

Appendix A

Evansville Water & Sewer Utility

Materials Specifications



WATER DEPARTMENT MATERIAL SPECIFICATIONS

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1. SERVICE LINE MATERIALS

ALL BRASS PRODUCTS INSTALLED AFTER OCTOBER 1, 2013 SHALL CONTAIN NO MORE THAN 0.25% LEAD. BRASS PRODUCTS SHALL BE MARKED WITH THE “NL” DESIGNATION CLEARLY IDENTIFYING THE PRODUCT AS NO-LEAD. ALL SERVICE LINE MATERIALS SHALL BE RATED FOR 150 PSI WORKING PRESSURE.

A. Tapping Saddles

All tapping saddles must be bronze body with stainless steel bands. The bands shall be a minimum of 2 inches wide for ¾ inch and 1 inch saddles and a minimum of 5 ¼ inches wide for 2 inch and larger saddles. The outlet of the saddle shall have corporation (CC) thread. All stainless steel bolts and nuts shall have special lubricating molybdenum disulfide coating, such as “Never Gall”, on the entire surface of the bolt and nut.

Mueller BR 1S Series and Mueller BR 2S Series

A.Y. McDonald Model 3835 or 3855

Ford 101BS and 202BS

Cambridge Brass Series 822 and Series 812

*Accepted for use on 16” and larger water mains

Romac Industries Inc. Model#202 NS

B. Corporation Stops

All ¾ inch and 1 inch corporation stops shall be corporation (CC) thread by pack joint with an external set screw. All 2 inch corporation stops shall be corporation thread by male iron pipe thread. All corp stops shall be ball valve style with 360 degree rotation.

Mueller ball style CC x Pack Joint for ¾ and 1 inch

Mueller ball style CC x MIP for 2 inch

Ford Ballcorp FB1000 style CC x Pack Joint for ¾ and 1 inch

Ford Ballcorp FB1000 style CC x MIP for 2 inch

A.Y. McDonald ball style CC x Pack Joint for ¾ and 1 inch

A.Y. McDonald ball style CC x MIP for 2 inch

Cambridge Brass ball style CC x CTS for ¾ and 1 inch

Cambridge Brass ball style CC x MIP 3011-A7M7 for 2 inch

C. Curb Stops

All curb stops shall be ball style with full 360 degree rotation. All ¾ and 1 inch curb stops shall have pack joint inlets with external set screws. The ¾ and 1 inch curb stops may have pack joint, MIP, or FIP outlets depending upon the use. 2 inch curb stops shall have a MIP inlet and may have pack joint, MIP, or FIP outlets depending upon the use.

Mueller Ball Style Curb Stop P-25172-3

A.Y. McDonald Ball Style

Ford Ball Valve Curb Stop B-44-R Style

Cambridge Brass

D. Copper Tubing

All service line material for $\frac{3}{4}$ and 1 inch shall be Type K copper.

United Steel
Kessler
KobeWieland Copper Products
Cerro Flow Products, Inc.
Cambridge-Lee Industries, LLC
Wieland Copper Products
Mueller

E. Polyethylene Tubing

All service line material for 2 inch shall be DR 9 HDPE.

Cresline
Hancor
ADS
Endot Industries, Inc.

F. Stop Box

Curb boxes shall be of the extension type. Each curb box shall be complete with foot piece, curb box and lid. If a stop box is used on a 2" curb stop, an enlarged base must be used and a top half of a valve box with a valve box lid will be installed over the stop box. Materials must be shipped in crate. Repair lids shall ship in boxes containing 10 lids.

Tyler 93D 6500 Domestic
Sigma VB 93-D
Bingham & Taylor #93 DOS Curb Box and Repair Lids 10374
Trumball Repair Lids T374
Mueller Repair Lids H-10374

G. Curb Stop Alignment Device/Enlarged Base

All $\frac{3}{4}$ and 1" curb stops shall require a curb stop alignment device. All 2" curb stops shall require an enlarged base.

$\frac{3}{4}$ " – **EMMA Sales VKAD034**
1" – **EMMA Sales VKAD100**
2" – **Tyler Union 6500**
2" – **Sigma VB 7965**

H. Meter Pits

All $\frac{3}{4}$ " and 1" meter pits shall be heavy wall bullet style only. 2" meter pits shall be constructed of HDPE or galvanized steel in non-traffic areas and reinforced concrete pipe in traffic areas.

