

**JEFFERSON UTILITIES**  
**270 INDUSTRIAL BLVD.**  
**KEARNEYSVILLE, WV 25430**  
**(304) 728-2077**

**STANDARDS AND SPECIFICATIONS**

**FEBRUARY 28, 2018**

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# GENERAL MATERIAL

MATERIALS LISTED IN THESE STANDARDS AND SPECIFICATIONS REPRESENT THE ABSOLUTE MINIMUM REQUIREMENTS ACCEPTABLE FOR THE USE BY JEFFERSON UTILITIES. SPECIFICALLY, JEFFERSON UTILITIES HAS REVIEWED AND CONSULTED THE APPROPRIATE STANDARDS WRITING AGENCY WITH A VIEW TO DETERMINE WHAT MATERIALS MOST SUIT THE SPECIFIC DESIGN CRITERIA, MAINTENANCE NEEDS, AND COST REQUIREMENTS OF JEFFERSON UTILITIES.

ALL PIPE, FITTINGS, AND OTHER RELATED MATERIALS USED IN THE CONSTRUCTION OF LINES SHALL BE IN FULL COMPLIANCE WITH THE WRITTEN SPECIFICATIONS AND DETAILS OF JEFFERSON UTILITIES LATEST MODIFICATIONS OR REVISIONS.

WHERE A MANUFACTURER'S NAME IS USED IN THESE SPECIFICATIONS, IT IS USED TO DESIGNATE A MINIMUM STANDARD OF QUALITY BASED ON THE SPECIFIC DESIGN CHARACTERISTICS TO THE MANUFACTURER SPECIFIED, NOT LIMITED TO, BUT INCLUDING, MATERIAL QUALITY, FLOW CHARACTERISTICS, INTERCHANGEABILITY, DESIGN FEATURES, INVENTORY, WARRANTY, MAINTENANCE COSTS, AND SERVICE.

EQUALITY EVALUATION SHALL BE DETERMINED NOT SOLELY ON WHETHER A PRODUCT IS CAPABLE OF DOING AN ADEQUATE JOB, BUT RATHER IF A PRODUCT WILL PERFORM THE SPECIFIC JOB SPECIFIED, AS WELL AS MEETING THE ADDITIONAL SPECIFIC REQUIREMENTS SET FORTH HEREIN.

JEFFERSON UTILITIES WILL BE THE SOLE JUDGE AS TO WHETHER A PRODUCT SHALL BE APPROVED AS AN EQUAL.

ANY PRODUCT NOT SPECIFIED IN THE LATEST MODIFICATIONS OR REVISIONS OF THE COMPANIES WRITTEN SPECIFICATIONS AND DETAILS, MUST HAVE THE COMPANIES APPROVAL BEFORE SHIPMENT TO PROJECTS WITHIN JEFFERSON UTILITIES JURISDICTION.

REPRESENTATIVE SAMPLES OF MATERIALS, INTENDED FOR THE INCORPORATION IN THE SPECIFICATIONS OF JEFFERSON UTILITIES, SHALL BE SUBMITTED FOR EXAMINATION, AND/OR TEST.

A WRITTEN POINT-BY-POINT DETAILED COMPARISON TO MATERIAL CURRENTLY SPECIFIED SHALL BE SUBMITTED WITH ANY POINTS OF EXCEPTIONS NOTED.

WRITTEN WARRANTIES, ALONG WITH CERTIFICATIONS OF MATERIAL COMPLIANCES, SHALL BE REQUIRED FOR ALL MATERIALS SUBMITTED FOR REVIEW.

NO SET TIME LIMITS SHALL BE GIVEN FOR MATERIAL REVIEW. IT IS NOT THE INTENT OF JEFFERSON UTILITIES TO COMPROMISE THE CURRENT SPECIFICATIONS AS WRITTEN.

ANY PRODUCT SHIPPED TO PROJECTS WITHOUT PRIOR APPROVAL SHALL BE DEEMED UNRESPONSIVE TO JEFFERSON UTILITIES AUTHORITY, AND SHALL BE REMOVED AND REPLACED BY APPROVED MATERIALS AT NO COST TO JEFFERSON UTILITIES.

FURTHERMORE, ANY PRODUCT SHIPPED WITHOUT PRIOR WRITTEN APPROVAL, SHALL BE DISQUALIFIED FOR REVIEW FOR ACCEPTANCE.

POINT BY POINT COMPARISON				
SPECIFIED MANUFACTURER				
SPECIFIED MANUFACTURER				
SPEC PAGE	POINT NO.	EXCEPTION		LIST EXCEPTIONS
		NO	YES	

