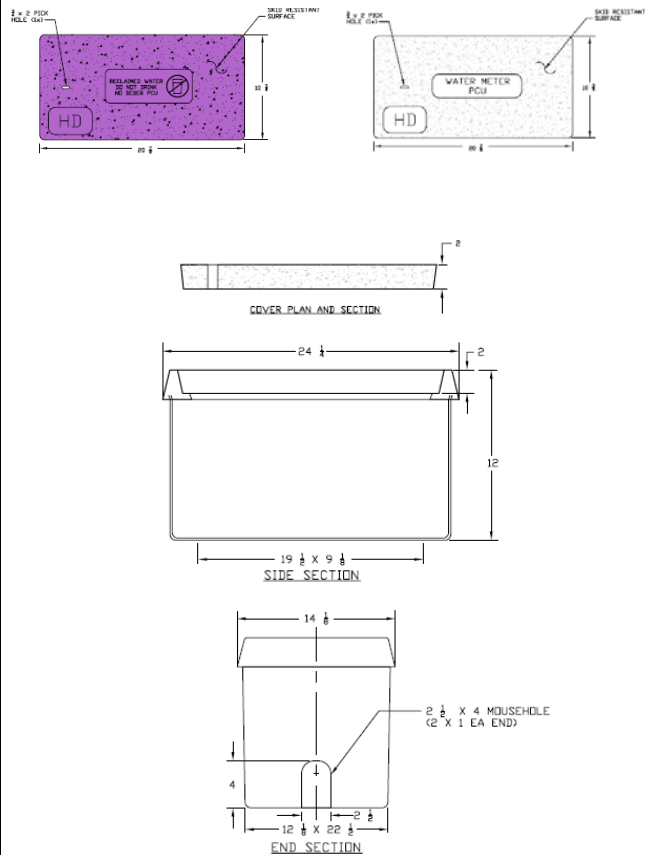
- Cover shall be natural concrete in color.

#### Reclaimed Water:

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".
- Shall have the international "DO NOT DRINK" symbol embossed on the cover.
- The letter size shall be .75" X .5" minimum and the symbol 4" in diameter minimum.

#### Include:

- Boxes shall be palletized and shrink-wrapped.



#### Approved manufacturer products as modified to meet the above specifications:

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- CDR SYSTEMS CORPORATION
- NEW BASIS



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## Material Specifications

### J 3 – 1" WATER METER BOX, 13" x 24" ( GREEN SPACE APPLICATIONS):

#### Specification/ Material:

- 1" water meter box 13" X 24", green space applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-8.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall have a hinged 6" X 9" cast iron meter reading access lid centered and shall be cast with wording "WATER METER".
- The cover shall have a lifting slot.
- Boxes to include 1-2.5" X 4" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU", "WATER METER" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### Dimensions:

- The cover shall be 2" thick.
- Shall have minimum outside dimensions as follows: 16" wide X 25" long measured at top collar & 13" wide X 22" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### Applications & Application Requirements:

- Acceptable in green space applications only.
- 1" metered services.

#### Potable Water:

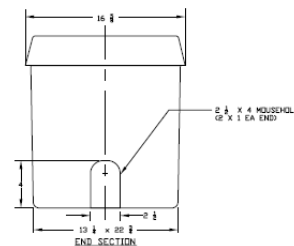
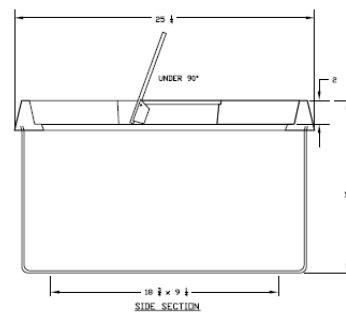
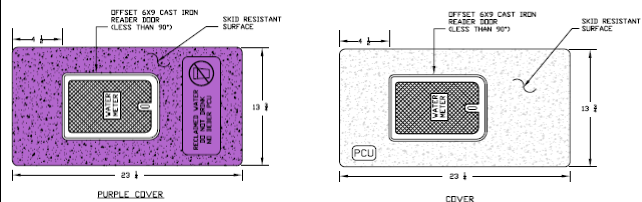
- Cover shall be natural concrete in color.

#### Reclaimed Water:

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".
- Shall have the international "DO NOT DRINK" symbol embossed on the cover.
- The letter size shall be .75" X .5" minimum and the symbol 4" in diameter minimum.

#### Include:

- Boxes shall be palletized and shrink-wrapped.



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## Material Specifications

### J 3.1 – 1" WATER METER BOX, 13" x 24" ( PARKING AREA APPLICATIONS):

#### **Specification/ Material:**

- 1" water meter box 13" X 24", parking area applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-16 and have labeling to indicate this load rating.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall have a lifting slot.
- Boxes to include 1-2.5" X 4" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU", "WATER METER" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### **Dimensions:**

- The cover shall be a minimum 2" thick.
- Shall have minimum outside dimensions as follows: 16" wide X 25" long measured at top collar & 13" wide X 22" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### **Applications & Application Requirements:**

- Required in parking lot applications and acceptable in green space applications.
- 1" metered services.

#### **Potable Water:**

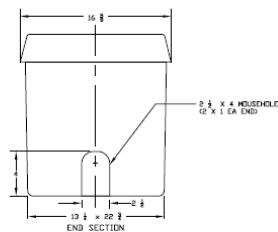
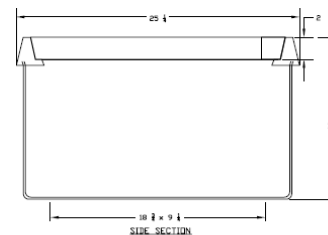
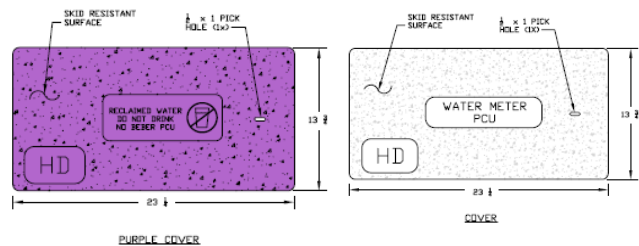
- Cover shall be natural concrete in color.

#### **Reclaimed Water:**

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".
- Shall have the international "DO NOT DRINK" symbol embossed on the cover.
- The letter size shall be .75" X .5" minimum and the symbol 4" in diameter minimum.

#### **Include:**

- Boxes shall be palletized and shrink-wrapped.



#### **Approved manufacturer products as modified to meet the above specifications:**

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## Material Specifications

### J 4 – BACKFLOW & WATER METER BOX, 11" x 32" ( GREEN SPACE APPLICATIONS):

#### Specification/ Material:

- Backflow & water meter box 11" X 32", green space applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-8.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall have a hinged 6" X 9" cast iron meter reading access lid centered and located 4.5" from the end of cover and shall be cast with wording "WATER METER".
- The cover shall have a lifting slot.
- Boxes to include 1-2.5" X 4" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### Dimensions:

- The cover shall have minimum thickness of 1-3/4".
- Shall have minimum outside dimensions as follows: 14" wide X 36" long measured at top collar & 12" wide X 34" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### Applications & Application Requirements:

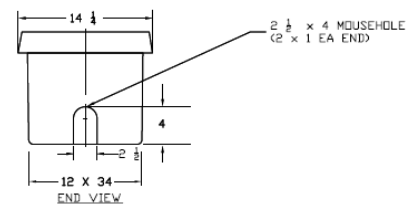
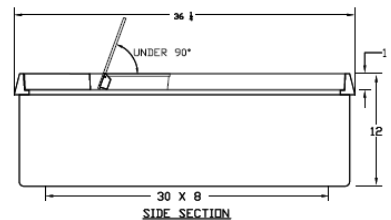
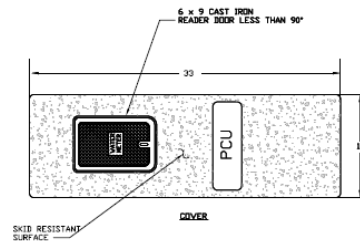
- Acceptable in green space applications only.
- 3/4" leak check meter assembly.
- 3/4" meter & DCV assembly.
- 1" meter & DCV assembly.
- 1-1/2" DCV assembly.
- 2" DCV assembly.

#### Potable Water:

- Cover shall be natural concrete in color.

#### Include:

- Boxes shall be palletized and shrink-wrapped.



#### Approved manufacturer products as modified to meet the above specifications:

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## Material Specifications

### J 4.1 – BACKFLOW & WATER METER BOX, 11" x 32" ( PARKING AREA APPLICATIONS):

#### **Specification/ Material:**

- Backflow & water meter box 11" X 32", parking area applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-16 and have labeling to indicate this load rating.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall be a solid design.
- The cover shall have a lifting slot.
- Boxes to include 1-2.5" X 4" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU", "WATER METER" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.
- Reader door is not required on C-857 A-16 covers.

#### **Dimensions:**

- The cover shall have minimum thickness of 1-3/4".
- Shall have minimum outside dimensions as follows: 14" wide X 36" long measured at top collar & 12" wide X 34" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### **Applications & Application Requirements:**

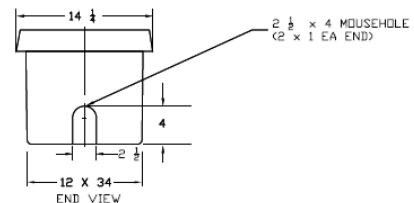
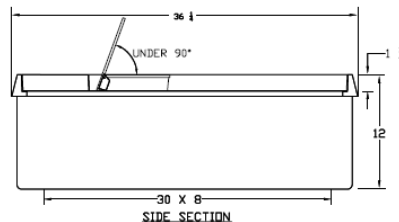
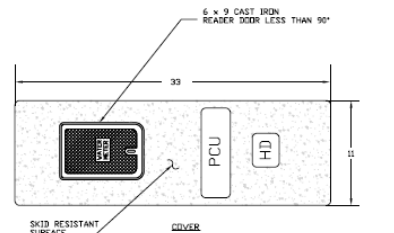
- Required in parking lot applications and acceptable in green space applications.
- 3/4" leak check meter assembly.
- 3/4" meter & DCV assembly.
- 1" meter & DCV assembly.
- 1-1/2" DCV assembly.
- 2" DCV assembly.

#### **Potable Water:**

- Cover shall be natural concrete in color.

#### **Include:**

- Boxes shall be palletized and shrink-wrapped.



#### **Approved manufacturer products as modified to meet the above specifications:**

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## Material Specifications

### J 5 – BACKFLOW & WATER METER BOX, 17” x 30” ( GREEN SPACE APPLICATIONS):

#### Specification/ Material:

- Backflow & water meter box 17” X 30”, green space applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-8.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25”.
- The cover shall have a hinged 6” X 9” cast iron meter reading access lid centered and shall be cast with wording “WATER METER”.
- The cover shall have a lifting slot.
- Boxes to include 1-3” X 6” MOUSEHOLE centered each end.
- All covers shall be embossed “PCU”, WATER METER” and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4” deep.

#### Dimensions:

- The cover shall be 2” thick.
- Shall have minimum outside dimensions as follows: 19” wide X 32” long measured at top collar & 17” wide X 30” long measured at box bottom.
- Overall height of box shall be 12” deep.

#### Applications & Application Requirements:

- Acceptable in green space applications only.
- 3/4” parallel DCV assemblies.
- 1” parallel DCV assemblies.
- 1-1/2” meter.
- 2” meter.

#### Potable Water:

- Cover shall be natural concrete in color.

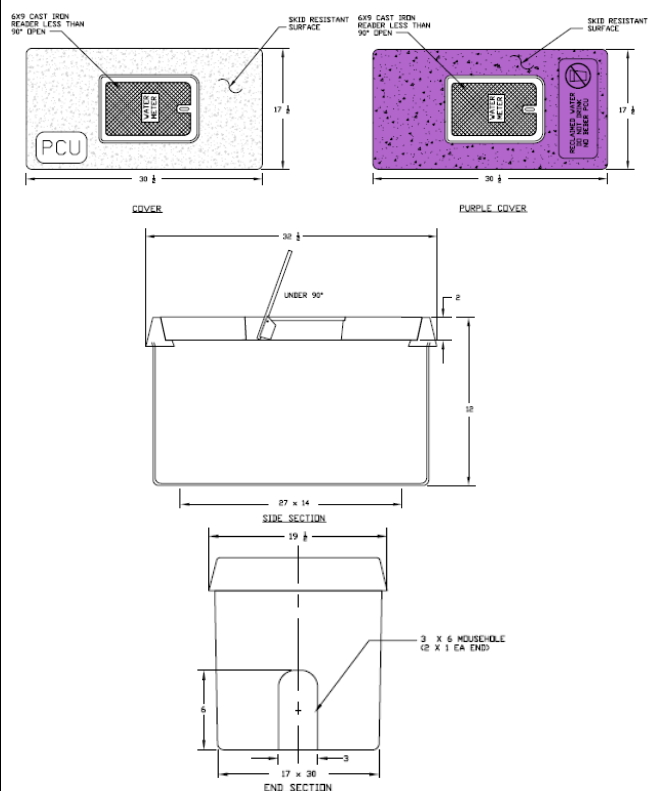
#### Reclaimed Water:

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording “RECLAIMED WATER DO NOT DRINK” in English and Spanish “NO BEBER”.
- Shall have the international “DO NOT DRINK” symbol embossed on the cover.
- The letter size shall be .75” X .5” minimum and the

symbol 4” in diameter minimum.

#### Include:

- Boxes shall be palletized and shrink-wrapped.



#### Approved manufacturer products as modified to meet the above specifications:

- ARMORCAST PRODUCT COMPANY
- CDR SYSTEMS CORPORATION
- NEW BASIS



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## Material Specifications

### **J 5.1 – BACKFLOW & WATER METER BOX, 17" x 30"** **( PARKING AREA APPLICATIONS):**

#### **Specification/ Material:**

- Backflow & water meter box 17" X 30", parking area applications, shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-16 and have labeling to indicate this load rating.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall be a solid design.
- The cover shall have a lifting slot.
- Boxes to include 1-3" X 6" MOUSEHOLE centered each end.
- All covers shall be embossed "PCU", "WATER METER" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### **Dimensions:**

- The cover shall be a minimum 2" thick.
- Shall have minimum outside dimensions as follows: 19" wide X 32" long measured at top collar & 17" wide X 30" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### **Applications & Application Requirements:**

- Required in parking lot applications and acceptable in green space applications.
- 3/4" parallel DCV assemblies.
- 1" parallel DCV assemblies.
- 1-1/2" meter.
- 2" meter.

#### **Potable Water:**

- Cover shall be natural concrete in color.

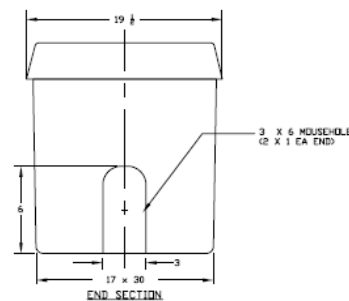
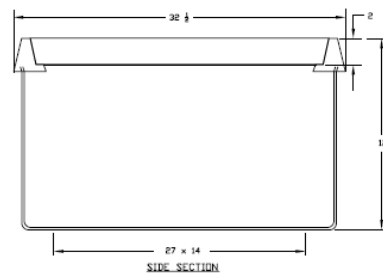
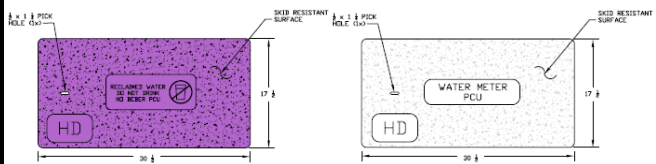
#### **Reclaimed Water:**

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".
- Shall have the international "DO NOT DRINK" symbol embossed on the cover.
- The letter size shall be .75" X .5" minimum and the

symbol 4" in diameter minimum.