Meter Pits, Non-Traffic Area

$\frac{3}{4}$ " and 1" – **Oldcastle** 20x24x24

$\frac{3}{4}$ " and 1" – **Carson** Bullet Style 20x24x24

$\frac{3}{4}$ " and 1" – **Sigma** Raven 20x24x24

2" Galvanized – **Contech** Construction Products, Inc.

2" HDPE –

DFW Industries

Francesville HDPE Corrugated

Prinsco Goldflo

Meter Pits, Traffic Rated

$\frac{3}{4}$ " to 2" - ASTM C76 Reinforced Concrete Pipe, 30"

I. Meter Pit Collar and Lid

All $\frac{3}{4}$ " and 1" meter pits shall have a 20" cast-iron collar and lid. The hold-down bolt shall have a 1 $\frac{1}{32}$ " head. The 2" meter pits shall have either a 30" aluminum collar and lid for non-traffic applications or a cast-iron frame and lid for traffic areas. All lids shall have a 1 $\frac{7}{8}$ " hole for the touch pad. Meter pits that have a compound meter with dual registers shall have two – 1 $\frac{7}{8}$ " holes for the touch pads. The area surrounding the touch pad holes shall be flat without raised lettering so that the touch pad tightens down firmly to the surface of the lid.

2" Meter Pit Casting Non-Traffic

Castings Inc. MH-150-24-AL

2" Meter Pit Casting Traffic Rated

East Jordan Iron Works Spring Assisted

20" Collar and Lid

Vestal

Tyler

Ford

Sigma

East Jordan

Mueller

Bingham & Taylor

4" and 6" Meter Pit Castings

East Jordan Iron Works 8196ZPT

Product #00821686B01 with Lift Assist Hatch

Neenah Foundry R-3498-P2S

With Spring Assist and 'SA' Hinges

J. Meter Setters

All 5/8", 3/4", and 1" setters shall be copper tube size and shall have an angle valve on the inlet riser. 2" setters shall have dual angle valves with a lockable high bypass. Connectors must be assembled with setter on delivery. All brass fittings with pack-joint ends shall have external set screws.

Mueller B-2404 (3/4" and 1") B-2423-2-99000 (2")

Ford 70 Series Coppersetter

5/8" X 3/4" V72-xxW-11-xx style

3/4" x 3/4" V73-xxW-11-xx style

1" V74-xxW-11-44 style 2" V77-xxHB-11-77 style

Cambridge Brass Series 6020

A.Y. McDonald

5/8" x 3/4" Meter Setter 20-207WXDD 33

3/4" x 3/4" Meter Setter 20-307WXDD 33

3/4" x 3/4" Meter Setter 722-207WX22 33

1" Meter Setter 20-410WXDD 44

2" Meter Setter 4136-214

K. Brass Fittings – Compression Fittings, Male & Female Adapters

All brass fittings with pack-joint ends shall have external set screws.

Mueller

A.Y. McDonald

Ford

Cambridge Brass

L. Inserts

All 2 inch HDPE tubing shall have stainless steel inserts placed inside the tubing at every connection to a fitting.

Mueller

A.Y. McDonald

Ford

Cambridge Brass

2. WATER LINE MATERIAL

M. Tapping Sleeves

Tapping Sleeves shall be constructed of Grade 18-8, Type 304 stainless steel with stainless steel drop-in bolts with heavy stainless steel hex nuts. The heavy hex stainless steel nuts must have special lubricating molybdenum disulfide coating, such as "Never Gall", on the entire surface of the bolt and nut.

The Tapping Sleeve shall be furnished with a griddled rubber gasket consisting of SAR compound for water service meeting ASTM D2000 80M4AA607. The gasket must provide 360 degree circumferential support and have 16 gauge stainless steel armors, a minimum of 2.25 inches wide, molded in place to span the gap between the two tapping sleeve sections.

The Tapping Sleeve shall be furnished with a 3/4" test port positioned top dead center with a stainless steel square head plug for easy use. The stainless steel flange must be recessed to accept standard tapping valves. The Tapping Sleeve shall be rated for a 200 psi working pressure and a 225 psi test pressure.

All stainless steel welds used in the construction of the sleeve shall conform to AS Codes and shall be passivated in order to return the surrounding stainless steel material to its original corrosive resistant condition. The flange outlet section shall be doubled welded, inside and out, to provide maximum strength.