# WATER

## **DUCTILE IRON PIPE**

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1. DUCTILE IRON PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF ANSI/AWWA C151/A21.5. PUSH-ON JOINTS AND MECHANICAL JOINTS FOR SUCH PIPE SHALL BE IN ACCORDANCE WITH ANSI/AWWA C111/A21.11.
2. PIPE THICKNESS SHALL BE DESIGNED IN ACCORDANCE WITH ANSI/AWWA C150/A21.50, AND SHALL BE BASED ON LAYING CONDITIONS AND INTERNAL PRESSURE.
3. WALL THICKNESS FOR 3" THRU 12" SHALL BE CL52. WALL THICKNESS FOR 14" THROUGH 24" SHALL BE CL51.
4. PIPE SHALL BE CEMENT MORTAR LINED IN ACCORDANCE WITH ANSI/AWWA C104/A21.4 DOUBLE LINED.
5. LAYING LENGTHS SHALL BE EITHER 18FT. OR 20FT. NOMINAL LENGTHS.
6. PIPE LARGER THAN 12" SHALL BE SHIPPED WITH AN APPROPRIATE PERCENTAGE OF FULLY GAUGED PIPE TO FACILITATE FITTING REQUIREMENTS.
7. DUCTILE IRON, FOR USE AS RESTRAINED JOINT, SHALL BE MECHANICAL JOINT PIPE USING WEDGE ACTION RESTRAINING GLANDS. PIPE SHALL BE USED AS INDICATED ON DRAWING OR DETAILS.
8. WALL THICKNESS FOR 3" THRU 12" SHALL BE CL52. WALL THICKNESS FOR 14" THROUGH 24" SHALL BE CL51.

## **TR FLEX RESTRAINED JOINT DUCTILE IRON PIPE**

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1. WHEN JOINT RESTRAINT FOR A 4" THROUGH 36" CL52 PUSH-ON JOINT PIPE INSTALLATION IS REQUIRED AND INDICATED IN THE PROJECT PLANS AND SPECIFICATIONS, RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS UTILIZING DUCTILE IRON COMPONENTS SHALL BE PROVIDED.
2. RESTRAINED JOINT PIPE SHALL BE DUCTILE IRON MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF ANSI/AWWA C151/A21.51. PUSH-ON JOINTS FOR SUCH PIPE SHALL BE IN ACCORDANCE WITH ANSI/AWWA C111/A21.11 "RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND FITTINGS." PIPE THICKNESS SHALL BE DESIGNED IN ACCORDANCE WITH ANSI/AWWA C150/A21.50 "THICKNESS DESIGN OF DUCTILE-IRON PRESSURE PIPE," AND SHALL BE BASED ON LAYING CONDITIONS AND

INTERNAL PRESSURES AS STATED IN THE PROJECT PLANS AND SPECIFICATIONS. PIPE THICKNESS CLASS 52.

3. RESTRAINED JOINT FITTINGS AND THE RESTRAINING COMPONENTS SHALL BE DUCTILE IRON IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF ANSI/AWWA C110/A21.10 AND/OR C153/A21.53 WITH THE EXCEPTION OF THE MANUFACTURER'S PROPRIETARY DESIGN DIMENSIONS. PUSH-ON JOINTS FOR SUCH FITTINGS SHALL BE IN ACCORDANCE WITH ANSI/AWWA C111/A21.11.
4. RESTRAINED JOINT PIPE AND FITTINGS SHALL BE U.S. PIPE'S TR FLEX PIPE AND FITTINGS OR APPROVED EQUAL. RESTRAINT OF FIELD CUT PIPE SHALL BE PROVIDED WITH U.S. PIPE'S TR FLEX GRIPPER ® RING, TR FLEX PIPE FIELD WELDMENTS OR APPROVED EQUAL.
5. CEMENT MORTAR LINING AND SEAL COATING FOR PIPE AND FITTINGS, WHERE APPLICABLE, SHALL BE IN ACCORDANCE WITH ANSI/AWWA C104/A21.4. ASPHALTIC OUTSIDE COATING SHALL BE IN ACCORDANCE WITH ANSI/AWWA C151/A21.51 FOR PIPE AND ANSI/AWWA C110/A21.10 OR ANSI/AWWA C153/A21.53 FOR FITTINGS.
6. RESTRAINED PUSH-ON JOINTS FOR PIPE AND FITTINGS SHALL BE DESIGNED FOR A WATER WORKING PRESSURE OF 350 PSI FOR SIZES 4" THROUGH 24" AND 250 PSI FOR SIZES 30" THROUGH 36".

#### **FLANGED DUCTILE IRON PIPE**

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1. FLANGED DUCTILE IRON PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI/AWWA C115/A21.15 AND HAVE A MINIMUM WALL THICKNESS OF CLASS 53.
2. FLANGES SHALL CONFORM TO CLASS 125 LB, AS SHOWN IN ANSI B16.1.
3. BOLT CIRCLE AND HOLES SHALL BE COMPATIBLE WITH CLASS 125 B16.1, OR CLASS 150 ANSI B16.5 (STEEL) FLANGES.
4. FLANGES REQUIRING GREATER PRESSURES, CLASS 250 TO CLASS 350, SHALL MEET THE APPROPRIATED STANDARDS WITH THE REQUIREMENTS INDICATED ON THE CONTRACT DRAWINGS.
5. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, PIPE SHALL BE CEMENT MORTAR LINED IN ACCORDANCE WITH THE REQUIREMENTS OF ANSI/AWWA C104/A21.4 STANDARD.

6. ALL FABRICATED FLANGE PIPING IN SIZES 3" THROUGH 24" SHALL BE MANUFACTURED FROM COMPONENTS MANUFACTURED OF DUCTILE IRON, AND MUST MEET ALL THE REQUIREMENTS LISTED ABOVE.
7. FLANGE PIPE SHALL HAVE AN OUTSIDE COATING OF PRIMER.