#### **Include:**

- Boxes shall be palletized and shrink-wrapped.



#### **Approved manufacturer products as modified to meet the above specifications:**

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## Material Specifications

### J 7 – POTABLE WATER & RECLAIM WATER BLOW-OFF BOX, 17" X 30":

#### Specification/ Material:

- Potable water & Reclaim blow-off box, industrial, shall meet or exceed 17" X 30" shall meet or exceed the performance specifications of:
- Boxes and covers shall be designed and tested to meet ASTM Standards C-857 A-16 and have labeling to indicate this load rating.
- Box and cover shall be made of a Polymer Concrete and fiberglass reinforced polyester material.
- Boxes shall be of straight wall design with integral bottom flange curved inward at least 1.25".
- The cover shall be a solid design.
- The cover shall have a lifting slot.
- Shall NOT include mouse holes.
- All covers shall be embossed "PCU" and patterned with a non-skid surface.
- All embossing shall be a minimum of 1/4" deep.

#### Dimensions:

- The cover shall be a minimum 2" thick.
- Shall have minimum outside dimensions as follows:  
19" wide X 32" long measured at top collar & 17" wide X 30" long measured at box bottom.
- Overall height of box shall be 12" deep.

#### Applications & Application Requirements:

##### Potable Water:

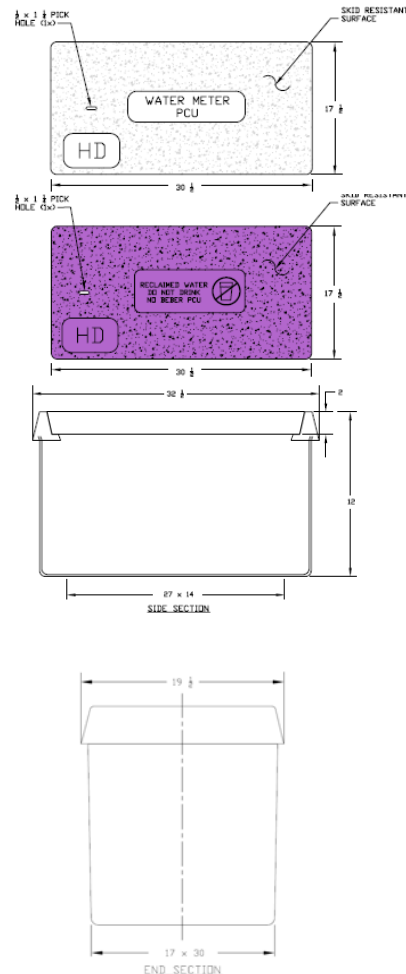
- Cover shall be natural concrete in color.

##### Reclaimed Water:

- Cover shall be purple in color (Pantone 522 C).
- Cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".
- Shall have the international "DO NOT DRINK" symbol embossed on the cover.
- The letter size shall be .75" X .5" minimum and the symbol 4" in diameter minimum.

#### Include:

- Boxes shall be palletized and shrink-wrapped.



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- NEW BASIS



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## Material Specifications

### J 8 – 24" X 24" UNDERGROUND ENCLOSURE :

#### Specification/ Material:

- 24" x 24" underground enclosures, shall meet or exceed the performance specifications of:
- Boxes and covers shall be tested to meet ASTM Standards C-857 A-16.
- Box and cover shall be made of a Polymer Concrete and fiber reinforced polyester material.
- The cover shall have a lifting slot.
- The lid color shall be through the entire depth and patterned with a non-skid surface.
- Box shall have an integral bottom flange, curved inward, at least 1.75" wide to prevent settling.
- The box shall have straight walls.

#### Dimensions:

- The cover shall be 2" thick.
- Shall have minimum inside dimensions **NOT NOMINAL** 24" wide X 24" long measured at the bottom of box.
- Overall height of box shall be 12" deep.

#### Include:

- Boxes shall be palletized and banded.

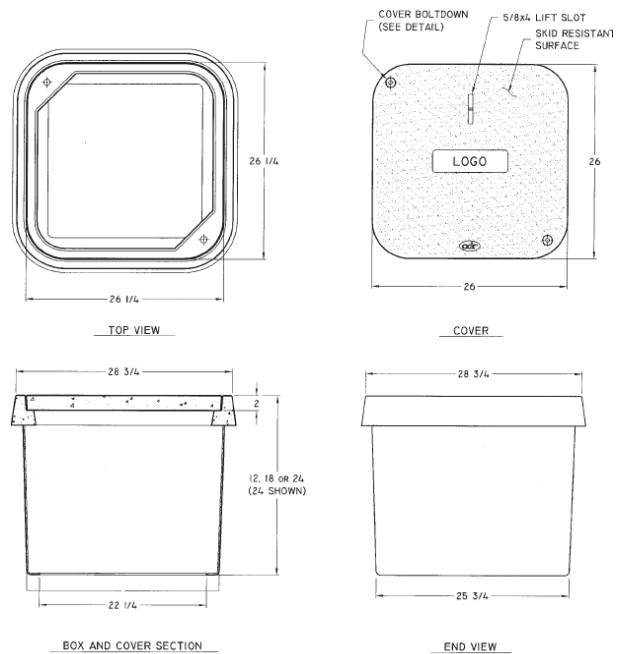
#### Application "Cover" requirements:

##### • Potable & Sanitary application:

- The cover shall be natural concrete in color.
- The cover shall be permanently embossed with the wording "PCU".
- The letter size shall be 1" X .75" minimum.
- All embossing shall be a minimum of .25" deep.

##### • Reclaimed application:

- The cover shall be purple in color (Pantone 522 C).
- The cover shall be permanently embossed with the wording "RECLAIMED WATER DO NOT DRINK" in English and Spanish "NO BEBER".



#### Manufacturer:

- CDR SYSTEMS CORPORATION - \_A04-2424-12.
- OPEN



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## Material Specifications

### J 9 – POLYETHYLENE ABOVEGROUND ENCLOSURE (13" X 16" X 32") :

**Specification/ Material:**

- Polyethylene aboveground enclosures, shall meet or exceed the performance specifications of:
- Shall be molded from a modified linear low-density polyethylene designed to resist impact, ultraviolet degradation, and environmental degradation.
- Shall have a uniform wall thickness of not less than .20 inches.
- Shall have a rectangular design with round corners.
- Shall be a non-louvered design.
- All hardware shall be constructed of aluminum and stainless steel.
- A galvanized stable bar and a slide channel may be included for easy installation and added security.
- Shall be color coded for type of service.

**Dimensions:**

- Above ground: 13" W X 16"D X 32"H.
- Below ground: 13" W X 16"D X 12"H.

**Locking device:**

- Shall be equipped with a hasp locking device.

**Color- Coded:**

- Blue- potable water
- Purple/ Lavender- reclaimed water
- Green- sanitary sewer

**Manufacturer:**

- CORNING CABLE MODEL 107 HO11
- WATER PLUS CORP. MODEL 131632 LH
- OPEN



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## Material Specifications

### J 9.1 – POLYETHYLENE ABOVEGROUND ENCLOSURE (30" X 17" X 20") :

**Specification/ Material:**

- Polyethylene aboveground enclosures, shall meet or exceed the performance specifications of:
- Shall be molded from a modified linear low-density polyethylene designed to resist impact, ultraviolet degradation, and environmental degradation.
- Shall have a uniform wall thickness of not less than .20 inches.
- Shall have a rectangular design with round corners.
- Shall have louvers for ventilation.
- All hardware shall be constructed of aluminum and stainless steel.
- Shall be color coded for type of service.

**Dimensions:**

- Above ground: 30" W X 17"D X 20"H.
- Below ground: 30" W X 17"D X 10"H.

**Locking device:**

- Shall be equipped with a hasp locking device.

**Color- Coded:**

- Blue- potable water
- Purple/ Lavender- reclaimed water
- Green- sanitary sewer

**Manufacturer:**

- CORNING CABLE MODEL 109 HO11
- WATER PLUS CORP. MODEL 171730 LH
- OPEN



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## Material Specifications

# SECTION K: MISCELLANEOUS



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## Material Specifications

### Section K: Miscellaneous—Contents

[K 1 Casing Insulators/ HDPE](#)

[K 2 Casing Insulators/ Stainless Steel](#)

[K 3 Polyethylene Encasement](#)

[K 4 Manhole Inserts/ Stainless Steel](#)

[K 5 Pipe Saddle Support/ Valve Vaults/ Adjustable](#)

[K 6 Cam-Lok Coupling Adapters & Dust Caps](#)

[K 7 Cylindrical Wall Seals & Line Sleeves](#)

[K 8 Metal Detectable Underground Warning Tape](#)

[K 9 Manhole Casting Adjustment Rings/ HDPE](#)

[K 9.1 Manhole Casting Adjustment Rings/ EPS](#)

[K 10 Manhole Internal Chimney Seal](#)

[K 11 Casing Pipe End Seals](#)

[K 12 Sanitary Sewer/ Inside Drop Bowls](#)

[K 13 Flange Insulating Gasket Kits](#)



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## Material Specifications

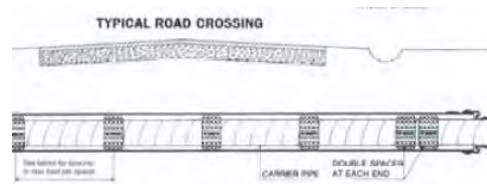
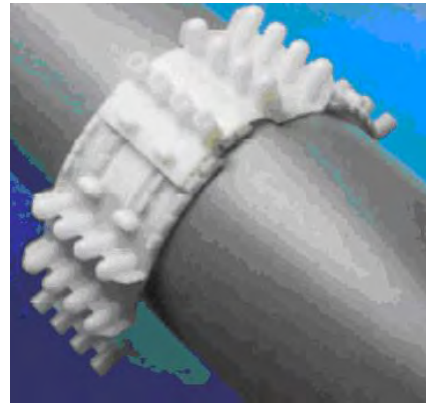
### K 1 – CASING INSULATORS/ HDPE:

#### Specification:

- Casing Insulators shall meet or exceed the performance specifications of:
- Must ensure electrical insulation between the two pipes.
- Shall permanently prevent bells from resting on casing pipe.
- Shall be resistant to corrosion.
- Spacers shall be manufactured out of high density polyethylene.

#### Requirements:

- Calculations are required to determine :
  - Type of segment or element.
  - Size of segment or element.
  - How many spacers are needed.
  - The insulator spacing.
  - That the spacers are not overloaded.
- **Special tools may be required for installation.**



#### Manufacturer:

- CASCADE– PHOENIX SERIES
- PIPELINE SEAL AND INSULATOR- RANGER “II” SERIES
- RACI SPACERS NORTH AMERICA INC.



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## Material Specifications

### K 2 – CASING INSULATORS/ STAINLESS STEEL:

#### Specification:

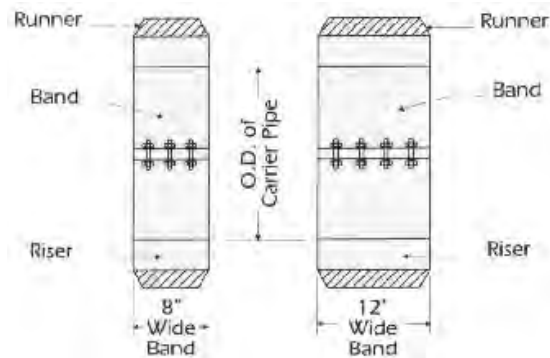
- Casing Insulators shall meet or exceed the performance specifications of:
- Must ensure electrical insulation between the two pipes.
- Shall permanently prevent bells from resting on casing pipe.
- Shall be resistant to corrosion.
- Band widths of eight (8) or twelve (12) inches.

#### Material:

- Panel & Riser:
  - Type 304 (18-8) stainless steel per ASTM Standards A240.
- Liner:
  - Elastomeric PVC per ASTM Standards D149 or extruded EPDM rubber.
- Skids:
  - Glass reinforced nylon or Ultra High Molecular weight (UHMW) polyethylene per ASTM Standards D638.
- Fasteners:
  - Type 304 (18-8) stainless steel per ASTM Standards A193.

#### Requirements:

- Band width requirement determined by weight, pipe and fluid, and spacing.



#### Manufacturer:

- BWM COMPANY- MODEL BWM-SS
- CASCADE WATERWORKS- MODEL CCS
- CCI PIPELINE SYSTEMS- MODEL CSS
- PIPELINE SEAL AND INSULATOR- MODEL S8G-2 & S12G-2
- POWER SEAL- MODEL 4810 PER SPEC.



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## Material Specifications

### K 3 – POLYETHYLENE ENCASEMENT:

**Specification:**

- Polyethylene film shall meet or exceed the performance specifications of:
- ANSI/ AWWA C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems.
- Shall have minimum thickness of 0.008" or 8-mil.
- Shall be linear low-density polyethylene film.
- Shall be supplied in rolled tube form, suitable for installation method "A" as outlined in reference standard.
- The tube shall be sized according to the pipe being protected.
- Film shall be color coded.

**Color-coded:**

- Blue– potable water
- Green– sanitary sewer/ force main
- Purple– reclaimed water

**Tube Size:**

Nominal pipe diameter   Minimum flat tube width

|         |     |
|---------|-----|
| 4"      | 14" |
| 6"      | 16" |
| 8"      | 20" |
| 10"     | 24" |
| 12"     | 27" |
| 14"     | 30" |
| 16"     | 34" |
| 18"     | 37" |
| 20"     | 41" |
| 24"     | 54" |
| 30"     | 67" |
| 36"-42" | 81" |
| 48"     | 95" |

**Marking Requirements:**

- Manufactures name or trademark
- Year of manufacture
- ANSI/ AWWA C105/ A21.5
- Thickness/ type (LLDPE)
- Size
- Warning- Corrosion Protection- Repair Any Damage



**Manufacturer:**

- OPEN



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## Material Specifications

### K 4 – MANHOLE INSERT/ STAINLESS STEEL:

#### **Specification:**

- Manhole inserts shall meet or exceed the performance specifications of:
- Shall reduce or eliminate inflow thru manhole cover.
- Shall have a deep dish design to allow for easy removal and replacement of the manhole cover (i.e., cover rotation).
- Body shall be manufactured of 304 stainless steel with a thickness of not less than 18 gauge.
- Shall have a sealing gasket made of Nitrile Buna-N (Acrylonitrile butadiene (NBR) ), EPDM (Ethylene Propylene Diene Monomer) or closed cell neoprene.
- Shall have a handle made of 1/8" minimum, 304 stainless steel cable. Plastic coating of handle is optional or 1" heavy weight polypropylene.
- The handle shall be attached using two 304 stainless steel round head bolts with flat washers and self-locking bolts or stainless steel pop rivets.

#### **Additional Requirements:**

- **When hydrogen sulfide (H<sub>2</sub>S) gas levels warrant relief; a relief valve shall be provided and meet the following:**
- The gas relief valve shall be designed to release at a pressure of 0.5 to 1.5 psi and have a water leak down rate no greater than 5 gallons per 24 hours.