Romac Industries, Inc. (SSTIII) All SS with SS Removable Bolts

Ford (Must be All SS with SS Removable Bolts)

JCM 432 All SS with SS removable bolts

Smith-Blair Stainless Steel Tapping Sleeve # 665 with SS Removable Bolts

Powerseal 3490 AS

N. Tapping Valves

All valves and parts shall be made and assembled in the continental United States. Tapping valves shall meet ANSI/AWWA C515 and have flange mechanical joint ends. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. Nuts, bolts, and gaskets for flange joints shall meet the requirements of ANSI/AWWA C515. Nuts and bolts shall be 304 stainless steel, and gaskets shall be rubber and must meet EWSU material specifications. Mechanical joints and accessories shall meet the requirements of ANSI/AWWA C111/A21.11. A full nominal diameter cutter shall be used for tapping.

Mueller C515 Ductile Iron Body Tapping Valves with SS Hardware MJ X FL

Kennedy C-515 KS-RW SS 7590SS with SS Hardware MJ X FL

Clow DI C-515 Model

M&H C-515 DI Resilient Wedge Tapping Valves 7590

American Flow Control Series 2500-1 Resilient Wedge Tapping Valve C-515

J & S Valve Series 6900.5 AWWA C515

O. Gate Valves

All valves and parts shall be made and assembled in the continental United States. Buried gate valves 4-inches and larger shall have iron body, non-rising stem gate, and resilient wedges. Valves shall meet the requirements of ANSI/AWWA C515 and have mechanical joint ends. Mechanical joints and joint accessories shall comply with ANSI/AWWA C111/A21.11. Valves shall be constructed to open right (clockwise) and shall have a two-inch (2") square operating nut. Valves shall include the following features:

- a. The thrust ring on the stem shall be properly and adequately bushed.

- b. The thrust ring shall be an integral part of the stems.
- c. All valves shall have full pipe size openings through the seat ring.
- d. All valves shall be furnished with mechanical joint accessories including bolts, glands, and gaskets. Bolts and nuts shall be made of cast iron (Corten or equal).
- e. The operating nut of an open right valve shall be painted red.
- f. All test plugs shall be solid brass or stainless steel.
- g. All packing gland or bonnet bolts and nuts must be made of 304 stainless steel

Gate valves 4-inches and larger installed above ground or in structures shall be ductile iron body. Valves shall correspond to ANSI/AWWA C515. Outside screw and yoke gate valves shall have flange joint ends and malleable iron handwheels. Flange joints and accessories shall be as specified in ANSI/AWWA C515. Bolts and nuts must be made of 304 stainless steel. Gaskets shall be full face and rubber and must conform to EWSU material specifications.

No gate valves smaller than 4-inch will be installed.

Mueller 2360 Series T-2360-20

Kennedy Gate Valve C-515 KS-RW

*All packing gland or bonnet bolts and nuts must be made of stainless steel

American Flow Control Series 2500-1 Resilient wedge gate valve C-515

*All packing gland or bonnet bolts and nuts must be made of stainless steel

Clow Model 2638

M&H C-515 DI Resilient Wedge gate valves 7571.

*All packing gland or bonnet bolts and nuts must be made of stainless steel

J & S Valve Series 6900.5 AWWA C515

American AVK Series 65

Knife Valves

Red Valve Series G Knife Gate Valve

Valtorc Series 5000 Ductile Iron Body

P. Butterfly Valves

All valves and parts shall be made and assembled in the continental United States. Butterfly valves shall be used in pipe sizes 16" and larger. Valves shall be constructed to open right (clockwise) and shall have a two (2) inch square operating nut when buried. Operating nut shall be painted red and be visible from the valve box cover. All valves shall have full pipe size opening through the seat ring. Butterfly valves and operators shall be Class 150B and meet the requirements of ANSI/AWWA C504. Buried butterfly valves shall have mechanical joints following ANSI/AWWA C111. Butterfly valves installed above ground or in structures shall have flange joints as specified in ANSI/AWWA C504. Nuts, bolts and gaskets for flange joints shall conform to ANSI/AWWA C110 and be zinc-coated alloy steel. Gaskets shall be full face and rubber, or as approved by the Engineer. Gearbox shall be rated for a minimum of 450 ft-lb torque.