**M O P V C P I P E A W W A C 9 0 9**

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1. PVC MOLECULAR ORIENTED PIPE SHALL BE MANUFACTURED TO CONFORM TO THE FOLLOWING STANDARDS: AWWA C909-09
2. ASTM F1483 – STANDARD SPECIFICATION FOR ORIENTED POLY VINYL CHLORIDE POLY VINYL CHLORIDE PRESSURE PIPE.
3. ASTM D1784 – STANDARD SPECIFICATION FOR RIGID POLY VINYL CHLORIDE (PVC) COMPOUNDS AND CHLORINATED POLY VINYL CHLORIDE (CPVC) COMPOUNDS. CELL CLASS 12454
4. ASTM D2241 – PERFORMANCE REQUIREMENTS STANDARD SPECIFICATION FOR POLY VINYL CHLORIDE (PVC) PRESSURE-TREATED PIPE (SDR SERIES).
5. ASTM D3139 – STANDARD SPECIFICATION FOR JOINTS FOR PLASTIC PRESSURE PIPE USING FLEXIBLE ELECTROMETRIC SEALS.
6. ASTM D2774 – STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PRESSURE PIPING.
7. UNI-B-1 – RECOMMENDED SPECIFICATION FOR THERMOPLASTIC PIPE JOINTS, PRESSURE, AND NON-PRESSURE APPLICATIONS.
8. NSF STANDARD NO. 61 – DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS.
9. POLY VINYL CHLORIDE PRESSURE PIPE LESS THAN 16" CLASS 235 SHALL BE WITH A SAFETY FACTOR OF 2 TO 1.
10. POLY VINYL CHLORIDE SHALL HAVE A MINIMUM HYDROSTATIC DESIGN BASIS (HDB) OF 1700 PSI.
11. POLY VINYL CHLORIDE IN SIZES 4" THROUGH 12" SHALL HAVE OUTSIDE DIAMETER OF DUCTILE IRON PIPE, AND SHALL REQUIRE NO SPECIAL REPAIR MATERIAL, TAPPING MATERIAL, OTHER THAN WHAT IS CURRENTLY BEING UTILIZED.
12. POLY VINYL CHLORIDE IN 16" SIZE SHALL BE RATED FOR 165PSI (CLASS 165)
13. THE POLY VINYL CHLORIDE AWWA C909 PVC PIPE MUST BE DOMESTICALLY MANUFACTURED AND MANUFACTURED IN THE UNITED STATES.

14. PIPE SHALL BE AS MANUFACTURED BY JM EAGLE INC. OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

**PVC PRESSURE PIPE AWWA C909 USED FOR 4" C900 ONLY**

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1. PIPE SHALL MEET THE REQUIREMENTS OF AWWA C900 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE
2. PIPE SHALL MEET THE FOLLOWING STANDARDS:
3. AWWA C900 PVC PRESSURE PIPE FOR 4"
4. AWWA C111 RUBBER GASKET JOINTS
5. ASTM D1784 PVC COMPOUNDS
6. ASTM F477 SPECIFICATION FOR ELASTOMERIC SEALS
7. UNI-B-1 THERMOPLASTIC PIPE JOINTS, PRESSURE & NON PRESSURE APPLICATIONS
8. U.L.F.M. STANDARDS
9. PIPE SHALL HAVE A FOUR TO ONE SAFETY FACTOR IN EACH PRESSURE CLASS AND CONFORM TO THE FOLLOWING CLASS AND PRESSURE RATINGS:
10. DR18 PC 235
11. EACH JOINT OF PIPE SHALL BE HYDROSTATICALLY TESTED AT THE FACTORY BEFORE SHIPMENT
12. THE PRESSURE CLASS REQUIRED SHALL BE INDICATED ON THE CONTRACT DRAWINGS
  - a. CERTIFICATION OF COMPLIANCE OF THE ABOVE SPECIFICATION AND STANDARD SHALL BE REQUIRED FROM THE MANUFACTURER BEFORE APPROVAL OF SUBMISSIONS.
  - b. C900 PVC PIPE SHALL BE DR18 AND BE PR CLASS 235
  - c. SHALL ONLY BE USED FOR 4" DIAMETER PVC PIPE

**PVC PRESSURE PIPE SDR 13.5 - 2" AND 3"**

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1. PVC PRESSURE PIPE SHALL BE MANUFACTURED TO STEEL PIPE SIZE (IPS) OUTSIDE DIMENSIONS WITH DR'S AND TOLERANCES IN COMPLIANCE WITH ASTM D2241 PVC PLASTIC PIPE, DR, PR.