#### **Manufacturer:**

- SEALING SYSTEMS INC.– STAINLESS STEEL INSERTS
- INFLOW SYSTEMS, INC.– INFLOW SHIELD
- OPEN



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## Material Specifications

### K 5 – PIPE SADDLE SUPPORT/ VALVE VAULTS/ ADJUSTABLE:

**Specification:**

- Adjustable pipe saddle supports shall meet or exceed the performance specifications of:
- Shall be a stanchion type support for vertical adjustment of stationary pipe.
- Shall comply with Federal Specification A-A-1192A (type 38) and the Manufactures Standardization Society (MMS), MSS-SP-69 (type 38).
- Material shall be an assembled cast iron saddle, locknut nipple and special cast iron reducer.
- Shall have a Galvanized finish.
- Shall be capable of vertical adjustments of four & one half (4 1/2") inches.

**Additional Requirements:**

- **For supporting pipe in pump station valve vaults only:**

**Manufacturer:**

- ANVIL INTERNATIONAL, INC.- Model 264
- OPEN



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## Material Specifications

### K 6 – CAM-LOK COUPLING ADAPTERS & DUST CAPS:

#### Specification:

- Cam-lock couplings adapters and dust caps shall meet or exceed the performance specifications of:
- Shall meet military standards/ specifications: MIL-A-59326 (which replaces MIL-C-27487, Coupling Halves– Quick Disconnect).
- All threaded connections shall have National Pipe Threads (NPT).
- All metal parts shall have machined connection and sealing surfaces.

#### Material:

- Part or Style “F”, male X male adapter shall be made of:
  - 316 Stainless Steel.
  - Brass/gun-metal.
- Dust Cap shall be made of:
  - 316 Stainless Steel with brass or stainless steel handles.
  - Polypropylene with brass or stainless steel handles.
  - Ny-Glass with brass or stainless steel handles.
  - PVC with brass or stainless steel handles.
- Gasket:
  - Nitrile Buna-N.
  - EPDM (Ethylene Propylene Diene Monomer).
  - Viton; Fluorel (FKM) (Fluorocarbon).

#### Restrictions for material is this category:

- Aluminum in not allowed.



#### Manufacturer:

- OPEN



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## Material Specifications

### K 7 – CYLINDRICAL WALL SEALS & LINE SLEEVES:

#### Specification:

- Cylindrical wall seals & line sleeves shall meet or exceed the performance specifications of:
- Rubber links shall meet ASTM D2000 M3 BA510.
- Stainless steel shall meet ASTM F593, with a 85,000 psi average tensile strength.
- Hydrostatic seal shall be capable of holding 20 psig (40 feet of head) between the pipe and barrier through which it passes.
- Wall sleeves shall be high impact resistant HDPE or PVC.
- Wall sleeves shall have a integral water stop collar.
- Hole forming disks can be used for holes above 29" in diameter.
- Pressure plates shall be a composite material.
- Components and system shall be manufactured at a plant with a current ISO-9001:2000 registration.

#### Material:

- Bolts and nuts shall be made of:
  - ANSI type 316 Stainless Steel.
  - ANSI type 304 Stainless Steel.
- Pressure plates shall be made of:
  - Reinforced nylon polymer.
- Gasket:
  - Nitrile Buna-N.
  - EPDM (Ethylene Propylene Diene Monomer).
  - Viton; Fluorel (FKM) (Fluorocarbon).

#### Additional information:

- For pipe penetrations through concrete vaults.
- Line sleeves are recommended, but not required. Holes can be cored into concrete barriers.



#### Manufacturer:

- ADVANCE PRODUCTS & SYSTEMS, INC.- MODELS "S-304", "S-316", "OS-304", "OS-316"
- PIPELINE SEAL AND INSULATOR, INC.- LINK-SEAL- MODELS "S-316" & "OS-316"
- OPEN



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## Material Specifications

### K 8 – METAL DETECTABLE UNDERGROUND WARNING TAPE:

#### Specification:

- Metal detectable underground tape shall meet or exceed the performance specifications of:
- Shall have a solid aluminum foil core with permanent printing under a protective layer to maintain the integrity and legibility of the warning sign.
- The aluminum core shall be laminated with a polyethylene layer.
- The inert polyethylene plastic shall be impervious to all known alkalis, acids, chemical reagents, and solvents likely to be encountered in the soil.
- Tape shall have a minimum thickness of 5 mils.
- The warning label shall be in black ink.
- The warning label shall be printed over a background color matching the type service.
- Affidavit of compliance to this specification shall be available upon request.

#### Requirements:

- **Color code:**
  - Blue Potable Water
  - Green Sanitary Sewer
  - Purple Reclaimed Water
- **Width requirements:**
  - Minimum of 2-inches.



#### Manufacturer:

- EMPIRE LEVEL MFG. CORP.
- MERCO TAPE COMPANY- M225
- PRESCO
- TRUMBULL- 364-49XX
- OPEN



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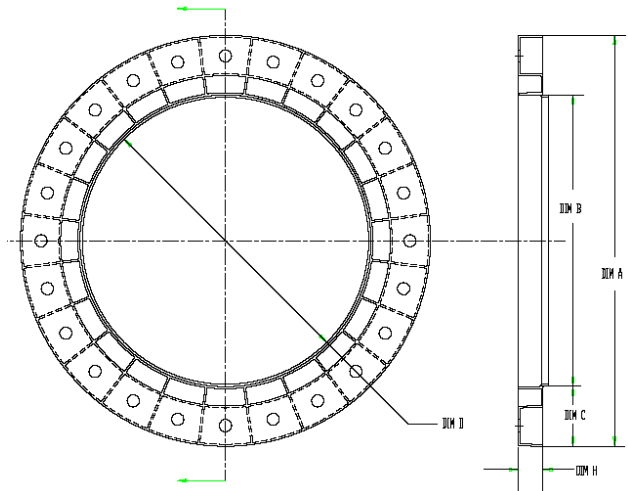
### K 9 – MANHOLE CASTING ADJUSTMENT RINGS/ HDPE :

**Specification:**

- HDPE manhole casting adjustment rings shall meet or exceed the performance specifications of:
- Shall be manufactured from High Density Polyethylene (HDPE) plastic as identified in ASTM D-1248 Standard Specification for Polyethylene Plastic Molding and Extrusion Materials.
- Material properties shall be tested and qualified for usage per the ASTM test methods referenced in the above standard.
- Shall have a minimum dynamic-load rating of ASSHTO HS-20.
- Shall be tested to assure compliance with impact and loading requirements per ASSHTO Standard Specification for Highway Bridges.
- Shall be manufactured from 100% recycled or virgin material.
- Shall be installed with a butyl sealant meeting ASTM C-990 per manufacture's directions.
- Affidavit of compliance to this specification shall be available upon request.

**Restrictions:**

- For adjustment of castings in non traffic applications only.



DIMENSION SCHEDULE

| CONC. SIZE | DIM A | DIM B | DIM C | DIM D | DIM H              |
|------------|-------|-------|-------|-------|--------------------|
| 24         | 23.75 | 33.50 | 5.00  | 23.25 | 125, 150, 200, 400 |
| 27         | 26.75 | 36.50 | 5.00  | 26.25 | 125, 150, 200, 400 |
| 30         | 29.75 | 39.50 | 5.00  | 29.25 | 150, 200, 325      |
| 32         | 31.75 | 41.50 | 5.00  | 31.25 | 200, 300           |
| 34         | 33.75 | 41.50 | 4.00  | 33.25 | 200, 300           |

**Manufacturer:**

- LADTECH INC.
- OPEN



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## Material Specifications

### K 9.1 – MANHOLE CASTING ADJUSTMENT RINGS/ EPS :

#### Specification:

- Expanded Poly-Styrene (EPS) manhole casting adjustment rings shall meet or exceed the performance specifications of:
- Shall be manufactured from High Density Poly-styrene (EPS) and fully encapsulated with Poly-urea.
- Material properties shall be tested and qualified for usage per the ASTM test methods referenced in this specification.
- Shall have a minimum dynamic-load rating of ASSHTO HS-20.
- Shall be tested to assure compliance with impact and loading requirements per ASSHTO Standard Specification for Highway Bridges.
- Shall be installed with Secure & Seal and Veil Safer per manufacture recommendations.
- Adjustment system shall include angle or wedge rings.
- Affidavit of compliance to this specification shall be available upon request.

#### Restrictions:

- For adjustment of castings in non traffic applications only.

#### Material properties of high density molded EPS:

| Property                        | Units                  | ASTM Test | Results              |                      |
|---------------------------------|------------------------|-----------|----------------------|----------------------|
| Density                         | pcf                    |           | 3.0 pcf              | 4.5 pcf              |
| Thermal Conductivity            | BTU/hr                 | C518      | 0.224                | 0.239                |
| 40°F factor at 75°F             | Ft <sup>2</sup> /°F/in |           | 0.235                | 0.242                |
| Compression Resistance          |                        |           |                      |                      |
| 10% deformation                 |                        |           | 50-70                | 70-90                |
| 5% deformation                  | psi                    | D1621     | 45-60                | 60-80                |
| 2% deformation                  |                        |           | 15-20                | 20-40                |
| Flexural Strength               | psi                    | D790      | 90-120               | 130-200              |
| Water Absorption (by volume)    | %                      | D570      | 2.0                  | 1.7                  |
| Coefficient of Linear Expansion | in./in.°F              | D696      | 2.7x10 <sup>-5</sup> | 2.8x10 <sup>-5</sup> |
| Shear Strength                  | psi                    | D732      | 55                   | 80                   |
| Tensile Strength                | psi                    | D1623     | 70-90                | 130-140              |

#### Material properties of Polyurea coating/ Veil Safe

| Property                         | Units        | ASTM Test | Results              |
|----------------------------------|--------------|-----------|----------------------|
| Flexural Modulus                 | Psi          | D790      | 375,000              |
| Tensile Strength                 | psi          | D638      | 8,600                |
| Elongation                       | %            | D638      | 300                  |
| Tear Strength                    | Psi          | D624      | 575                  |
| Shore Hardness                   | D scale      | D2240     | 80-82                |
| Moisture Vapor Transition        | Perm. in.    | E96       | 0.010                |
| Abrasion Resistance              | Wt. loss-mg. | D6040     | 65                   |
| H-18, 1000g, 1000 rev.           |              |           | <5                   |
| Cs-17, 1000g, 1000 rev.          |              |           |                      |
| Flash Point                      | °F           |           | >400                 |
| Coefficient of Thermal Expansion | In/in/°C     | D696      | 4 x 10 <sup>-5</sup> |
| Flame Spread                     |              | E108      | UL790                |



#### Manufacturer:

- UNDERGROUND TECHNOLOGIES– GRADE ADJUSTMENT RING
- OPEN



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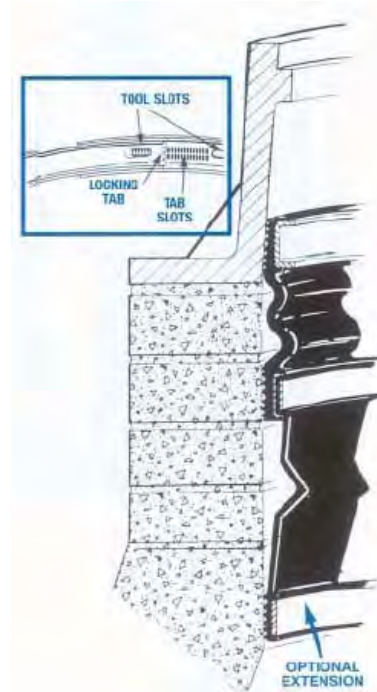
### K 10 – MANHOLE INTERNAL CHIMNEY SEAL :

#### **Specification:**

- Manhole internal chimney seals shall meet or exceed the performance specifications of:
- Shall be designed to prevent leakage of water through the chimney section of the manhole.
- Shall have a minimum 25 year design life.
- Shall seal the entire chimney area and extend from the frame or casting down to the top of the cone.
- Shall consist of a flexible internal rubber seal and extension and stainless steel compression bands.
- The rubber shall be extruded or molded from a high grade rubber compound conforming to the applicable requirements of ASTM C-923, with a minimum 1200 psi tensile strength, maximum 18% compression set and a hardness (durometer) of 48 and have a minimum thickness of 3/16 inches.
- The sleeve shall be double, triple or quadruple pleated with a minimum unexpanded vertical height of 8 inches, 10 inches or 12 inches respectively.
- Expansion bands shall be 16 gauge stainless steel conforming to ASTM A-240 type 304 and have a minimum width of 1 inch.
- The bands shall have a minimum adjustment range of 2 diameter inches and have a capacity to develop the pressures necessary to make a watertight seal.
- The band shall be permanently held in this expanded position with a positive locking mechanism.
- Affidavit of compliance to this specification shall be available upon request.

#### **Additional Requirements:**

- Shall cover the entire area between the casting and the pre-cast manhole cone.



#### **Manufacturer:**

- CRETEX SPECIALTY PRODUCTS
- NPC FLEXRIB FRAME –CHIMNEY SEAL
- OPEN



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## Material Specifications

### K 11 – CASING PIPE END SEALS :

#### **Specification:**

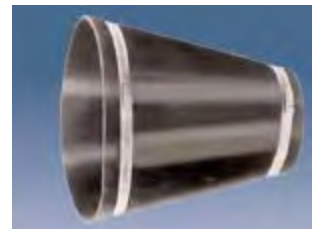
- Casing pipe end seals shall meet or exceed the performance specifications of:
- Shall be designed to prevent leakage of water and soil through the casing pipe ends.
- Shall be one piece neoprene or synthetic rubber boot.
- Wrap around end seals are not acceptable.
- The rubber boot shall be chemical resistant and retain good flexibility.
- Bands and screw assembly shall be manufactured from totally non-magnetic series 300 stainless steel.
- Affidavit of compliance to this specification shall be available upon request.

#### **Additional Requirements:**

- Ends of casings shall be sealed utilizing brick and mortar under the rubber boot to secure the carrier pipe and maintain the pipe elevation/ height based upon the casing spacers and end seals.



Model ESC



#### **Manufacturer:**

- ADVANCE PRODUCTS & SYSTEMS, INC.- MODEL "AC" & "AM"
- CCI PIPELINE SYSTEMS- MODEL ESC
- PIPELINE SEAL AND INSULATORS- MODEL "C", "R" & "S"
- OPEN



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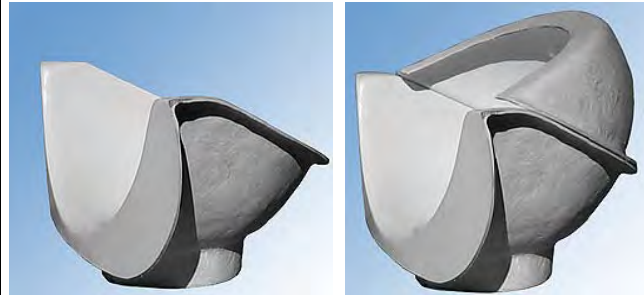
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## Material Specifications

### K 12 – SANITARY SEWER INSIDE DROP BOWL :

#### **Specification:**

- Sanitary sewer inside drop bowls shall meet or exceed the performance specifications of:
- Shall be a plastic composite collection device designed to facilitate a controlled drop of effluent into the main stream flow of a sanitary sewer manhole.
- Shall be fabricated from marine grade fiberglass.
- Shall have an optional hood for use in force main applications.
- Clamping pipe supports brackets shall be manufactured from totally non-magnetic 11 gauge type 304 stainless steel.
- Bolts, washers and nuts shall be manufactured from totally non-magnetic 18-8 stainless steel.
- Secure bowl and pipe support brackets to wall with lead tamp-in expansion anchors.
- Seal bowl to wall with an approved marine grade high-performance polyurethane adhesive sealant.
- Connection from drop bowl to drop pipe shall be by approved external flexible pipe adapter.
- The bowl size shall be determined by incoming pipe size and flow rate.
- The bowl assembly shall be installed as per manufacturer's instructions.
- Affidavit of compliance to this specification shall be available upon request.