DeZurik

Henry Pratt
Kennedy
Mueller

Q. Fire Hydrants

Fire hydrants shall be domestically produced, a dry-barrel, compression shutoff, traffic model design and shall comply with ANSI/AWWA C502. Main valve size shall be 5-1/4 inch. Inlets shall be 6-inch mechanical joint. Each hydrant shall have two 2-1/2-inch nozzles and one 5 inch factory installed Storz connection. The hydrant shall have a positive non-corrodible type bronze lined drain valve. When the hydrant is open the drip valve will close the drain and when the hydrant is closed the drain will open. The operating nut as well as the two – 2 ½ caps shall have a 1 ½ inch pentagonal nut. The two 2 ½ inch caps shall not have chains attached. The 5 inch Storz cap shall have a jacketed stainless steel cable attaching the cap to the main body of the hydrant. All hydrants shall be open right. Each hydrant shall be the proper bury depth for the water main to which the hydrant is connected. Hydrants shall be furnished with mechanical joint accessories including bolts, glands and gaskets. Bolts and nuts shall be Corten or equal. The hydrant valve shall be epoxy coated with a minimum of 9 mils. Fire hydrant coating shall meet the requirements of ANSI/AWWA C502. Fire hydrant bodies will be painted school bus yellow with bonnet colors to vary depending on the size of water main supplying the hydrant. Hydrants supplied by a 4 inch main shall have a red bonnet. Hydrants supplied by a 6 inch main shall have a green bonnet. Hydrants supplied by an 8 inch or larger main shall have the bonnet painted yellow to match the body. There shall be one hydrant wrench, equipped to fit the specified operating nut size, supplied with every five hydrants.

Mueller Super Centurion

Kennedy Guardian K81D

Clow Medallion

AVK

American Flow Control Waterous Pacer (Must Have 16" Top Barrel)

R. PVC Pipe – Open Cut Installation

For open-cut installations (unless otherwise indicated), pipe with a nominal diameter 12" or less shall conform to AWWA C-900, DR18. The material used also shall conform to ASTM D1784, Class 12454-B (PVC 1120). Pipe with a nominal diameter of 16" shall conform to AWWA C-900, DR18. Joints shall be composed of elastomeric gasket joints and shall be in accordance with the requirements of ASTM D3139. Joints shall be bell and spigot end, mechanical joint or coupling push-on type. Joints shall be designed so as to provide for the thermal expansion and contraction experienced with a total temperature change of 75 degrees F° at each joint. Details of the joint design and assembly shall be in accordance with joint manufacturer's standard practice. Gaskets shall be in accordance with the requirements of ASTM F477 and ANSI A-21.11. Joint lubricant shall have no deteriorating effects on the gasket or the pipe. The lubricant containers shall be labeled with manufacturer's name. Pipe from different manufactures shall not be joint together via bell and spigot connection. All transitions between manufacturers shall occur at a gate valve or mechanical joint fitting and noted on the record drawings.

North American Pipe Corporation
Diamond Pipe
PW Eagle Vinyl-Lock
JM Eagle
National Pipe & Plastics
Northern Pipe Products, Inc.
Pipelife Jetstream Inc.
Sanderson Pipe Corp
Vinylplex

S. Ductile Iron Pipe – Open Cut Installation

Ductile iron pipe shall be domestically produced and shall meet the requirements of ANSI/AWWA C151/A21.51. Design and manufacture pipe for the pressure class listed plus 100 psi surge pressure. Additionally, a safety factor of 2.0 and a depth of cover indicated on the drawings or as required by the manufacturers and ANSI/AWWA specifications, shall be included. Ductile iron pipe shall be pressure class 350. All ductile iron pipes shall have cement-lining in accordance with ANSI/AWWA C104/A21.4. All ductile iron must be encased in V-BIO enhanced polyethylene with a minimum thickness of 8 mils in accordance with the AWWA C105 standard for corrosion protection of Ductile Iron pipe. Gaskets for mechanical joints and push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11.