2. PIPE SHALL BE MANUFACTURED TO STEEL PIPE O.D.'S (IPS) IN SIZES 2" AND 3" PIPE. PIPE SHALL BE JOINED BY MEANS OF A RUBBER RING BELL JOINT, WHICH SHALL BE AN INTEGRAL AND HOMOGENEOUS PART OF THE PIPE.
3. PIPE SHALL CONFORM TO ALL REQUIREMENTS OF ASTM D2214 FOR PVC PIPE.
4. PRESSURE RATINGS AND CLASS SHALL BE AS INDICATED ON DRAWINGS. IF DRAWINGS DO NOT SHOW CLASS, THE HIGHEST CLASS SHALL BE REQUIRED.
5. PIPE SHALL HAVE A TWO TO ONE (2 TO 1) SAFETY FACTOR WITH CLASS AND SDR'S AS FOLLOWS:
  6. SDR 13.5
  7. 315 PSI
  8. WHEN USED FOR POTABLE WATER SYSTEMS, PIPE SHALL BEAR THE N.S.F SEAL.
  9. THE FOLLOWING ASTM'S SHALL BE REQUIRED:
    - a. ASTM D1784 PVC COMPOUND
    - b. ASTM D2214 PVC STANDARD SPECIFICATIONS
    - c. ASTM D3139 JOINTS FOR PVC PRESSURE PIPE
    - d. UNI-B-1 THERMOPLASTIC PIPE JOINTS
10. CERTIFICATES OF COMPLIANCE OF THE ABOVE SPECIFICATIONS SHALL BE REQUIRED FROM THE MANUFACTURER BEFORE APPROVAL OF SUBMITTALS.

#### **TRACER WIRE**

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1. TRACER WIRE SHALL BE INSTALLED WITH ALL PVC PIPE. TRACER WIRE SHALL BE BURIED ONE FOOT BELOW GROUND LEVEL DIRECTLY ABOVE PIPE. TRACER WIRE WILL BE NUMBER 12 IN SIZE AND HAVE A BLUE PLASTIC COATING.
2. TRACER WIRE SHALL BE SOLID WITH NO BREAKS BETWEEN TRACER WIRE ACCESS BOXES.

#### **TRACER WIRE ACCESS BOX**

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1. TRACER WIRE ACCESS BOXES SHALL BE INSTALLED AT EVERY TEE, BEND, BLOW-OFF, AND FIRE HYDRANT, OR ANY CHANGE OF DIRECTION. TRACER WIRE ACCESS BOXES SHALL HAVE STAINLESS STEEL TERMINAL BOLTS WITH

CASTINGS CONFORMING TO ASTM A-48 CLASS 30 LATEST REVISION. BOXES SHALL HAVE WATER CAST INTO LID.

#### **DETECTABLE WARNING AND IDENTIFICATION TAPE**

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1. COMPOSITION OF DETECTABLE TAPE SHALL CONSIST OF .50 MIL THICK, SOLID CORE, ENCASED IN A REINFORCED PROTECTIVE PLASTIC JACKET THAT IS RESISTANT TO ALKALIS, ACIDS, AND OTHER DESTRUCTIVE ELEMENTS COMMONLY FOUND IN SOIL. OVERALL THICKNESS SHALL BE 4.5 MIL NOMINAL, AND WIDTH SHALL BE 6”.
2. COLOR SHALL BE BRIGHT BLUE WITH BLACK PRINTED LETTERS ON ONE SIDE STATING: **CAUTION: WATER LINE BURIED BELOW.**
3. TAPE SHALL BE WATER DETECTABLE TAPE AS MANUFACTURED BY PRO-LINE OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **MECHANICAL JOINT FITTINGS**

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1. MECHANICAL JOINT FITTINGS IN SIZES 3” THROUGH 24” SHALL MEET THE REQUIREMENTS OF AWWA C153.
2. FITTINGS SHALL BE MANUFACTURED FROM A HIGH STRENGTH, IMPACT RESISTANT DUCTILE IRON, HAVING A MINIMUM TENSILE OF 70,000 PSI WITH A MINIMUM YIELD OF 50,000 PSI AND A MINIMUM ELONGATION OF 5%.
3. FITTING WALL THICKNESS SHALL BE CL53 12” DIAMETERS THROUGH 24” DIAMETERS.
4. FITTINGS SHALL BE RATED AT 350 PSI.
5. *CEMENT LINING* – ALL FITTINGS SHALL BE CEMENT-LINED IN ACCORDANCE WITH ANSI A21.4 – AWWA C111- LATEST REVISION.
6. *JOINT ACCESSORIES* – ALL ACCESSORIES, GLANDS, BOLTS, AND GASKETS SHALL CONFORM TO ANSI A21.11-AWWA C111-LATEST REVISION.
7. *FITTINGS* - ALL FITTINGS SHALL BE LISTED WITH UNDERWRITERS LABORATORIES.
8. WHERE FITTINGS ARE TO BE USED WITH PVC PIPING SYSTEMS, APPROPRIATE GASKETS SHALL BE FURNISHED IF REQUIRED.
9. HYDRANT LOCKING TEES WILL BE REQUIRED FOR HYDRANT CONNECTIONS.
10. FITTINGS SHALL BE AS MANUFACTURED BY TYLER/UNION OR APPROVED EQUAL.