#### **Manufacturer:**

- DURAN INC.- RELINER INSIDE DROP SYSTEM
- OPEN



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## Material Specifications

### K 13 – FLANGE INSULATING GASKET KITS :

#### **Specification:**

- Flange insulating gasket kits shall meet or exceed the performance specifications of:
- Designed and manufactured to work with flange pipe and fittings per ANSI B16.1 125 pound class specifications.
- Shall create an insulated joint to separate a branch connection from a cathodically protected pipeline.
- Nuts, bolts and gasket shall be designed to withstand the design and test pressures of the pipe.
- Each kit shall be individually packaged in a reinforced cardboard box, which is clearly labeled as to its contents.
- Each kit shall include the following items:

#### **Gasket:**

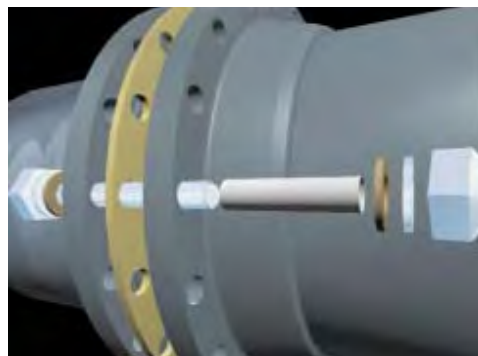
- Gasket shall be full-faced isolating and sealing - Type "E", 1/8 inch thick, manufactured from Nema grade G-10 glass reinforced epoxy retainer with a Nitrile, Viton or EPDM seal. The G-10 retainer shall have a 550 volt/mil dielectric strength and a minimum 50,000 psi compressive strength.

#### **Sleeve:**

- Shall have one full length Nema grade G-10 sleeve for every flange bolt. The G-10 shall be a 1/32 inch thick tube with a 400 volt/mil dielectric strength.

#### **Washer:**

- Shall have two insulating washers manufactured from Nema grade G-10 glass reinforced epoxy for each bolt hole. Their compressive strength shall be 50,000 psi, dielectric strength 550 volts/mil. Two, 1/8 inch thick zinc plated, hot rolled steel washers for each bolt. The I.D. of all washers shall fit over the isolating sleeve and both the steel and isolating washers shall have a same I.D. and O.D.
- Products supplied must have ISO 9001 or later certification.
- Affidavit of compliance to this specification shall be available upon request.



#### **Approved manufacturer products as modified to meet the above specification:**

- ADVANCE PRODUCTS & SYSTEMS, INC.
- PIPELINE SEAL AND INSULATOR, INC.
- OPEN



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## Material Specifications

# SECTION L: ELECTRICAL



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## Material Specifications

### Section L: Electrical—Contents

[L 1 Tracer Wire \(Solid Copper\)](#)

[L 1.1 Tracer Wire \(Copper-Clad Steel Wire\)](#)

[L 2 Direct bury wire splice kit](#)



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## Material Specifications

### L 1 – TRACER WIRE ( Solid Copper):

#### Specification:

- Tracer wire shall meet or exceed the performance specifications of:
- Manufactured for the purpose of direct burial power applications in accordance with the National Electric Code.
- Conductor shall be soft drawn bare copper meeting the requirements of ASTM Standard Specification B-3.
- Shall be a minimum gauge size 14.
- Conductor shall be solid strand.
- Insulation shall be polyvinylchloride (PVC) or low density, high molecular weight polyethylene for applications of up to 600 volts.
- Insulation shall be color coded per type service.
- Shall be constructed in accordance with Underwriter Laboratories, Inc.
- Thermoplastic High Heat resistant Nylon coated (THHN) and Thermoplastic Heat and Water resistant Nylon coated (THWN) are both acceptable.

#### Color– coded:

- Blue– potable water
- Purple/ Lavender– reclaim water
- Green– sanitary sewer/ force main

#### Restrictions:

- For use in open cut pipeline installations.
- For service lines up to 2" in diameter installed by directional drill.



#### Manufacturer:

- OPEN



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## Material Specifications

### L 1.1 – TRACER WIRE (Copper-Clad Steel Wire):

#### Specification:

- Tracer wire (Copper-Clad Steel Wire) shall meet or exceed the performance specifications of:
- Conductor shall be copper-clad steel wire composed of a steel core with a uniform and continuous copper cladding thoroughly bonded to the steel throughout.
- Cladding: The steel and copper interface must have a metallurgical bond achieved through a high heat and pressure bonding process. Established process for porosity-free material.
- Steel: Extra high strength with 0.54 carbon or greater. Verified to meet required mechanical properties.
- Copper: UNS-C10200; of copper according to ASTM B-170 (latest revision). High conductivity, oxygen free copper to achieve optimal signal performance.
- Shall be a minimum gauge size 12AWG (.0808" diameter).
- Shall have an average tensile break load of 1150#
- Conductor shall be solid strand.
- Surface Condition; Shall be free of any defects, including flakes, grooves, pits, and voids. Wire shall be smooth, bright and shiny, and free of excessive copper dust and residual drawing lubricants.
- Insulation shall be color coded per type service.

#### Insulation & thickness requirements:

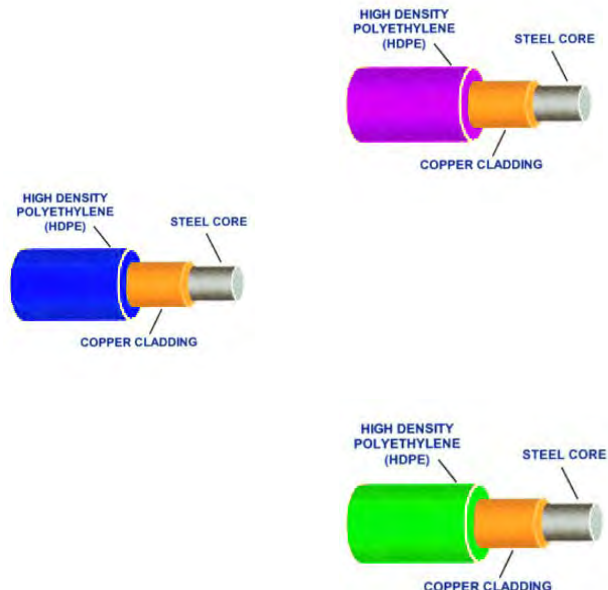
- Insulation shall be high molecular weight-high density polyethylene (HDPE) jacket complying with ASTM-D1248, 30 volt rating.
- 30 mil insulation for 2" to 8" pipe installed by directional drill and all sizes installed by open cut.
- 45 mil insulation for 10" and larger pipe and all subaqueous pipe installed by directional drill.

#### Color– coded:

- Blue– potable water
- Purple/ Lavender– reclaim water
- Green– sanitary sewer/ force main

#### Restrictions:

- Acceptable for open cut installations.
- Required on pipe installed by horizontal directional drill over 2" in diameter.



#### Manufacturer:

- Copperhead Industries LLC.- 1245X EHS
- OPEN



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## Material Specifications

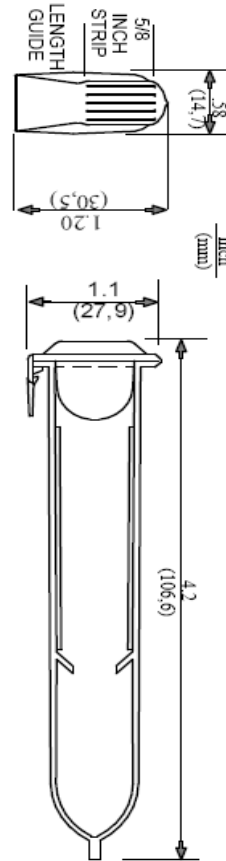
### L 2 – DIRECT BURY SPLICE KITS:

#### Specification:

- Direct bury water proof wire connectors shall meet or exceed the performance specifications of:
- UL Standards 486D, direct bury wire splices.
- Shall be compatible with THHN or THWN insulation thickness and AWG solid strand copper wiring.
- Shall use a silicone insulating gel sealant.

#### Design:

- Shall splice and effectively moisture seal three to four (minimum) # 14 conductors as part of the installation of tracer wire in pipe line construction.



#### Manufacturer:

- 3M- DBR-6 DIRECT BURY SPLICE KIT
- KING INNOVATION– KING 6 BLUE



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## Material Specifications

# SECTION M: COATINGS & SEALANTS



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## Material Specifications

### Section M: Coatings & Sealants—Contents

[M 1    Manhole Coatings](#)

[M 2    Metal Appurtenances Coating](#)

[M 3    Metal Appurtenances Primer/ Fast Drying](#)

[M 4    Metal appurtenances Primer/ Rust Inhibitive](#)

[M 5    Chemically Activated Acrylic Gel \(Grout\)](#)

[M 5.1   Chemically Activated Acrylamide Gel \(Grout\)](#)

[M 5.2   Water Activated Polymer Solution/ Foam \(Grout\)](#)

[M 6    Pipe Gasket Lubricants](#)

[M 7    PTFE “Teflon” Thread Sealant Tape](#)

[M 8    Flexible Joint Sealants](#)

[M 8.1   Flexible Butyl Joint Sealants](#)

[M 9    Vinyl/ PVC Adhesive Tape](#)

[M 9.1   Polyethylene Adhesive Tape](#)

[M 10   Polyurethane Adhesive Sealant/ Caulk](#)

[M 11   Protecto 401 Touch-up Kit](#)



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## Material Specifications

### M 1 – MANHOLE COATING:

#### **Specification:**

- Manhole coatings shall meet or exceed the performance specifications of:
- Shall be a corrosion resistant coating.
- Shall provide one coat protection for concrete and steel in a variety of chemical, immersion and underground conditions.
- Steel Structures Painting Council, SSPC– Paint 16, Coal Tar Epoxy– Polyamide Black Paint.
- Corps of Engineers Formula C-200.
- Shall be a high build, polyamide epoxy, two component, coal tar coating.
- Finished product shall be black in color.



#### **Manufacturer:**

- BLP MOBILE PAINTS– NO. 40-AX-7
- RUST-OLEUM– C9578
- SHERWIN-WILLIAMS– TARGUARD
- TNEMEC- HI-BUILD TNEME-TAR 46H-413
- OPEN



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# Material Specifications

## M 3 – METAL APPURTENANCES PRIMER/ FAST DRYING:

### Specification:

- Metal appurtenance fast drying primers shall meet or exceed the performance specifications of:
- Metal appurtenances shall mean exposed metal items that are not enclosed in vaults or exposed to a sewer gas environment including, but not limited to: valves, valve boxes, backflow device units, master meter units, fire hydrants, and exposed piping.
- Federal specification crossover: TT-P-664, quick drying, rust inhibiting, high solids modified alkyd red oxide primer.
- Shall be a single component primer.
- Shall be applied per manufactures recommendations.



**MULTIPRIME®**  
**97-680 Series**

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**HPC/Industrial Maintenance**      **MULTIPRIME® Low VOC Quick Dry Universal Primers**

| Generic Type  | Tinting and Base Information  |
|---|---|
| Modified Alkyd  | Small amounts of MPD (4257 Lane) colorants may be added to provide desired colors. Additions up to 4 oz. (118 ml) per gallon have no effect on dry or recoat times. Do not mix with 95 Lane Custom Colors. Medium White (97-680) approximates color 11.4 in the PITTSBURGH® PAINT VOICE OF COLOR SYSTEM®. |
| <b>General Description</b>  |   |
| MULTIPRIME® Low VOC primers are inhibitive metal primers for use on ferrous metal or aluminum substrates. They may be topcoated with a variety of topcoats including epoxy, vinyl, urethane or conventional finishes. They may also be used as a barrier coat over existing alkyd systems to allow topcoating with strong solvent containing topcoats. FOR METAL SUBSTRATES ONLY. |   |
|   | 97-680      Medium White<br>97-689      Red Oxide   |

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**Recommended Uses**

Aluminum  
Ferrous Metal

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**Features / Benefits**


Fast Dry, less than 30 minutes  
Compatible with most industrial maintenance topcoats  
Corrosion inhibitive formula

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**Limitations of Use:**

Apply only when temperatures are above 40°F (5°C) and surface temperature is at least 5°F (3°C) above the dew point. Not recommended for immersion service, as a barrier coat, or a primer beneath AQUAPON® High Build Coatings. Do not apply directly to new galvanized steel, oil galvanized steel that has been treated by abrasive blast techniques, or over zinc rich primers. Enze products are not recommended as topcoats over these primers. Drying times listed may vary depending on temperature, humidity and air movement. DANGER: Rags, steel wool or waste soaked with this product may spontaneously catch fire if improperly discarded. Immediately after use, place rags, steel wool or waste in a sealed water-filled metal container. Refer to www.pittsburghpaint.com. Spontaneous Combustion Advisory for additional information.

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**MULTIPRIME®**  
**97-680 Series**

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**HPC/Industrial Maintenance**      **MULTIPRIME® Low VOC Quick Dry Universal Primers**

**General Surface Preparation**

Remove all loose paint, mill scale, and rust. The surface to be coated must be dimensionally stable, dry, clean, and free of oil, grease, and other foreign materials.

For use as a primer coat apply 3.0 to 4.0 mils dry, (5.8 to 7.8 mils wet).  
For use as a barrier coat, apply 2.0 to 3.0 mils dry, (3.8 to 5.8 mils wet). **WARNING!** If you scrape, sand, or remove old paint, you may release lead dust or fumes. LEAD IS TOXIC. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a properly fitted NIOSH-approved respirator and prevent skin contact to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the USEPA National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead. In Canada contact a regional Health Canada office. Follow these instructions to control exposure to other hazardous substances that may be released during surface preparation.

**PREVIOUSLY PAINTED SURFACES:** Old coatings should be tested for adhesion of the existing system and lifting by the proposed topcoat. **FERROUS METAL OR ALUMINUM:** The minimum surface preparation for these substrates is SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning. Improved service life may be obtained by the use of SSPC-SP6 (NACE Number 3) Commercial Blast Cleaning. Service life of coating is in direct proportion to surface preparation. The surface to be coated must be clean, dry, and well prepared to receive the coating. HPC Systems in Detail Brochure (H13095) COATING SYSTEMS: 240-HD, 244-HD.

For specific recommendations, see your PITTSBURGH® Paints dealer or call 1-800-441-9695.

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| Recommended Primers              | Application Information                     |
|----------------------------------|---|
| none                             | Self priming on properly prepared surfaces. |
| <b>Recommended Spread Rates:</b> |   |
| Wet Mills:                       | 5.6 minimum to 7.4 maximum                  |
| Wet Micros:                      | 142.2 minimum to 188.0 maximum              |
| Dry Mills:                       | 3.0 minimum to 4.0 maximum                  |
| Dry Micros:                      | 76.2 minimum to 101.6 maximum               |

**Application Equipment:** Changes in application equipment, pressures and/or tip sizes may be required depending on ambient temperatures and application conditions. Spray equipment must be handled with due care and in accordance with manufacturer's recommendation. High-pressure injection of coatings into the skin by airless equipment may cause serious injury.