Joints shall be compression type push-on joints, Type P0J-1, single gasket type conforming to ANSI A21.11 "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings". The bell shall have cast or machined gasket socket recesses, a tapered annular opening and flared socket design to provide deflections up to maximum of 5 degrees. Plain spigot ends shall be suitably beveled to permit easy entry into bell, centering in gasket and compression of the gasket. The joint shall be liquid tight under all pressure ranges from vacuum up to 350 psi. Sufficient lubricant shall be furnished to provide a thin coat on each spigot end. The lubricant shall be non-toxic, shall impart no taste or odor to conveyed liquid, and shall have no deleterious effect on the rubber gasket. The lubricant shall be of such consistency that it can be easily applied to the pipe in hot and cold weather and shall adhere to either wet or dry pipe.

U.S. Pipe and Foundry Co.
American
Clow
Griffin
McWane

T. Restrained Joint Pipe – Installed by Trenchless Technology, Within Casing or Open Cut

All PVC and Ductile-Iron pipe installed by directional drilling, pipe-bursting, or other trenchless methods and pipe installed within a casing shall meet the same standards and specifications as open-cut installation pipe with the additional requirement of restrained joints. The restrained joint can be integrally part of the pipe or it can be a restrained joint coupling that attaches two pipes together.

Certain Teed Certa-Lok
EAGLE LOC 900
Griffin Pipe DI Bolt-Lok
Griffin Pipe DI MECH-LOK
Griffin Pipe SNAP-LOK
Diamond Lok – 21
U.S. Pipe and Foundry Co.
American
McWane

U. Restraint Devices

All restraint devices shall be domestic only. Mechanical joint restraint shall be incorporated in the design of the follower gland. The restraint mechanism shall consist of a plurality of individually activated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536-80. The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153 of latest revision. Torque actuated twist off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of restraining devices.

Ebaa Iron, Inc. Megalug Series 1100 for Ductile Iron
Ebaa Iron, Inc. Megalug Series 2000PV for PVC
Ebaa Iron, Inc. Megalug Series 1500TD for C-900 and Ductile Iron Bell Joint Restraint
Ebaa Iron, Inc. Megalug Series 2800 for C-905 Bell Joint Restraint
Sigma Domestic One-Lok D-SLDE for Ductile Iron
Sigma Domestic One-Lock D-SLCE for PVC
Ford Meter Box
Star Domestic Stargrip Series 4000 for PVC
Star Domestic Stargrip Series 3000 for Ductile Iron
Tyler Union Domestic Series 1000 for Ductile Iron
Tyler Union Domestic Series 2000 for PVC

V. Ductile Iron Fittings

All fittings shall be domestically produced mechanical joint ductile iron fittings meeting all applicable requirements of ANSI/AWWA-C110/A21.10 or ANSI/AWWA-C153/A21.53 specifications. All fittings shall be cement mortar lined and bituminous or epoxy-coated meeting ANSI/AWWA C110/A21.10 specifications. All fittings shall have a minimum pressure rating of 150 psi. All joints shall conform to AWWA C111 or AWWA C115 as appropriate.

Fitting joints shall be mechanical joints or restrained push-on joints. Joints shall meet the requirements of ANSI/AWWA C111/A21.11. Restrain all mechanical joints as indicated on the drawings or as required by the manufacturer's recommendations and ANSI/AWWA specifications. Pipe connecting to restrained joint fittings shall be restrained as indicated on the drawings or as required by the manufacturer's recommendations and ANSI/AWWA specifications

Star Ductile Iron Compact Fittings
Tyler Union MJ C153 Ductile Iron Compact fittings
Sigma C153 MJ Ductile Iron Fittings
Krausz Hymax Grip End Cap

W. Valve Boxes – Extensions- Risers – Lids

Valve boxes for butterfly valves and gate valves shall be heavy duty cast iron cast domestically in the US. Valve boxes shall be two piece or three piece type. Each two piece box shall be complete with bottom section, top section and cover. Each three piece box shall be complete with base, center section, top section and cover. Valve boxes shall be extension type with slide or screw type adjustment. Each base and bottom section shall be the proper size for the valve served. Each valve box assembly shall be the proper length for the valve served. The minimum thickness of metal shall be 3/16-inch. The minimum thickness of the top half where the box receives the lid shall be 11/16-inch. Cast the word "WATER" in each valve box cover. All valve box covers shall be heavy duty with a minimum weight of 12 pounds. All valve box covers shall be manufactured by the same company as the valve box and shall be cast domestically in the US. All valve boxes shall be installed with a valve box alignment device properly sized to fit the corresponding valve.