11. DOMESTIC MANUFACTURED FITTINGS ARE PREFERRED BUT IMPORT FITTINGS ARE ALLOWED WITH APPROVAL FROM JEFFERSON UTILITIES.

**WEDGE ACTION RESTRAINTS FOR**

**D.1. PIPE AND FITTINGS**

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1. MECHANICAL JOINT RESTRAINTS FOR DUCTILE IRON FITTINGS AND PIPE SHALL BE INCORPORATED IN THE DESIGN OF THE FOLLOWER GLAND. SAID GLAND SHALL INCLUDE A RESTRAINING MECHANISM AGAINST THE PIPE, WHICH INCREASES ITS RESISTANCE AS PRESSURE INCREASES.
2. GLANDS SHALL BE DESIGNED TO ALLOW FLEXIBILITY OF PIPE JOINTS AFTER INSTALLATION AND BACKFILL.
3. GLANDS SHALL BE MANUFACTURED OF DUCTILE IRON, CONFORMING TO ASTM A536-80.
4. RESTRAINING DEVICES SHALL BE OF DUCTILE IRON, HEAT-TREATED TO A MINIMUM HARDNESS OF 370 BHN.
5. DIMENSIONS OF GLAND SHALL BE SUCH THAT IT CAN BE USED WITH THE STANDARDIZED MECHANICAL JOINT BELL WITH TEE-HEAD BOLTS CONFORMING TO ANSI/AWWA A21-11, AND ANSI/AWWA C153/A21.53 LATEST REVISION.
6. THE DESIGN SHALL INCORPORATE TWIST-OFF NUTS TO INSURE PROPER TORQUE UPON INSTALLATION, LEAVING HEX HEAD NUT FOR DISASSEMBLY IF REQUIRED.
7. THE MECHANICAL JOINT RESTRAINING DEVICE IN SIZES 4" THROUGH 16" SHALL HAVE A WORKING PRESSURE OF 350 PSI, WITH A SAFETY FACTOR OF TWO TO ONE.
8. IN SIZES, 18" THROUGH 36" THE WORKING PRESSURE SHALL BE 250 PSI WITH A TWO TO ONE SAFETY FACTOR.
9. GLANDS SHALL HAVE U.L. LISTING THROUGH 16" IN SIZE, AND FACTORY MUTUAL APPROVAL THROUGH 16".
10. RESTRAINING GLANDS SHALL BE AS MANUFACTURED BY THE FORD METER BOX CO., INC., UNI-FLANGE SERIES 1400 OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.
11. WEDGE ACTION RETAINER GLANDS WILL BE USED ON ALL VALVES, HYDRANTS, AND CONCRETE THRUST BLOCKS SHALL ALSO BE REQUIRED.

## **PVC PIPE RESTRAINTS**

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1. MECHANICAL JOINT RESTRAINTS FOR PVC PIPE, USING MECHANICAL JOINT FITTINGS, SHALL BE INCORPORATED IN THE DESIGN OF THE FOLLOWER GLAND.
2. THE RESTRAINT MECHANISM SHALL CONSIST OF A PLURALITY OF INDIVIDUALLY ACTIVATED GRIPPING SURFACES TO MAXIMIZE RESTRAINT CAPABILITY.
3. GLANDS SHALL BE MANUFACTURED OF DUCTILE IRON CONFORMING TO ASTM A536-80.
4. DIMENSIONS OF THE GLANDS SHALL BE SUCH THAT IT CAN BE USED WITH STANDARDIZED MECHANICAL JOINT BELL AND THE TEE HEAD BOLTS CONFORM TO ANSI/AWWA A21.22/C111 AND ANSI AWWA A21.53/C153 OF LATEST REVISION.
5. THE DESIGN SHALL INCORPORATE TWIST-OFF NUTS TO INSURE PROPER TORQUE UPON INSTALLATION, LEAVING HEX HEAD NUT FOR DISASSEMBLY IF REQUIRED.
6. THE MECHANICAL JOINT RESTRAINING DEVICE IN SIZES 4" THROUGH 12" SHALL HAVE A WORKING PRESSURE OF 150 PSI WITH A 2 TO 1 SAFETY FACTOR.
7. IN SIZES 14" THROUGH 24" THE WORKING PRESSURE SHALL BE 150 PSI WITH A 2 TO 1 SAFETY FACTOR.
8. RESTRAINING GLANDS SHALL HAVE A PRESSURE RATING EQUAL TO THAT OF THE PVC PIPE ON WHICH IT IS USED AND SHALL BE FORD METER BOX, UNI-FLANGE SERIES 1500. SEE DETAIL W10-11.

## **FLANGE JOINT FABRICATED PIPE**

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1. FLANGED DUCTILE IRON PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI/AWWA C115/A21.15 AND HAVE A MINIMUM WALL THICKNESS OF CLASS 53.
2. FLANGES SHALL CONFORM TO CLASS 125 LB, AS SHOWN IN ANSI B16.1.
3. BOLT CIRCLE AND HOLES SHALL BE COMPATIBLE WITH CLASS 125 B16.1, OR CLASS 150 ANSI B16.5 (STEEL) FLANGES.
4. FLANGES REQUIRING GREATER PRESSURES, CLASS 250 TO CLASS 350, SHALL MEET THE APPROPRIATED STANDARDS WITH THE REQUIREMENTS INDICATED ON THE CONTRACT DRAWINGS.

5. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, PIPE SHALL BE CEMENT MORTAR LINED IN ACCORDANCE WITH THE REQUIREMENTS OF ANSI/AWWA C104/A21.4 STANDARD.
6. ALL FABRICATED FLANGE PIPING IN SIZES 3" THROUGH 24" SHALL BE MANUFACTURED FROM COMPONENTS MANUFACTURED OF DUCTILE IRON, AND MUST MEET ALL THE REQUIREMENTS LISTED ABOVE.
7. FLANGE PIPE SHALL HAVE AN OUTSIDE COATING OF PRIMER.

#### **FLANGE FITTINGS**

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1. FLANGED FITTINGS IN SIZES 3" THROUGH 24" SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI/AWWA C110 A21.10, OR TO ANSI B16.1.
2. FITTING SHALL BE MANUFACTURED OF DUCTILE IRON AND RATED FOR 250-PSI WATER WORKING PRESSURE.
3. ALL ELBOWS OR BENDS (STRAIGHT SIZES), TEES, CROSSES, CONCENTRIC REDUCERS, BASE ELBOWS (EXCEPT REDUCING SIZES), AND BOTTOM BASE TEES ARE MANUFACTURED TO ANSI/AWWA C110/A21.10 STANDARDS.
4. LONG RADIUS AND REDUCING ELBOWS, REDUCING ON THE RUN TEES, SIZE OUTLET FITTINGS, ECCENTRIC REDUCERS, AND LATERALS ARE IN ACCORDANCE WITH ANSI B16.1.
5. ALL FITTINGS SHALL BE DRILLED AND FACED FOR 125 LB DRILLING PATTERN, UNLESS OTHERWISE SHOWN ON DRAWINGS.
6. FITTINGS SHALL HAVE CEMENT MORTAR LINING, EXCEPT FOR AIR PIPING.
7. FITTINGS SHALL HAVE A PRIMER COATING.
8. FLANGED FITTINGS SHALL BE MANUFACTURED BY TYLER OR UNION, AND SHALL BE IN STRICT ACCORDANCE WITH THE ABOVE SPECIFICATIONS.

#### **FLANGE GASKETS AND BOLTS**

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1. FLANGE BOLT AND GASKET KITS SHALL BE FURNISHED FOR EACH FLANGE JOINT CONNECTION.
2. FLANGE GASKETS SHALL BE FULL FACE RED RUBBER, WITH A MINIMUM THICKNESS OF 1/8". GASKETS SHALL BE MANUFACTURED OF STYRENE BUTADIENE RUBBER.

3. FLANGE BOLTS SHALL BE MANUFACTURED OF CARBON STEEL, PER ASTM A307, OR STAINLESS STEEL, IF INDICATED ON DRAWINGS.

#### **DI SMALL DIA FITTINGS**

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1. 2" WATER MAIN FITTINGS FOR PVC SHALL BE MANUFACTURED OF DUCTILE IRON GRADE 65-45-12 I ACCORDANCE WITH ASTM A536.
2. FITTING SHALL BE PRESSURE RATED AT 350 PSI. GASKETS SHALL MEET ASTM F477. ALL FITTINGS SHALL BE IRON PIPE SIZE DEEP BELL PUSH JOINTS AND SHALL NOT REQUIRE TRANSITION GASKETS.
3. RESTRAINTS SHALL BE DUCTILE IRON KNUCKLE JOINTS AS MANUFACTURED BY HARRINGTON CORPORATION OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.
4. FITTINGS SHALL BE HARCO DEEP BELL AS MANUFACTURED BY THE HARRINGTON CORPORATION OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **BRASS FITTINGS AND PIPE**

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1. ALL THREADED FITTINGS AND PIPE FOR BURIED SERVICE SHALL BE MANUFACTURED FROM BRASS, MEETING ANSI B16.15 SPECIFICATIONS, AND LOW LEAD.
2. BRASS FITTINGS SHALL BE SO DESIGNED AND MANUFACTURED TO PROVIDE FULL FLOW WITH MINIMUM RESTRICTIONS.
3. ALL THREADS SHALL BE ACCURATELY MACHINED AND GAUGED TO INSURE A PERFECT FIT WITH PIPE.
4. THREADED FITTINGS AND NIPPLES SHALL BE BRASS NO LEAD OR DUCTILE IRON
5. BRASS NIPPLES SHALL BE DOMESTICALLY MADE AND BE AVAILABLE IN VARIOUS LENGTHS AS REQUIRED.