**Conventional Spray:** Fluid Nozzle: DeVilbiss gun, with 704 or 777 air cap with E tip and needle, or comparable equipment.  
Atomization Pressure: 55 - 70 Fluid Pressure: Can not specify, dependent on numerous factors.  
**Airless Spray: Pressure 1800 psi, tip 0.015" - 0.018"**  
**Brush:** High Quality Natural Bristle Brush  
**Roller:** Not Recommended

**Thinning:**  
Thinning is not required, though the product may be thinned 5% by volume with acetone to improve flow and leveling.

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**Permissible temperatures during application:**


|            |             |           |
|------------|-------------|-----------|
| Material:  | 40 to 90°F  | 5 to 32°C |
| Ambient:   | 40 to 100°F | 5 to 38°C |
| Substrate: | 40 to 130°F | 5 to 54°C |

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**Packaging: 1-Gallon (3.78L)      5-Gallon (18.9L)**

Not all products are available in all sizes. All containers are not full-filled.

PPG believes the technical data presented is currently accurate; however, no guarantee of accuracy, completeness, or performance is given or implied. Improvements in coatings technology may cause future technical data to vary from what is in this bulletin. For complete, up-to-date technical information, visit our web site or call 1-800-441-9695.

|   |                        |                    |                     |                            |                        |
|---|------------------------|--------------------|---------------------|----------------------------|------------------------|
|  | PPG Industries, Inc.   | Technical Services | Architect/Specifier | PPG Architectural Finishes | PPG Canada, Inc.       |
|   | Architectural Coatings | 1-800-441-9695     | 1-888-PPG-IDEA      | 400 S. 13th Street         | Architectural Coatings |
|   | One PPG Place          |                    |                     | Louisville, KY 40203       | 4 Kenview Blvd         |
|   | Pittsburgh, PA 15272   | 1-888-807-5123 fax |                     | Brampton, ON L6Y 5E4       |                        |

www.ppgppc.com

### Manufacturer:

- PPG PITTSBURGH PAINT– PP 97-680
- OPEN



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# Material Specifications

## M 4 – METAL APPURTENANCES PRIMER/ RUST INHIBITIVE:

### Specification:

- Metal appurtenance rust inhibitive primers shall meet or exceed the performance specifications of:
- Metal appurtenances shall mean exposed metal items that are not enclosed in vaults or exposed to a sewer gas environment including, but not limited to: valves, valve boxes, backflow device units, master meter units, fire hydrants, and exposed piping.
- Federal specification crossover: TT-P-636; TT-P-654.
- Shall be a single component primer.
- Shall be applied per manufactures recommendations.

7-852, 7-858 Series

| HPC/Industrial Maintenance  |                                    | Int/Ext Rust Inhibitive Steel Primers      |  |
|---|------------------------------------|--|--|
| <b>Generic Type</b>   | <b>Timing and Base Information</b> |  |  |
| Alloyed Rust  | DO NOT TINT                        | White                                      |  |
|   | 7-852                              | White                                      |  |
|   | 7-858                              | Red  |  |
| <b>General Description</b>  |                                    |  |  |
| Industrial enamel primers are for industrial use and may be used on properly prepared exterior or exterior ferrous metal surfaces. Rust inhibitive formulation to keep corrosion in check. For Professional Use Only; Not Intended for Household Use.   |                                    |  |  |
| <b>Recommended Uses</b>   |                                    |  |  |
| Ferrous Metal   |                                    |  |  |
| <b>Features / Benefits</b>  |                                    |  |  |
| Rust inhibitors formulation.<br>Durable interior exterior finish.<br>Performance Offset to Federal Standards TT-P-636, TT-P-654, TT-P-1335  |                                    |  |  |
| <b>Limitations of Use</b>   |                                    |  |  |
| Apply when air and surface temperatures are above 50°F (10°C), and surface temperature is at least 5°F (3°C) above the dew point. Avoid exterior application here in the day when dew and condensation are likely to form or if rain is threatening. Not recommended for immersion service. Do not leave unprotected for an extended period of time. Allow primer to dry 24 hours before applying whitewash topcoats. Drying times listed may vary depending on temperature, humidity and air movement. DANGER: Rags, steel wool or waste soaked with this product may spontaneously catch fire if improperly discarded. Immediately after use, place rags, steel wool or waste in a sealed water-filled metal container. Refer to www.ppgindustrial.com; Spontaneous Combustion Advisory for additional information. |                                    |  |  |
| <b>Product Data</b>   |                                    |  |  |
| Gloss:  |                                    | Flat                                       |  |
| VOC*:   |                                    | 2.75 lbs/gal 330.00 g/L                    |  |
| Coverages:  |                                    | 390 to 535 sq ft/gal (36 to 49 sq m/3.78L) |  |
| DFT:  |                                    | 1.7 minimum to 2.3 maximum                 |  |
| Weight/Gallon*:   |                                    | 11.6 lbs. (5.3 kg) +/- 0.2 lbs. (91 g)     |  |
| Volume Solids*:   |                                    | 56.5% +/- 2%                               |  |
| Weight Solids*:   |                                    | 75.7% +/- 2%                               |  |
| Clean-up:   |                                    | Paint Thinner                              |  |
| Drying Time:  |                                    | To Touch: 6 to 8 hours                     |  |
|   |                                    | To Handle: 16 hours                        |  |
|   |                                    | To Recoat: Overnight                       |  |
| Dry Time @77°F (25°C), 50% relative humidity:   |                                    |  |  |
| Flash Point:  |                                    | 106°F, (41.1°C)                            |  |

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7-852, 7-858 Series

| HPC/Industrial Maintenance   |  | Int/Ext Rust Inhibitive Steel Primers   |  |
|--|--|---|--|
| <b>General Surface Preparation</b>   |  |   |  |
| The surface to be coated must be dimensionally stable, dry, clean, and free of oil, grease, release agents, curing compounds, and other foreign materials. The service life of the coating is directly related to the surface preparation. WARNING! If you scrape, sand, or remove old paint, you may release lead dust or fumes. LEAD IS TOXIC. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a properly fitted NIOSH-approved respirator and prevent skin contact to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the USEPA National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead. In Canada contact a regional Health Canada office. Follow these instructions to control exposure to other hazardous substances that may be released during surface preparation. |  |   |  |
| FERROUS METAL: The recommended surface preparation is Commercial Blast Clean per SSPC-SP6. The minimum surface preparation is Hand Tool or Power Tool Clean per SSPC-SP2 or SP3.   |  |   |  |
| <b>Recommended Primers</b>   |  | <b>Application Information</b>  |  |
|  |  | <b>Recommended Spread Rate:</b><br>Wet Mills: 3.0 minimum to 4.1 maximum<br>Wet Micros: 76.3 minimum to 104.0 maximum<br>Dry Mills: 1.7 minimum to 2.3 maximum<br>Dry Micros: 43.3 minimum to 58.4 maximum  |  |
|  |  | <b>Application Equipment:</b> Changes in application equipment, pressures and/or tip sizes may be required depending on ambient temperatures and application conditions. Spray equipment must be handled with due care and in accordance with manufacturer's recommendation. High-pressure injection of coatings into the skin by airless equipment may cause serious injury.<br><b>Conventional Spray:</b> Graco 700 Gun - 217-757 equipment. Fluid Pressure: 20 lbs. Atomizing Pressure: 35-40 lbs.<br><b>Airless Spray:</b> Pressure 2000 psi, tip 0.015" - 0.031"<br><b>Brush:</b> China or Natural Bristle Brush<br><b>Roller:</b> 3/8" - 3/4" nap roller cover.<br><b>Thinning:</b><br>DO NOT THIN. |  |
| <b>Directions for Use</b>  |  |   |  |
| Stir thoroughly before using and frequently during use. USE WITH ADEQUATE VENTILATION. KEEP OUT OF REACH OF CHILDREN. Explosion-proof equipment must be used when coating with these materials in confined areas. Keep containers closed and away from heat, sparks, and flames when not in use. Read all label and Material Safety Data Sheet (MSDS) information prior to use. MSDS are available through our website or by calling 1-800-441-6695.   |  |   |  |
| <b>Permissible temperatures during application:</b><br>Material: 80 to 90°F 16 to 32°C<br>Ambient: 50 to 100°F 10 to 38°C<br>Substrate: 50 to 125°F 10 to 52°C   |  |   |  |
| <b>Packaging:</b>  |  |   |  |
| 1-Gallon (3.78L)   |  | 5-Gallon (18.9L)  |  |
| <small>Not all products are available in all sizes. All containers are not full-filled.</small><br>PPG believes the technical data presented is currently accurate; however, no guarantee of accuracy, completeness, or performance is given or implied. Improvements in coatings technology may cause future technical data to vary from what is in this bulletin. For complete, up-to-date technical information, visit our web site at <a href="http://www.ppg.com">www.ppg.com</a> .   |  |   |  |
| PPG Industries, Inc.<br>Architectural Coatings<br>One PPG Place<br>Pittsburgh, PA 15272  | Technical Services<br>1-800-441-6695<br>1-888-PPG-IDEA | Architect/Specialty<br>PPG Architectural Finishes<br>400 S. 13th Street<br>Louisville, KY 40203   | PPG Canada, Inc.<br>Architectural Coatings<br>4 Kennewick Blvd<br>Brampton, ON L5T 5E4 |

### Manufacturer:

- PPG PITTSBURGH PAINT– PP 7-858
- OPEN



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Port Richey, FL 34668

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## Material Specifications

### M 5 – CHEMICALLY ACTIVATED ACRYLIC GEL:

#### **Specification:**

- Chemically activated acrylic gel (grout) shall meet or exceed the performance specifications of:
- Shall be a water solution of acrylic resin.
- Shall form an elastic and cohesive gel with the addition of a catalyst which stops flowing water.
- Gel set time shall be controllable from a few seconds to several hours even in flowing water.
- Shall have approximately the same viscosity as water (1 to 2 centipoises) in solution.
- When catalyzed, shall produce a gel which is non-toxic.
- Shall have a tracer dye added if colorless.
- Shall be mixed and applied per manufactures recommendations.

#### **Catalyst:**

- AV-101 Catalyst T+ or Chemical grout monomer, Triethanolamine (TEA) catalyst & water.
- AV-103 Catalyst SP or Sodium Persulfate (SP) initiator & water.

#### **Possible Additives:**

- AV-105 Ethylene Glycol: Protects against freezing.
- AV-257 Icoset: Increases compressive and tensile strength.
- AC 50W: Root Inhibitor.
- Dye: Tracer Dyes

#### **Restrictions:**

- For sealing existing or rehabilitated, in-service gravity sewers and manholes including:
  - Sewer joint sealing.
  - Sewer laterals.
  - Manhole waterproofing.
  - Lateral connections to cured in-place liners.
- Not for potable water applications.
- For soil stabilization.
- Shall not be used after 6-12 months from manufactures date depending on manufacture.



#### **Manufacturer:**

- AVANTI INTERNATIONAL- AV-118 DURI-FLEX ACRYLIC GEL
- DE NEEF CONSTRUCTION CHEMICALS INC.- AC-400 ACRYLATE GROUT
- OPEN



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## Material Specifications

### M 5.1 – CHEMICALLY ACTIVATED ACRYLAMIDE GEL:

**Specification:**

- Chemically activated acrylamide gel (grout) shall meet or exceed the performance specifications of:
- Shall be a water solution of three or more chemicals which is a blend of Acrylamide Monomer (AM) and Methylenebisacrylamide (MBA).
- Shall form an elastic and cohesive gel with the addition of catalysts which stops flowing water.
- Gel set time shall be controllable from a few seconds to several hours even in flowing water.
- Shall have approximately the same viscosity as water (1 to 2 centipoises) in solution.
- Shall have a tracer dye added.
- Shall be mixed and applied per manufactures recommendations.

**Catalyst:**

- AV-101 Catalyst T+.
- AV-102 Catalyst AP.

**Possible Additives:**

- AV-105 Ethylene Glycol: Protects against freezing.
- AV-257 Icoset: Increases compressive and tensile strength.
- AC 50W: Root Inhibitor.
- Dye: Tracer Dyes

**Restrictions:**

- For sealing existing or rehabilitated, in-service gravity sewers and manholes including:
  - Sewer joint sealing.
  - Sewer laterals.
  - Manhole waterproofing.
  - Lateral connections to cured in-place liners.
- Not for potable water applications.
- For soil stabilization.
- Shall not be used after 12 months from manufactures date.



**Manufacturer:**

- AVANTI INTERNATIONAL- AV-100
- OPEN



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## Material Specifications

### M 5.2 – WATER ACTIVATED POLYMER SOLUTION/ FOAM:

#### **Specification:**

- Water activated polymer solution which cures when reacted with water (grout) shall meet or exceed the performance specifications of:
- Shall prevent water infiltration unto sub-grade structures and pipes.
- Shall be either hydrophilic or hydrophobic polyurethane.
- Shall form a strong film, gel, or foam of polyurethane, with the addition of or contact with water, which stops flowing water.
- Shall have an approximate viscosity of 120- 2500 centipoises in solution.
- Shall be mixed and applied per manufactures recommendations.
- Shall be supplied in cartridges for use with or without a caulking gun.

#### **Restrictions:**

- For sealing existing or rehabilitated, in-service gravity sewers and manholes including:
  - Large cracks or joints in concrete.
  - Precast structures.
  - Manhole waterproofing.
  - Manhole connections or pipe penetrations.



#### **Manufacturer:**

- AVANTI INTERNATIONAL- AV-202 MULTI-GROUT
- DE NEEF CONSTRUCTION CHEMICALS, INC.- HYDRO-ACTIVE CUT “HOT SHOT”
- OPEN



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## Material Specifications

### M 6 – PIPE GASKET LUBRICANTS:

#### Specification:

- Pipe gasket lubricants shall meet or exceed the performance specifications of:
- AWWA C-111 (ANSI-A21.11), Rubber-gasket joints for ductile-iron pressure pipe and fittings.
- Shall be suitable for lubricating the parts of the joint for assembly.
- Shall be nontoxic.
- Shall not support the growth of bacteria.
- Shall have no deteriorating effects on the gasket material.
- Shall not impart taste or odor to the water in the pipe.
- Containers shall be labeled with the trade name of the lubricant.
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Affidavit of compliance to this specification shall be available upon request.



#### Manufacturer:

- EASE-ON PIPE JOINT LUBRICANT
- J.C. WHITLAM- BLUE LUBE
- OPEN



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## Material Specifications

### M 7 – PTFE “TEFLON” THREAD SEALANT TAPE:

#### **Specification:**

- PTFE (polytetrafluoroethylene) “Teflon” thread sealant tape shall meet or exceed the performance specifications of:
- Shall meet MIL-T-27730A specifications.
- Shall be Underwriters Laboratory Listed as noted (UL).
- Shall comply with and be labeled as approved by the National Sanitation Foundation (NSF) for use in potable water lines meeting NSF 61.
- Shall be nontoxic.
- Shall not support the growth of bacteria.
- Shall not impart taste or odor to the water in the pipe.
- Affidavit of compliance to this specification shall be available upon request.