Tyler Union Domestic Only
Bingham and Taylor Domestic Only

Valve Boxes with a depth greater than 5 feet shall also use valve stem extension adapters consisting of a stainless steel extension.

X. Tracer Wire – Tracer Wire Connectors

Tracer wire shall be Polyethylene insulated for underground service, solid copper or copper clad steel. Wire insulation shall be highly resistant to alkalis, acid and other destructive agents found in soil. Location wire for PVC pipe shall be 12 AWG – Solid Core RHW or RHH underground copper cable. Location wire for open cut applications may also use the same wire required for directional drilling applications. Location wire used in directional drilling applications shall be 12 AWG-Solid CCS Directional Drill Tracer Wire, 45 MIL HDPE, 30 Volt, Direct Burial Only Wire. Directional Drill Tracer Wire shall be extra high strength with a minimum break load of 1150 pounds. Tracer wire shall be contiguous without splices throughout the directional drill path. Tracer wire shall be installed on pipeline installations and shall be taped to the top of the pipe. Tracer wire shall come up and be accessible in every valve box and shall have enough excess so that it extends 3 feet above grade. The wire shall be located on the exterior of the bottom half of the valve box and then protrude through the two halves so that it is located on the interior of the top half.

Copperhead EHS (Extra High Strength for Directional drilling)
Copperhead 12GA. Solid Core Copper HDPE Coating for Open Cut
Copperhead Locking Snakebite Twist Lock Connectors
Copperhead DryConn Direct Bury Lug Connectors
Agave Wire LTD. Extra High Strength Bore Tough Tracer Wire
Pro-Pak Pro-Trace 12 GA 45 mil Drilling Tracer Wire

Y. Anchor Couplings

Swivel x Swivel Anchor Couplings shall be domestically manufactured from ductile iron in accordance with and meet all applicable terms and provisions of standards ANSI/AWWA C153/A21.53. Ductile iron fittings shall be rated for 350 psi working pressure. Fittings shall be bituminous coated and cement lined.

Tyler
Star
Sigma
Foundry Services
Clear Water

Z. Repair Couplings

Couplings shall be epoxy coated steel bodies with 304 stainless steel hardware. The 304 stainless bolt and nut shall have a molybdenum disulfide coating attached to the complete surface, such as “Never Gall”.

Hymax
Smith-Blair Top Bolt
TPS TX3

AA. Repair Clamps

All repair clamps must be all stainless steel with stainless steel lugs or ductile iron lugs and must have 3 drop-in stainless steel removable bolts and nuts with 1” longer starter bolt in center of clamp. Clamps sized 2 inch through 12 inch must be one-piece design. The heavy hex stainless steel bolts and nuts must have special lubricating molybdenum disulfide coating, such as “Never Gall”, on the entire surface of the bolt and nut.

Mueller
Romac SL1
Smith-Blair 256
JCM 131
Ford FLS Style
TPS Quick-Cam

BB. Valve Box Alignment Device

A valve box alignment device shall be installed on every valve installed in the Evansville system. It shall be sized according the valve it is installed on.

EMMA Sales Box-Lok

CC. Automatic Flushing Device

Kupferle Foundry 9400 Eclipse (Open Atmosphere Discharge)
Kupferle Foundry 9800 Eclipse (Underground Discharge)

DD. Casing

Casing pipe shall be bituminous coated steel pipe with a minimum wall thickness of 0.375 inches and shall be capable of withstanding traffic or the loads of pavement, subgrade and traffic, where applicable. The casing pipe and joints shall be constructed to prevent leakage of any matter from the casing or conduit throughout its entire length.

Casing pipe used for railroad crossings shall meet the minimum standards set forth by the railroad involved.

EE. Casing Spacers

Casing spacers shall be made of T-304 stainless steel of a minimum thickness of 14 gauge. Each shell section shall be a minimum of 12" wide and shall be assembled with stainless steel bolts and nuts. The shell shall be lined with a ribbed PC extrusion with a retaining section that overlaps the edges of the shell and prevents slippage. Bearing surfaces (runners) shall be ultra-high molecular weight polymer for high abrasion resistance and a low coefficient of friction. The runners shall be attached to support structures at appropriate positions to properly support the carrier within the casing and to ease installation. The runners shall be attached to the stainless steel risers with stainless steel hardware. All welds and metal surfaces shall be chemically passivated. The risers shall be sized such that the carrier pipe is nearly centered within the casing upon installation. designed Spacers shall be installed no more than 2 feet from the end of the casing and shall be spaced a minimum of 10 foot on center with a spacer near the center of each pipe and near the bell of each pipe.