## **PVC PIPE RESTRAINTS**

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1. MECHANICAL JOINT RESTRAINTS FOR PVC PIPE, USING MECHANICAL JOINT FITTINGS, SHALL BE INCORPORATED IN THE DESIGN OF THE FOLLOWER GLAND.
2. THE RESTRAINT MECHANISM SHALL CONSIST OF A PLURALITY OF INDIVIDUALLY ACTIVATED GRIPPING SURFACES TO MAXIMIZE RESTRAINT CAPABILITY.
3. GLANDS SHALL BE MANUFACTURED OF DUCTILE IRON CONFORMING TO ASTM A536-80.
4. DIMENSIONS OF THE GLANDS SHALL BE SUCH THAT IT CAN BE USED WITH STANDARDIZED MECHANICAL JOINT BELL AND THE TEE HEAD BOLTS CONFORM TO ANSI/AWWA A21.22/C111 AND ANSI AWWA A21.53/C153 OF LATEST REVISION.
5. THE DESIGN SHALL INCORPORATE TWIST-OFF NUTS TO INSURE PROPER TORQUE UPON INSTALLATION, LEAVING HEX HEAD NUT FOR DISASSEMBLY IF REQUIRED.
6. THE MECHANICAL JOINT RESTRAINING DEVICE IN SIZES 4" THROUGH 12" SHALL HAVE A WORKING PRESSURE OF 150 PSI WITH A 2 TO 1 SAFETY FACTOR.
7. IN SIZES 14" THROUGH 24" THE WORKING PRESSURE SHALL BE 150 PSI WITH A 2 TO 1 SAFETY FACTOR.
8. RESTRAINING GLANDS SHALL HAVE A PRESSURE RATING EQUAL TO THAT OF THE PVC PIPE ON WHICH IT IS USED AND SHALL BE FORD METER BOX, UNI-FLANGE SERIES 1500.

## **GATE VALVES - RESILIENT SEATED**

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1. GATE VALVES IN SIZES 3" THROUGH 36" SHALL BE MANUFACTURED TO MEET, AND OR EXCEED, ALL THE REQUIREMENTS OF AWWA C515 FOR RESILIENT SEATED DUCTILE IRON GATE VALVES.
2. VALVES SHALL INCLUDE THE FOLLOWING SPECIFIC DESIGN CRITERIA:
3. VALVE BODY SHALL BE MANUFACTURED OF DUCTILE IRON AND HAVE A WORKING PRESSURE OF 250 PSI IN ALL SIZES.
4. ALL FERROUS COMPONENTS SHALL BE DUCTILE IRON, BODY, WRENCH NUT, STUFFING BOX, AND VALVE WEDGE.
5. THE LETTERS "DI", OR WORDS "DUCTILE IRON" SHALL BE CAST INTO THE VALVE BODY ALONG WITH "250W" OR "250 PSI".

6. THE VALVE WEDGE SHALL BE DUCTILE IRON, ENCAPSULATED WITH EPDM RUBBER, IN SIZES 2" THROUGH 30". THE WEDGE SHALL BE SYMMETRICAL AND SEAL EQUALLY WELL WITH FLOW IN EITHER DIRECTION.
7. VALVES SHALL HAVE A FUSION BONDED EPOXY COATING INSIDE AND OUT FOR MAXIMUM CORROSION RESISTANCE, COMPLYING WITH ANSI/AWWA C550 APPLIED ELECTRICALLY BEFORE ASSEMBLY.
8. THE VALVE SHALL HAVE A SMOOTH FULL DIAMETER WATERWAY WITH NO RECESSES TO TRAP DEBRIS OR OBSTRUCT FLOW.
9. VALVE STEM SHALL BE HIGH STRENGTH CORROSION RESISTANT BRONZE. STEM SHALL BE SEALED BY THREE O-RINGS. THE TOP TWO O-RINGS SHALL BE REPLACEABLE WITH VALVE FULLY OPEN AND WHILE SUBJECT TO FULL RATED WORKING PRESSURE. O-RINGS SET IN A CARTRIDGE SHALL NOT BE ALLOWED.
10. SEALING GASKETS SHALL BE PRESSURE ENERGIZED O-RINGS.
11. TORQUE MINIMIZING THRUST WASHERS LOCATED WITH (1) ABOVE AND (1) BELOW THE THRUST COLLAR, ASSURING TROUBLE FREE OPERATION OF THE VALVE.
12. GATE VALVES IN SIZES 4" THROUGH 12", SHALL BE (U.L.), UNDERWRITERS LABORATORIES LISTED, AND (F.M.), FACTORY MUTUAL RESEARCH CORPORATION APPROVED.
13. VALVES SHALL BE NSF STANDARD G1 CERTIFIED.
14. BOLTING MATERIALS SHALL DEVELOP THE PHYSICAL STRENGTH REQUIREMENTS OF ASTM A307, AND MAY HAVE EITHER REGULAR SQUARE OR HEXAGONAL HEADS WITH DIMENSIONS CONFORMING TO ANSI B18.2.1. METRIC SIZE SOCKET HEAD CAP SCREWS ARE NOT ALLOWED. ALL EXTERIOR BOLTS AND NUTS WILL BE TYPE 304, STAINLESS STEEL ONLY.
15. OPERATING UB SHALL HAVE FOUR FLATS AT STEM CONNECTION TO ASSURE EVEN INPUT TORQUE TO THE STEM.
16. FLANGED VALVES IN SIZES 3" THROUGH 12" SHALL BE O S & Y 125 LB. FLANGES. MANUFACTURER SHALL BE ABLE TO FURNISH 250 LB. FLANGES IF REQUIRED.
17. VALVES 16" AND LARGER SHALL HAVE AN ENCLOSED GEAR CASE. DESIGN SHALL BE OF THE BEVEL GEAR TYPE, FOR HORIZONTAL INSTALLATION.
18. VALVES SHALL BE OPEN LEFT.
19. IN ADDITION TO ALL THE ABOVE REQUIREMENTS, THE PRESSURE RATINGS AND SPECIFICS OF THE ABOVE CONDITIONS MUST BE PUBLISHED IN THE MANUFACTURER CATALOGS. THE MANUFACTURER MUST HAVE BEEN MANUFACTURING VALVES FOR AT LEAST EIGHTY (80) YEARS, AND HAVE A



TEN (10) YEAR WARRANTY AGAINST DEFECTIVE MATERIAL AND WORKMANSHIP.