#### **Additional Requirements:**

- |                    |                            |
|--------------------|----------------------------|
| • Color            | White                      |
| • Density          | Standard .5 - .7           |
| • Thickness        | .003" - .0038"             |
| • Temperature      | -450°F to +500°F           |
| • Pressure         | Hard vacuum to 10,000 PSI. |
| • Package          | Plastic Spool & Shell      |
| • Width            | .75" or 1"                 |
| • Length per spool | 260" or 520"               |



#### **Approved manufacturer product as modified to meet the above specification:**

- MERCOTAPE COMPANY- M55
- OPEN



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Last Revised Date: 04/20/19

## Material Specifications

### M 8 – FLEXIBLE JOINT SEALANTS:

#### Specification:

- Preformed flexible plastic joint sealant (gaskets) shall meet or exceed the performance specifications of:
- ASTM C-990 standard specification for joints, concrete pipe, manholes and pre-cast box sections.
- Federal Specification SS-S210-A, "Sealing Compound Preformed Plastic For Pipe Joints", Type 1, Rope Form.
- AASHTO M-198 75 1.
- Shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler.
- Shall appear as a semi-solid black strip.
- Shall contain no solvents, irritating fumes or obnoxious odors.
- The compound shall not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength.
- Shall be supplied in extruded rope-form of suitable cross-section and of such size as to fill the joint space when manhole sections are stacked.
- Shall be protected by a suitable removable two-piece wrapper.
- Affidavit of compliance to this specification shall be available upon request.



| Chemical Composition  | TEST                                      | REQUIRED                 |
|---|---|--------------------------|
| Hydrocarbon, % by weight  | METHOD<br>ASTM D 4-80                     | 50-70                    |
| Inert Mineral Filler, % by weight                               | AASHTO T111                               | 30-50                    |
| Volatile Matter, % by weight                                    | ASTM D 6-80                               | 2.0 Max.                 |
| <b>Physical Properties*</b>                                     |   |                          |
| Specific gravity, @ 77F.  | ASTM D 71-84                              | 1.2-1.35                 |
| Ductility at 77F, cm  | ASTM D 113-85                             | 5.0 min.                 |
| Softening Point, Ring & Ball, @ 77F                             | ASTM D 36-85                              | 320 min.                 |
| Penetration, Cone, @ 77 F,<br>150 g, 5 sec. In 0.1 mm           | ASTM D 217-82                             | 50-120                   |
| Flash Point, Cleveland Open Cup, F                              | ASTM D 92-85                              | 600 min.                 |
| Fire Point, Cleveland Open Cup, F                               | ASTM D 92-85                              | 625 min.                 |
| Compression Test @ 77° F lb/in <sup>2</sup>                     | ASTM C 972                                | 100 max.                 |
| Compression Test @ 32° F lb/in <sup>2</sup>                     | ASTM D 972                                | 200 max.                 |
| <b>Sag or Flow Resistance</b>                                   |   |                          |
| Sag or flow resistance, in vertical position for 5 days @ 135 F | FS SS-S-210A<br>sect. 4.5.3/ASTM<br>C 990 | No sagging               |
| <b>Chemical Resistance</b>                                      |   |                          |
| 30 days Immersion @ room temperature in each of the following:  | FS SS-S-2120A<br>sect. 3.6/ASTM<br>C 990  |                          |
| 5% Solution of Caustic Potash                                   |   | No visible Deterioration |
| 5% Solution of Hydrochloric Acid                                |   | No visible Deterioration |
| 5% Solution of Sulfuric Acid                                    |   | No visible Deterioration |
| Saturated Hydrogen Sulfide Solution                             |   | No visible Deterioration |

#### Manufacturer:

- HENRY COMPANY- RAM-NEK/ RN101
- OPEN



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## Material Specifications

### M 8.1 – FLEXIBLE BUTYL JOINT SEALANTS:

#### Specification:

- Preformed flexible butyl plastic joint sealant (gaskets) shall meet or exceed the performance specifications of:
- ASTM C-990 standard specification for joints, concrete pipe, manholes and pre-cast box sections.
- Federal Specification SS-S210-A, "Sealing Compound Preformed Plastic For Pipe Joints", Type 1, Rope Form.
- AASHTO M-198B.
- Shall be produced from special blend of butyl and asphalt.
- Shall appear as a extruded black fluid coil.
- Shall be protected by a suitable removable two-piece wrapper.
- Affidavit of compliance to this specification shall be available upon request.

| Chemical Composition  | TEST METHOD                          | REQUIRED                  |
|---|--------------------------------------|---------------------------|
| Hydrocarbon, % by weight  | ASTM D 4-80                          | 50-70                     |
| Inert Mineral Filler, % by weight                               | AASHTO T111                          | 30-50                     |
| Volatile Matter, % by weight                                    | ASTM D 6-80                          | 2.0 Max.                  |
| <b>Physical Properties*</b>                                     |                                      |                           |
| Specific gravity, @ 77F.  | ASTM D 71-84                         | 1.2-1.35                  |
| Ductility at 77F, cm  | ASTM D 113-85                        | 5.0 min.                  |
| Softening Point, Ring & Ball, @ 77F                             | ASTM D 36-86                         | 320 min.                  |
| Penetration, Cone, @ 77 F, 150 g, 5 sec., in 0.1 mm             | ASTM D 217-82                        | 50-120                    |
| Flash Point, Cleveland Open Cup, F                              | ASTM D 92-85                         | 600 min.                  |
| Fire Point, Cleveland Open Cup, F                               | ASTM D 92-85                         | 625 min.                  |
| Compression Test @77° F lb/in²                                  | ASTM C 972                           | 100 max.                  |
| Compression Test @ 32° F lb/in²                                 | ASTM D 972                           | 200 max.                  |
| <b>Sag or Flow Resistance</b>                                   |                                      |                           |
| Sag or flow resistance, in vertical position for 5 days @ 135 F | FS SS-S-210A, sect. 4.5.3/ASTM C 990 | No sagging                |
| <b>Chemical Resistance</b>                                      |                                      |                           |
| 30 days immersion @ room temperature in each of the following:  | FS SS-S-2120A, sect. 3.6/ASTM C 990  |                           |
| 5% Solution of Caustic Potash                                   |                                      | No visible Deterioration. |
| 5% Solution of Hydrochloric Acid                                |                                      | No visible Deterioration. |
| 5% Solution of Sulfuric Acid                                    |                                      | No visible Deterioration. |
| Saturated Hydrogen Sulfide Solution                             |                                      | No visible Deterioration. |



#### Manufacturer:

- HENRY COMPANY- BUTYL-NEK/ BN109
- OPEN



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## Material Specifications

### M 9 – VINYL/ PVC ADHESIVE TAPE:

**Specification:**

- Vinyl or polyvinylchloride (PVC) adhesive tape shall meet or exceed the performance specifications of:
- Adhesion to steel: minimum 17 oz./in. width per ASTM D3330.
- Tensile strength at break: minimum 15 oz./in. width per ASTM D 3759.
- Minimum elongation at break: 120%: per ASTM D 3759.
- Minimum backing thickness: 4.0 mils per ASTM D 3652.
- Minimum total tape thickness: 5.0 mils per ASTM D 3652.
- Shall be a minimum width of two (2") inches.
- Shall be color coded for type of service.
- Affidavit of compliance to this specification shall be available upon request.

**Intended use:**

- Installation of polyethylene encasement.
- Attachment of tracer wire.

**Color– coded:**

- Blue– potable water
- Purple/ Lavender– reclaim water
- Green– sanitary sewer/ force main

**Manufacturer:**

- 3M VINYL TAPE 471
- MERCO TAPE M804
- SHURTAPE VP410
- OPEN



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## Material Specifications

### M 9.1 – POLYETHYLENE ADHESIVE TAPE:

**Specification:**

- Polyethylene adhesive tape shall meet or exceed the performance specifications of:
- Adhesion to steel: minimum 10 oz./in. width per ASTM D3330.
- Tensile strength at break: minimum 10 oz./in. width per ASTM D 3759.
- Elongation at break: 220%: per ASTM D 3759.
- Minimum backing thickness: 3.5 mils per ASTM D 3652.
- Minimum total tape thickness: 5.0 mils per ASTM D 3652.
- Shall be a minimum width of two (2") inches.
- Shall be color coded for type of service.
- Affidavit of compliance to this specification shall be available upon request.

**Intended use:**

- Installation of polyethylene encasement.
- Attachment of tracer wire.

**Color– coded:**

- Blue– potable water.
- Purple/ Lavender– reclaim water.
- Green– sanitary sewer/ force main.

**Manufacturer:**

- 3M POLYETHYLENE TAPE 483
- OPEN



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## Material Specifications

### M 10 – POLYURETHANE ADHESIVE SEALANT/ CAULK:

#### Specification:

- High-performance polyurethane adhesive & sealant shall meet or exceed the performance specifications of:
- Shall be a high-performance marine grade polyurethane adhesive sealant.
- Shall have a minimum tensile strength of 600 psi.
- Shall have a minimum 900% elongation before breaking.
- Shall be suitable for above and below water applications.
- Shall not shrink.
- Shall create a permanent bond with fiberglass and gel coat material.
- Affidavit of compliance to this specification shall be available upon request.

#### Intended use:

- Installation of inside drop bowl.
- Sealing of bowl to manhole wall.



#### Manufacturer:

- 3M MARINE ADHESIVE SEALANT 5200
- 3M MARINE ADHESIVE SEALANT FAST CURE 5200



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## Material Specifications

### M 11 – PROTECTO 401 TOUCH-UP KIT:

#### **Specification:**

- Protecto 401 touch-up kit shall meet or exceed the performance specifications of:
- Shall be a brushable novalac epoxy designed for sealing cut ends and repairs when pipes are lined with Protecto 401 Ceramic Epoxy.
- Shall be applied per manufactures procedure.
- Affidavit of compliance to this specification shall be available upon request.

#### **Surface Preparation:**

- The surface preparation shall be equal to the specifications for the project or as outlined in the touch-up procedure.
- Shall not be applied over wet or frozen surfaces.

#### **Application Data:**

- Application by brush, roller or airless sprayer.
- Thinning or clean up with Methyl Ethyl Ketone.
- Dry film thickness shall be as outlined in specifications.
- Pipe and fitting can be install while still wet.

#### **Intended Use:**

- Sealing of cut ends of Protecto 401 lined pipe.
- Repairing field damaged areas of Protecto 401 lined pipe and fittings.

#### **Contents Of Kit:**

- Protecto joint compound part A.
- Protecto joint compound part B.
- Paint brush.
- Stir stick.
- Sand paper.
- Directions.



#### **Manufacturer:**

- PROTECTO 401



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## Material Specifications

# SECTION N: CONCRETE



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## Material Specifications

### Section N: Concrete—Contents

[N 1 Concrete/ Pre-cast Thrust Block](#)

[N 2 Cement/ Calcium Aluminate](#)

[N 3 Cement/ Calcium Aluminate Lining System/ Sanitary Sewer](#)

[N 4 Cement/ Hydraulic Cement](#)

[N 5 Concrete/ High Early Concrete Mix](#)



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## Material Specifications

### N 1 – CONCRETE/ PRE-CAST THRUST BLOCKS:

#### Specification:

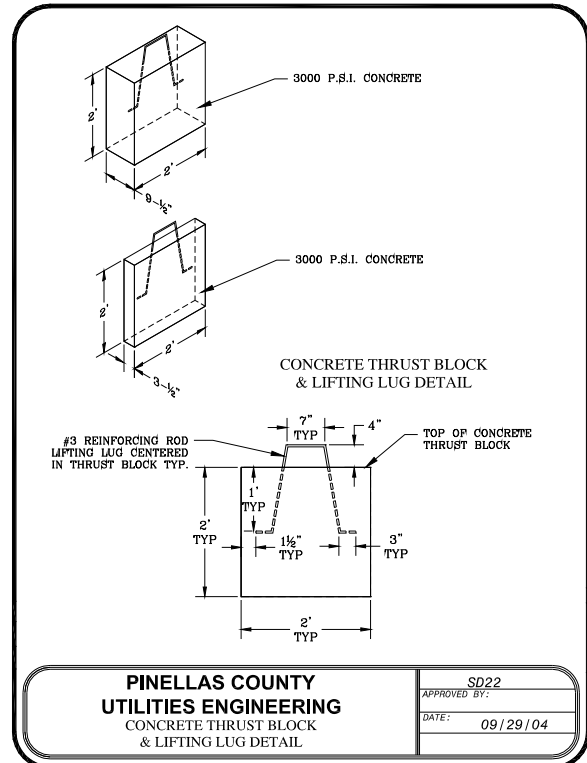
- Concrete thrust blocks shall meet or exceed the performance specifications of:
- Must conform to the standard detail.

#### Include:

Thrust blocks shall be palletized and banded.

#### Restrictions:

- For connections, repairs and adjustments to exiting, in-service pipelines only.



#### Manufacturer:

- OPEN



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## Material Specifications

### N 2 – CEMENT/ CALCIUM ALUMINATE:

#### Specification:

- Calcium aluminate cement shall meet or exceed the performance specifications of:
- Made with 100% fused calcium aluminate aggregate and calcium aluminate cement.
- Compressive strength per ASTM C109 shall meet the following minimums:
  - 1 hour– 400psi
  - 24 hours– 2000psi
  - 28 days– 9000 psi
- Shall have a minimum bond of 2000psi per ASTM C882.
- Shall have no shrinkage @ 95% R.H. per ASTM C596.

#### Application:

- For use where harsh hydrogen sulfide conditions exist in sanitary sewers.
- For construction or reconstruction of the bench and invert in concrete, masonry, or inert (such as fiberglass) lined manholes, wet wells and lift stations.