Cascade Waterworks Manufacturing Model CCS

Advanced Products Model SSI

FF. End Seals

Mechanical seals shall be used to seal the annular space between the casing and carrier pipe. Seal elements shall be made of EPDM, and pressure plates shall be made of reinforced nylon polymer. All hardware shall be made of 316 stainless steel per ASTM F-593. Coloration shall be throughout elastomer for positive field inspection.

Cascade Waterworks, Neoprene Seal with Stainless Bands

Link-Seal

Innerlynx by Advanced Products

GG. Expansion Couplings

Expansions Joints shall be manufactured of ductile iron conforming to applicable requirements of ANSI/AWWA C153/A21.53 with mechanical joint ends. The Expansions Joint shall be tested against its own restraint to a minimum pressure of 350 psi. Pressure-containing parts shall be lined with a minimum coating of 15 mils of fusion bonded epoxy conforming to ANSI/AWWA C213. Joint restraints shall be installed on all mechanical joint connections.

Ebaa Iron Works Ex-Tend or Flex-Tend (As Indicated by Engineer or EWSU)

Certa-Lok Expansion Coupling (As Indicated by Engineer or EWSU)

HH. Air and Vacuum (Combination) Valves and Vaults

Air and vacuum valve shall be constructed of ductile iron per ASTM A536 Grade 65-45-12 and shall have stainless steel hardware. Size of valve shall be sized by engineer.

Air and vacuum valve vaults for 2" and smaller air and vacuum valves shall be set atop a minimum of 18" of open grade stone to allow for adequate drainage. The frame and cover shall have the word "WATER" cast in the cover. Air and vacuum valve vaults for valves larger than 2" shall be 48" precast manhole barrels set atop a minimum of 24" of open grade stone to allow for adequate drainage. The manhole barrel shall have a precast reducing lid with a 24" diameter hole. The frame and cover shall have the word "WATER" cast in the cover. The lids shall be set flush with grade and shall be placed in such a location that allows for positive drainage away from the lid.

Combination Air and Vacuum Valve

Val-Matic Valve and Manufacturing Corp. Model 200 Series Single Body Combination Air Valve with Rust Resistant Galvanized Cast Iron Hood with 30 mesh screen

Combination Air and Vacuum Valve Vault, Frame and Cover

Contech Construction Products, Inc.- 30" Diameter Galvanized (Non-Traffic)

ASTM C478 Precast Concrete Manhole, 48" – (Traffic)

Castings Inc. MH-150-24-AL – (Non-Traffic)

Neenah R-1915 Series

US Foundry 755

II. Bell Stop

Bell Stop shall be constructed of cast ductile iron per ASTM A536 and shall offer 360° contact and support of the pipe wall with an epoxy finish. Bell stop shall include a compression ring of SBR Rubber per ASTM D2000 and shall prevent over-insertion of the spigot end of the pipe into the bell while allowing for expansion and contraction.

Ford Meter Box Bell Stop 4" – 12"

S&B Technical Products – Resistive Insertion Grip

Pro-Pipe Solutions – Eagle Claw Pipe Assembly Tool (In Lieu of Bell Stops)

JJ. Valve Operating Nut Stem Extensions

Operating nut valve stem extensions shall be installed on all gate, tapping and butterfly valves 5 feet or more in bury depth. The length of the stem extension shall provide a minimum 2 feet and maximum 4 feet dimension to the top of the valve operating nut. Valve stem extensions shall be stainless steel.

Trumbull Industries, Inc.

1-1/4" Square Stem

Mueller

Clow Valve Company

Kennedy Valve

Waterworks Tool Company

3. OR EQUAL MATERIALS

The Utility shall reserve the right to modify these specifications at any time. Materials, make, and model numbers may be added, modified, or deleted from these specifications. The Utility will consider approved equal items where applicable. For a part to be considered equal and approved for use within the Evansville Water Distribution System, a Material Submittal for Approval Form shall be submitted to the Utility along with a representative sample of the part and factory submittal information. The submittal must be approved before the part is used in the Evansville Water Distribution System.

4. MATERIAL SUBMITTAL FOR APPROVAL FORM

Attached