#### Manufacturer:

- STRONG SEAL– BENCH MIX
- OPEN



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## Material Specifications

### N 3 – CEMENT/ CALCIUM ALUMINATE LINING SYSTEM/ SANITARY SEWER:

#### Specification:

- Calcium aluminate cement lining system shall meet or exceed the performance specifications of:
- Lining material shall provide a corrosion resistant liner to prevent any deterioration of concrete surfaces from hydrogen sulfide and other corrosive gases/acids produced by wastewater and to prevent infiltration.
- Shall be 100% calcium aluminate cement with 100% calcium aluminate aggregate.
- Manufacture shall warrant material and workmanship for a minimum period of ten (10) years.
- Shall be designed to withstand long-term exposure to a bacterially corrosive hydrogen sulfide environment that may be expected to produce a pH of 1 on normal Portland Cement concrete or typical brick and mortar surfaces.
- Mortar furnished under this specification shall be a pre-packaged mortar, including all cement, aggregate, and any required admixtures of fibers.
- It is the intent of this specification that the contractor only be required to add the proper amount of potable water so as to produce a mortar suitable for pneumatic application.
- Typical package weights shall not be less than 50 pounds.
- To ensure total unit responsibility, all materials and installation shall be furnished by, and coordinated with, one supplier/ manufacture.
- **Use of this product is restricted to rehabilitation of existing structures.**
- The chemical composition of the cement portion as well as the aggregates of the mortar mix shall be as follows:

| Chemical analysis main constituents |           |                                    |                  |
|-------------------------------------|-----------|------------------------------------|------------------|
| Al <sub>2</sub> O <sub>3</sub>      | CaO       | FeO+Fe <sub>2</sub> O <sub>3</sub> | SiO <sub>2</sub> |
| 41% - 46%                           | 33% - 38% | 8% - 13%                           | 4% - 9%          |

- The design properties of the mortar mix shall be as follows:

#### MINIMUM PHYSICAL/ MATERIAL PROPERTIES

|            |   | 24 HRS | 7 DAYS                    | 28 DAYS |
|------------|---|--------|---------------------------|---------|
| ASTM C 109 | Compressive Strength, psi                 | >5,500 | >7,000                    | >8,000  |
| ASTM C 293 | Flexural Strength, psi                    | >1,300 | >1,400                    | >1,600  |
| ASTM C 596 | Shrinkage at 90% Humidity, %              | < 0.04 | < 0.06                    | < 0.08  |
| ASTM C 666 | Freeze-Thaw After 300 Cycles              |        | No Damage                 |         |
| ASTM C 496 | Splitting Tensile Strength                |        | > 900 psi                 |         |
| ASTM C 882 | Bond Strength by Slant Shear              |        | > 2,300 psi at 28 days    |         |
| ASTM C 457 | Air Void Content (7 Days)                 |        | 2-4%                      |         |
| ASTM C 642 | Specific Gravity/Absorption Test (7 Days) |        | 3-5%                      |         |
|            | Static Modulus of Elasticity (24 hrs)     |        | 7.1 x 10 <sup>6</sup> psi |         |



#### Manufacturer:

- KERNEOS ALUMINATE TECHNOLOGIES-SEWPERCOAT "PG"
- OPEN



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## Material Specifications

### N 4 – CEMENT/ HYDRAULIC CEMENT:

#### **Specification:**

- Cement-based hydraulic cement shall meet or exceed the performance specifications of:
- Shall be used above or below grade, interior or exterior.
- Shall not shrink.
- Shall stop seeping or flowing water in concrete and masonry structures.
- Hydraulic cement furnished under this specification shall be a pre-packaged product, including all cement and any required admixtures.
- It is the intent of this specification that the contractor only be required to add the proper amount of potable water so as to produce a mortar suitable for application.
- Coverage: One pound shall fill a minimum of 15 cubic inches.
- Packaging: 50 lb. pail.
- Shelf life: One year from date of manufacture.

#### **Technical Data:**

- Shall have a minimum compressive strength, ASTM C-109, 24 hours- 1800psi, 48 hours- 3500psi.
- Shall have a minimum tensile strength, ASTM C-307, 24 hours- 200psi, 28 days- 360psi.

#### **Application:**

- For use where harsh hydrogen sulfide conditions exist in sanitary sewers or other structures to stop seepage and flowing water.



#### **Manufacturer:**

- BONSAL- INSTANT HYDRAULIC CEMENT
- CEMENT TECHNOLOGY- MS PLUG, BLUE-3-5 MIN., RED-45-90 SEC., GREEN-20 MIN. SET TIME.
- OPEN



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## Material Specifications

### N 5 – CONCRETE/ HIGH EARLY CONCRETE MIX:

#### Specification:

- High early concrete mix shall meet or exceed the performance specifications of:
- Shall be used above or below grade, interior or exterior.
- High early concrete mix furnished under this specification shall be a pre-packaged product, including all cement and any required admixtures.
- It is the intent of this specification that the contractor only be required to add the proper amount of clean potable water so as to produce a concrete mix suitable for application.
- Coverage: A 60 lb bag yields approximately 0.45 cu ft. An 80 lb bag yields approximately 0.0 cu ft.
- Packaging: 60 & 80 lb. bags.
- Shelf life: One year from date of manufacture.

#### Technical Data:

- Shall have a minimum compressive strength, ASTM C-387, 1day- 1500psi, 3day- 2500psi, 7day- 3500, 28day- 5000.
- Slump range- 2" - 3".

**Use of this product is restricted to small non-structural concrete repairs where truck mix is not practical and should be limited to:**

- Sidewalk panel replacement.
- Curb and gutter section replacement.
- Valve box pads.



#### Manufacturer:

- QUIKRETE- QUIKRETE 5000 HIGH EARLY STRENGTH CONCRETE MIX #1007
- OPEN



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## Material Specifications

# SECTION O: STRUCTURES



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## Material Specifications

### Section O: Structures—Contents

[O 1    Fiberglass Manholes/ Sanitary Sewer](#)

[O 2    Fiberglass Manhole Liners/ Sanitary Sewer](#)

[O 3    Fiberglass Wetwell Liners/ Sanitary Sewer](#)

[O4    Polypropylene and/ or Fiberglass Reinforced Plastic Concrete Protective Liner/ S. Sewer](#)

[O4.1   Polypropylene Fiberglass Reinforced Plastic Manhole Base Liner/ Sanitary Sewer](#)

[O5    High Density Polyethylene Concrete Protective Liner/ Sanitary Sewer](#)

[O6    Multi-Component Stress Panel Liner System/ Sanitary Sewer](#)

[O7    Multi-Component; Urethane/ Epoxy, Polyurea Liner System/ Sanitary Sewer](#)

[O8    Polymorphic Resin Liner System/ Sanitary Sewer](#)



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## Material Specifications

### O 2 – FIBERGLASS MANHOLE LINER/ SANITARY SEWER:

#### **Specification:**

- Fiberglass manhole liners shall meet or exceed the performance specifications of:
- Shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins with fiberglass reinforcements specifically manufactured for use with sewage.
- Shall be a one piece unit.
- Shall have no vertical seams.
- Shall meet ASTM Standards D 3753, Fiber-glass-Reinforced Polyester Manholes and Wetwells.
- Reinforcing material shall be Grade "E" type glass in the form of continuous roving and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
- The inter surface shall be a resin-rich layer of 0.010 to 0.020 inches thick.
- The concentric cone section shall be affixed to the barrel section at the factory with resin-glass reinforced joint resulting in a one piece unit.
- The liner wall thickness shall not be less than 0.50 (1/2") inches.
- Shall provide an area for which a grade ring or brick can be installed to accept a typical metal ring & cover and have strength to support a traffic load without damage to the manhole.
- As a UV inhibitor the resin on the exterior surface shall have a color pigment added for a minimum thickness of 0.125 inches.
- Shall have a minimum dynamic-load rating of 16,000 lbs. (AASHTO HS-20) when tested in accordance with ASTM D 3753 and shall not leak, crack or suffer other damage when load tested to 40,000 lbs.
- Shall meet or exceed NBS PS 15-69 physical properties as listed in table 1, of that standard:
  - Ultimate Tensile Strength (psi) 15,000
  - Flexural Strength (psi) 22,000
  - Flexural Modulus or elasticity (psi) 1,000,000
- Shall be sized per construction drawings.

- Pipe entering through the manhole wall with an invert equal to or higher than the bench will be sealed all around the interior wall by use of a fiberglass patch kit. There will be no exposed mortar above bench or fillet level.
- Affidavit of compliance to this specification shall be available upon request.

#### **Identification:**

- Each manhole liner shall be marked inside and out with the following information:
  - Manufactures name and trademark
  - Manufactures factory location
  - Manufactures serial number or date code
  - Total length or nominal diameter



#### **Manufacturer:**

- CONTAINMENT SOLUTIONS, INC.
- L.F. MANUFACTURING, INC.
- OPEN



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## Material Specifications

### O 1 – FIBERGLASS MANHOLE/ SANITARY SEWER:

#### **Specification:**

- Fiberglass manholes shall meet or exceed the performance specifications of:
- Shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins with fiberglass reinforcements specifically manufactured for use with sewage.
- Shall be a one piece unit.
- Shall have no vertical seams.
- Shall meet ASTM Standards D 3753, Fiber-glass-Reinforced Polyester Manholes and Wetwells.
- Reinforcing material shall be Grade "E" type glass in the form of continuous roving and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
- The inter surface shall be a resin-rich layer of 0.010 to 0.020 inches thick.
- The concentric cone section shall be affixed to the barrel section at the factory with resin-glass reinforced joint resulting in a one piece unit.
- The manhole wall thickness shall not be less than 0.50 (1/2") inches.
- Shall provide an area for which a grade ring or brick can be installed to accept a typical metal ring & cover and have strength to support a traffic load without damage to the manhole.
- As a UV inhibitor the resin on the exterior surface shall have a color pigment added for a minimum thickness of .125 inches.
- Stub out connections shall be made by using a fiberglass reinforced pipe stub out as a sealing surface for an approved manhole connection boot.
- Invert and bench area can be either a non-corrosive material completely enclosed in a minimum 1/4 inch layer of fiberglass chop or concrete coated with an approved coating.
- Shall have a minimum dynamic-load rating of 16,000 lbs. (AASHTO HS-20) when tested in accordance with ASTM D 3753 and shall not leak, crack or suffer other damage when load tested to 40,000 lbs.

- Shall meet or exceed NBS PS 15-69 physical properties as listed in table 1, of that standard:
  - Ultimate Tensile Strength (psi) 15,000
  - Flexural Strength (psi) 22,000
  - Flexural Modulus or elasticity (psi) 1,000,000
- Shall have a concrete base, 8" thick when less than 12' deep and 12" thick when more than 12' deep. The base shall extend a minimum of 1 foot from the outside wall of the manhole.
- The base shall be sized to act as a anti-floatation device for the entire unit.
- Shall be sized per construction drawings.
- Affidavit of compliance to this specification shall be available upon request.

#### **Identification:**

- Each manhole shall be marked inside and out with the following information:
  - Manufactures name and trademark
  - Manufactures factory location
  - Manufactures serial number or date code
  - Total length or nominal diameter



#### **Manufacturer:**

- CONTAINMENT SOLUTIONS, INC.
- L.F. MANUFACTURING, INC.
- OPEN



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## Material Specifications

### O 3 – FIBERGLASS WETWELL LINER/ SANITARY SEWER:

#### **Specification:**

- Fiberglass wetwell liners shall meet or exceed the performance specifications of:
- Shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins with fiberglass reinforcements specifically manufactured for use with sewage.
- Shall be a one piece unit.
- The wetwell liner pipe shall have plain ends and have no vertical seams.
- Fiberglass tops and hatch openings shall be provided.
- Shall meet ASTM Standards D 3753, Fiber-glass-Reinforced Polyester Manholes and Wetwells.
- Reinforcing material shall be Grade "E" type glass in the form of continuous roving and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
- The inter surface shall be a resin-rich layer of 0.010 to 0.020 inches thick.
- The liner wall thickness shall not be less than 0.625 (5/8") inches.
- As a UV inhibitor the resin on the exterior surface shall have a color pigment added for a minimum thickness of 0.125 inches.
- Shall have a minimum dynamic-load rating of 16,000 lbs. (AASHTO HS-20) when tested in accordance with ASTM D 3753 and shall not leak, crack or suffer other damage when load tested to 40,000 lbs.
- Shall meet or exceed NBS PS 15-69 physical properties as listed in table 1, of that standard:
  - Ultimate Tensile Strength (psi) 15,000
  - Flexural Strength (psi) 22,000
  - Flexural Modulus or elasticity (psi) 1,000,000
- Shall be sized per construction drawings.
- Pipe entering through the wetwell wall with an invert equal to or higher than the bench will be sealed all around the interior wall by use of a fiber-glass patch kit.

- Affidavit of compliance to this specification shall be available upon request.

#### **Identification:**

- Each wetwell liner shall be marked inside and out with the following information:
  - Manufactures name and trademark
  - Manufactures factory location
  - Manufactures serial number or date code
  - Total length or nominal diameter



#### **Manufacturer:**

- CONTAINMENT SOLUTIONS, INC.
- L.F. MANUFACTURING, INC.
- OPEN



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## Material Specifications

### O 4 – POLYPROPYLENE AND/ OR FIBERGLASS REINFORCED PLASTIC CONCRETE PROTECTIVE LINERS/ SANITARY SEWER:

#### Specification:

- Polypropylene (PP) and/ or fiberglass reinforced plastic (FRP) concrete protective manhole and wet-well liners shall meet or exceed the performance specifications of:
- Shall be manufactured from commercial grade polypropylene or plastic polyurethane hybrid polymer composite with fiberglass reinforcements specifically manufactured for use with sewage.
- Shall be a non load-bearing component.
- Shall be cast integrally within monolithic pre-cast concrete structure sections.
- PP liner sections consist of 3 or more segments of equal height and radial length that when welded together will form a section which corresponds to the inside diameter of the concrete structure.
- FRP liner sections shall be prefabricated rigid sections of un-layered homogeneous composite with an aggregate coated and steel spirals/ lattice bonded outer surface to anchor to concrete sections.
- The liner shall have return joint flanges corresponding to pre-cast sections.
- Lined pre-cast section seams shall be sealed with an approved butyl sealant strip or extrusion welding.
- PP/ FRP or PE tops, hatch openings, base and cone sections shall be provided.
- The liner wall thickness shall not be less than:
  - PP and PE= 0.24 inches
  - FRP= 0.16 inches
- Shall be sized per construction drawings.

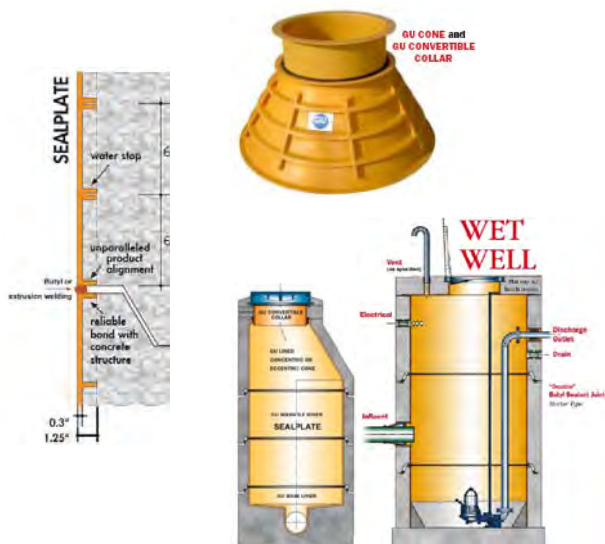
#### Material Properties:

- Polypropylene (PP)- 100% Polypropylene copolymer
  - Hardness- 80 Rockwell (R scale)
- Polyethylene (PE)
  - Hardness— 80 Rockwell (R scale)
- Fiberglass reinforced Polyurethane composite-
  - Reinforcing material shall be Grade "E" type glass with a minimum length of fibers being 0.625 inches. Content by weight 12%- 15%
  - Inert filler content by weight 10%- 13%
  - Bonding aggregate, pre-washed, kiln dried, frac-

tured 3/8" gravel. Graded particle size minimum 3/16" and maximum 3/8". Rate of application- 3.5 lbs./sq ft.

#### Physical Properties:

- Density of FRP per ASTM D1622- 1.17g/cm3
- Shore "A" hardness durometer per ASTM D2240- exceeds 90 on scale.
- Shall exhibit no surface degradation from chemicals per ASTM D1308 when exposed to: Nitric Acid 69%, Hydrochloric Acid 60%, Ammonia 28%, Sodium Hydroxide 5.25%, Sulfuric Acid 50%, Sulphuric Acid 80%, Acetone, Unleaded Gasoline, Turpentine.
- Affidavit of compliance to this specification shall be available upon request.



#### Manufacturer:

- GU FLORIDA, INC.
- OPEN



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## Material Specifications

### O 4.1 – POLYPROPYLENE / FIBERGLASS REINFORCED PLASTIC MANHOLE BASE LINER/ SANITARY SEWER:

#### Specification:

- Polypropylene (PP)/ fiberglass reinforced plastic (FRP) concrete protective manhole base liners shall meet or exceed the performance specifications of:
- Shall include: full flow channels with side walls to the crown of the pipes; inner bench surfaces to have a non-skid pattern; gasketed, flexible and watertight bell type connectors and/ or sleeves for flexible boot connectors of either PP, FRP or PVC to suit specific pipe types, alignments and grades shall be monolithically attached to the manhole base liner channeling and shall extend to the outside profile of the pre-cast concrete structure.
- Shall be a non load-bearing component.
- Shall be integrally cast in pre-cast concrete structures.
- Shall be prefabricated one piece construction of un-layered homogeneous composite with an aggregate coated and steel spirals/ lattice bonded outer surface to anchor to concrete sections.
- The liner thickness shall not be less than 0.12" - 0.20" inches.
- Shall be sized per construction drawings.

#### Material Properties:

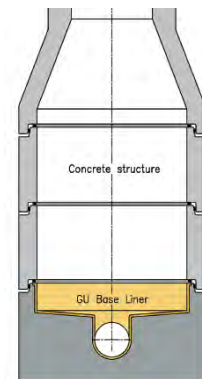
- Polypropylene (PP)- 100% Polypropylene copolymer.
  - Hardness– 80 Rockwell (R scale)
- Fiberglass reinforced Polyurethane composite (FRP)
  - Glass fiber– type E, min fiber length– 0.625" inches. Content by weight– 10%- 12%.
  - Inert filler content by weight– 10%- 13%.
- Bonding aggregate, pre-washed, kiln dried, fractured 3/8" gravel. Graded particle size minimum 3/16" and maximum 3/8". Rate of application- 3.5 lbs./sq ft.

#### Physical Properties:

- Density of FRP per ASTM D1622- 1.17g/cm3
- Shore "A" hardness durometer per ASTM D2240- exceeds 90 on scale.
- Shall exhibit no surface degradation from chemicals per ASTM D1308 when exposed to: Nitric Acid 69%, Hydrochloric Acid 60%, Ammonia 28%, Sodium Hy-

droxide 5.25%, Sulfuric Acid 50%, Sulphuric Acid 80%, Acetone, Unleaded Gasoline, Turpentine.

- Acetone immersion per ASTM D2152- No attack.
- Affidavit of compliance to this specification shall be available upon request.



#### Manufacturer:

- GU FLORIDA, INC.
- OPEN



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## Material Specifications

### O 5 – HIGH DENSITY POLYETHYLENE CONCRETE PROTECTIVE LINERS/ SANITARY SEWER:

#### Specification:

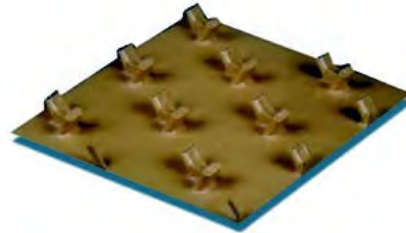
- High density polyethylene (HDPE) or polypropylene random copolymer (PP-R) concrete protective manhole and wetwell liners shall meet or exceed the performance specifications of:
- Shall be manufactured from high density polyethylene (HDPE) or polypropylene random copolymer (PP-R) and extruded with a large number of anchoring studs, a minimum of 39/ft<sup>2</sup>, shall have a minimum pull out of 112.5 lbs./anchoring stud.
- Shall provide a waterproof, corrosion resistant liner to prevent any deterioration of concrete surfaces from hydrogen sulfide and other corrosive gases/acids produced by wastewater.
- Shall be a non load-bearing component.
- Shall be integrally cast in new pre-cast concrete structures.
- The liner wall thickness shall not be less than 2mm and the flat sheet, non anchored, used for overlapping joints, shall have a minimum thickness of 3mm.
- Shall have good impact resistance, shall be flexible, and have an elongation sufficient to bridge up to a 1/4-inch settling crack, without damage to the lining.
- The interior surfaces to be protected shall include the walls, ceiling, and pipe entries.
- All joints shall be sealed by means of thermal welding performed by Agru certified welder.
- All welding shall be performed in accordance with the published directives and procedures of the manufacturer and by welders certified by the manufacturer. Completion of welding will provide a one piece monolithic concrete protective liner system.
- Inspection shall be by visually checking and spark testing all welded joints.
- The liner shall be repairable at any time during the life of the structure.
- Shall be sized per construction drawings.

#### Material Properties:

- The liner system and welding rod shall be manu-

factured from the same resins and meet the following properties:

| Property                                  | Test Method | Unit              | HDPE      | PP-R      |
|---|-------------|-------------------|-----------|-----------|
| Density                                   | ASTM D792   | g/cm <sup>3</sup> | 0.0945    | 1.78      |
| MFI<br>(Melt Flow Index)                  | ASTM D1238  | g/10min           | (190/5)   | (190/5)   |
| Heat Reversion<br>(Dimensional Stability) | ASTM D1638  | %                 | <2        | <2        |
| Yield Stress                              | ASTM D638   | PSI               | ≥2,320    | ≥2,900    |
| Elongation of Yield                       | ASTM D638   | %                 | ≥12       | ≥10       |
| Elongation at Break                       | ASTM D638   | %                 | ≥200      | ≥50       |
| Fire Classification                       | UL-94       |                   | V2        | V2        |
| Maximum Working<br>Temperature            |             | C°<br>F°          | 60<br>140 | 90<br>194 |



#### Manufacturer:

- AGRU SURE GRIP LINER
- OPEN



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# Material Specifications

## O 6 – MULTI-COMPONENT STRESS PANEL LINER SYSTEM / SANITARY SEWER:

### Specification:

- Multi-layered poly resin composite protective man-hole and wetwell liner system shall meet or exceed the performance specifications of:
- Shall provide a waterproof, corrosion resistant liner to prevent any deterioration of concrete surfaces from hydrogen sulfide and other corrosive gases/acids produced by wastewater.
- Manufacture shall warrant material and workmanship for a minimum period of ten (10) years.
- Shall be a non load-bearing component.
- To ensure total unit responsibility, all material and installation shall be furnished by, and coordinated with, one supplier/ manufacturer.
- The interior surfaces to be protected shall include the walls, ceiling, benches and pipe entries.
- Total thickness of multi-component stress panel liner shall be a minimum of 500 mils and shall sustain a 300 PSI pull test.
- **Use of this system is restricted to rehabilitation of existing structures.**

### Physical/ Material Properties:

1. Liner.
 

|                         |                                   |
|-------------------------|-----------------------------------|
| <u>Installation</u>     | <u>Liner</u>                      |
| Moisture barrier        | Modified Polymer                  |
| Surfacer                | Polyurethane/Polymeric blend foam |
| Final corrosion barrier | Modified polymer                  |
2. Modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.

### TYPICAL CHEMICAL ANALYSIS

| "A" Component                               |                   |
|---|-------------------|
| Viscosity, 77° F, cps., ASTM D-1638         | 300-400           |
| Physical State                              | Liquid            |
| Color                                       | Clear to amber    |
| Hygroscopicity                              | Reacts with water |
| "B" Component                               |                   |
| Viscosity, 160° F, cps., ASTM D-1638        | 400-600           |
| Physical State                              | Liquid            |
| Color                                       | Flamingo Pink     |
| Non-Volatile                                | 100%              |
| Reaction Profile (100 grams, 175° F sample) |                   |
| Gel Time, seconds                           | 1-2               |
| Tack Free Time, seconds                     | 15                |
| Cure Time, seconds                          | 30                |

| Processing                        |             |
|-----------------------------------|-------------|
| A System / B System, volume ratio | 1.00 / 1.00 |

### Typical Physical Properties

|                       |       |
|-----------------------|-------|
| Tensile Strength, PSI | >1500 |
| Elongation, %         | >125  |
| Tear Strength, PSI    | 350   |
| Shore D Hardness      | 55-65 |
| 100% Modulus, PSI     | >1500 |

3. Polyurethane Rigid Structure Foam, low viscosity two-component, containing flame retardants.

### TYPICAL CHEMICAL ANALYSIS

| "A" Component                       |   |
|-------------------------------------|---|
| Viscosity, 77° F, cps., ASTM D-1638 | 200                                       |
| Physical State                      | Liquid                                    |
| Color                               | Dark Brown                                |
| Hygroscopicity                      | Reacts with water and evolves CO2 gas     |
| "B" Component                       |   |
| Viscosity, 77° F, cps., ASTM D-1638 | 600-1000                                  |
| Physical State                      | Liquid                                    |
| Color                               | Tan                                       |
| Hygroscopicity                      | Absorbs water rapidly thus changing ratio |

### Reaction Profile (100 grams, 77° F sample)

|                         |      |
|-------------------------|------|
| Cream Time, seconds     | 1-4  |
| Tack Free time, seconds | 5-8  |
| Rise Time, seconds      | 6-10 |

### Processing

|                                   |             |
|-----------------------------------|-------------|
| A System / B System, volume ratio | 1.00 / 1.00 |
|-----------------------------------|-------------|

### Typical Physical Properties

|  |         |
|--|---------|
| Density, nominal, core, lbs/ft3 ASTM D-1622 @ 74° F          | 4-10    |
| Compression Strength, ASTM D-1621 @ 74° F parallel rise; PSI | 90-150  |
| Closed Cell Content, % - ASTM 1940 @ 74° F                   | Over 90 |
| Shear Strength, PSI - ASTM C-273 @ 74° F                     | 225-250 |



### Manufacturer:

- CONCRETE CONSERVATION, INC.- SPECTRA-SHIELD
- OPEN



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## Material Specifications

### O 7 – MULTI-COMPONENT; URETHANE/EPOXY, POLYUREA LINER SYSTEM / SANITARY SEWER:

#### Specification:

- Multi-component protective manhole and wetwell liner system shall meet or exceed the performance specifications of:
- Shall be a two component, 100% solids, no VOC's, elastomeric coating.
- Manufacture shall warrant material and workmanship for a minimum period of ten (10) years.
- Shall provide a waterproof, corrosion resistant liner to prevent any deterioration from hydrogen sulfide and other corrosive gases/acids produced by wastewater.
- Can be used to rehabilitate and protect concrete, steel, fiberglass, or masonry surfaces.
- Shall use a system tested approved high early strength, non-corrosive, cementitious concrete to rebuild the substrate profile and create a surface for coating.
- To ensure total unit responsibility, all material and installation shall be furnished by, and coordinated with, one supplier/ manufacturer.
- The interior surfaces to be protected shall include the walls, ceiling, benches and pipe entries.
- Urethane/epoxy, polyurea liner system shall be a minimum of 90 mils to an unlimited build thickness.

#### ADHESION RESULTS:

##### ASTM D-4541 Patti Tester

|                               |         |
|-------------------------------|---------|
| Concrete (direct to concrete) |         |
| (NO PRIMER):                  | >350PSI |
| - Glue Failure                |         |
| Concrete Green Monster Primer | 600 PSI |
| -EPOXY Glue Failure           |         |
| -1/8" Concrete on dolly       |         |
| Carbon Steel (direct)         | 900 PSI |



#### PRIMER

##### TYPICAL PROPERTIES (1:1 BY VOL.):

|                            |            |        |
|----------------------------|------------|--------|
| TENSILE STRENGTH, PSI      | ASTM D638  | 4500   |
| ELONGATION, %              | ASTM D638  | 6      |
| COMPRESSIVE STRENGTH, NEAT | ASTM D695  | 3800   |
| COMPRESSIVE STRENGTH, SAND | ASTM D695  | 4450   |
| SHRINKAGE                  |            | None   |
| EXUDATION                  |            | None   |
| BOND STRENGTH, psi         | ASTM D4541 | 1200   |
| HARDNESS, SHORE D          | ASTM D2240 | 71     |
| SOLIDS CONTENT, %          |            | 89     |
| COLOR                      |            | Amber  |
| VISCOSITY, cps, neat       |            | 25     |
| VOC, g/l                   |            | 2.3    |
| POT LIFE @ 72° F           |            | 3 min  |
| TACK FREE @ 72° F          |            | 10 min |
| FINAL CURE @ 72° F         |            | 20 min |

#### LINER

##### TYPICAL PHYSICAL PROPERTIES :

|                           |                |         |
|---------------------------|----------------|---------|
| TENSILE STRENGTH, PSI     | ASTM D412      | 4500    |
| ELONGATION, %             | ASTM D412      | 460     |
| 100% MODULUS              | ASTM D412      | 1460    |
| 200% MODULUS              | ASTM D412      | 1960    |
| 300% MODULUS              | ASTM D412      | 2650    |
| TEAR STRENGTH, PLI        | ASTM D624      | 570     |
| HARDNESS, SHORE A         | ASTM D2240     | 98      |
| HARDNESS, SHORE D         | ASTM D2240     | 52      |
| FLEXIBILITY, 1/8" MANDREL | ASTM D1737     | PASS    |
| FLASH POINT, °F           | PENSKY-MARTIN  | >200    |
| TABER ABRASION, MG LOSS   | ASTM D4060     | 17.0    |
| CS 17 WHEELS              | 1KG, 1000 REVS |         |
| VISCOSITY B-SIDE (75°F)   | CPS            | 650     |
| VISCOSITY A-SIDE (75°F)   | CPS            | 350     |
| A-SIDE HOSE TEMPERATURE   | °F             | 140-160 |
| B-SIDE HOSE TEMPERATURE   | °F             | 140-160 |
| BLOCK TEMPERATURE         | °F             | 160     |
| CONSTANT PRESSURE, PSI    |                | 2000    |



#### Manufacturer:

- GML COATINGS– GREEN MONSTER
- OPEN



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## Material Specifications

### O 8 – POLYMORPHIC RESIN LINER SYSTEM / SANITARY SEWER:

#### Specification:

- Polymorphic resin protective manhole and wetwell liner system shall meet or exceed the performance specifications of:
- Manufacture shall warrant material and workmanship for a minimum period of ten (10) years.
- Shall be a modified isphthalic polyester liner system made of two-components, 100% solid, known as polymorphic resin as described below.
- Shall provide a waterproof, corrosion resistant liner to prevent any deterioration of concrete surfaces from hydrogen sulfide and other corrosive gases/acids produced by wastewater.
- Can be used to rehabilitate and protect concrete, steel, fiberglass, or masonry surfaces.
- System shall restore structural integrity of brick/concrete structures.
- Shall use an approved quick setting cementitious material to bring substrate to profile.
- To ensure total unit responsibility, all material and installation shall be furnished by, and coordinated with, one supplier/ manufacturer.
- The resin based material shall be used to form the sprayed on/ structure enhanced monolithic liner covering all interior surfaces to be protected and shall include the walls, ceiling, benches, inverts and pipe entries.
- Application of liner system shall be in strict accordance with manufacture's recommendation. The three coat system is made of a prime coat (DS-101 10-25 mils thick), intermediate coat (DS301 75-150 mils thick), and a final coat (DS-401 10-25 mils thick). Final installation shall be a minimum thickness of 150 mils and not more than 250 mils thick.

#### Minimum Physical/ Material Properties

|                      |                    |                   |
|----------------------|--------------------|-------------------|
| Flexural Strength    | ASTM D790          | 8,630 psi         |
| Compressive Strength | ASTM D695          | 15,120 psi        |
| Tensile Strength     | ASTM D638          | 4,900 psi         |
| Barcol Hardness      | Impressor #L25     | 72 to 75          |
| Adhesive Strength    | direct to metal    | 1,582 psi         |
| Adhesive Strength    | direct to concrete | substrate failure |



#### Manufacturer:

- INTEGRATED ENVIRONMENTAL TECHNOLOGIES, (I.E.T.) - SYSTEM 3
- OPEN



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