#### **GATE VALVE EXTENSION STEMS**

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1. ALL BURIED VALVES 3" AND LARGER SHALL HAVE EXTENSION STEMS EXTENDING TO WITHIN APPROXIMATELY ONE FOOT OF FINISHED GRADE.
2. VALVE EXTENSION STEMS SHALL BE FACTORY ASSEMBLED USING A .875" DIAMETER HOT ROLLED STEEL ROD MEETING ASTM A-36-84A. THE TOP AND BOTTOM PIECE SHALL BE 2" SQUARED TO ACCOMMODATE THE VALVE AND THE VALVE OPERATING WRENCH.
3. THESE PIECES SHALL BE OF HIGH TENSILE DUCTILE IRON, FACTORY PINNED, AND WELDED IN PLACE.
4. STEMS SHALL BE FURNISHED WITH OPEN LEFT, OPEN RIGHT DROP IN INDICATOR TO FIT TOP PIECE. BOTTOM PIECE SHALL BE FURNISHED WITH TWO STAINLESS STEEL SET SCREWS TO LOCK ON VALVES.
5. THE STEM SHALL ALSO BE FITTED WITH A STEEL ALIGNMENT RING TO POSITION THE STEM IN THE CENTER OF THE VALVE BOX. THIS RING SHALL BE POSITIONED APPROXIMATELY 10" FROM THE TOP OF THE STEM.
6. STEMS SHALL BE COATED WITH AN ASPHALTUM, PAINT.
7. THE CONTRACTOR SHALL FURNISH FOUR EACH 4' TEE HANDLE WRENCHES PER CONTRACT.

#### **BUTTERFLY VALVE**

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1. BUTTERFLY VALVES MAY BE USED ON THE PROJECTS WITH PRIOR APPROVAL. THE FLOWING SPECIFICATIONS MUST BE MET.
2. VALVES LARGER THAN 12"s SHALL BE BUTTERFLY VALVES IN CONFORMANCE WITH AWWA C904. BUTTERFLY VALVES SHALL HAVE A WORKING PRESSURE OF 250 PSI WITH A TEST PRESSURE OF 1.5 TIMES THE WORKING PRESSURE (375 PSI MIN); THE VALVE SHELL TEST SHALL BE 500 PSI MINIMUM.

#### **FIRE HYDRANTS**

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1. FIRE HYDRANTS SHALL MEET OR EXCEED AWWA C502, LATEST REVISION.
2. FIRE HYDRANTS SHALL HAVE A RATED WORKING PRESSURE OF 200 PSI WITH A TEST PRESSURE OF 400 PSI.

3. HYDRANT SHALL INCLUDE THE FOLLOWING SPECIFIC DESIGN CRITERIA:
4. THE MAIN VALVE CLOSURE SHALL BE OF THE COMPRESSION TYPE, OPENING AGAINST THE PRESSURE AND CLOSING WITH THE PRESSURE.
5. TRAFFIC FEATURE TO BE DESIGNED SO THAT THE NOZZLE SECTION OF THE HYDRANT CAN BE ROTATED (BY DEGREE) TO FULL 360 DEGREE CIRCLE DURING FIELD INSTALLATIONS IF NECESSARY.
6. THE MAIN VALVE OPENING SHALL NOT BE LESS THAN 5 1/4" AND BE DESIGNED SO THAT REMOVAL OF SEAT, DRAIN VALVE MECHANISM, INTERNAL ROD, AND ALL WORKING PARTS CAN BE REMOVED THROUGH TOP OF HYDRANT, WITHOUT DISTURBING THE GROUND LINE JOINT OR THE NOZZLE SECTION OF THE HYDRANT.
7. BRONZE TO BRONZE. THE BRONZE SEAT SHALL BE THREADED INTO MATING THREADS OF BRONZE FOR EASY FIELD REMOVAL.
8. THE DRAINING SYSTEM OF THE HYDRANT SHALL BE BRONZE, AND ACTIVATED BY THE MAIN STEM WITHOUT THE USE OF AUXILIARY RODS, TOGGLES, PINS, ETC. THE STAINLESS STEEL SPRING ASSISTED DRAIN MECHANISM SHALL BE COMPLETELY CLOSED AFTER NO MORE THAN THREE TURNS OF THE OPERATING NUT IN THE OPENING DIRECTION, ALLOWING THROTTLING OF HYDRANTS AS NEEDED. A MINIMUM OF TWO INSIDE PORTS AND FOUR DRAIN PORT OUTLETS TO THE EXTERIOR OF THE HYDRANT, INSURING POSITIVE DRAIN WHEN CLOSED. DRAIN SHUT-OFFS SHALL BE BY DIRECT COMPRESSION CLOSURE.
9. THE OPERATING NUT, MAIN STEM, COUPLING, AND MAIN VALVE ASSEMBLY SHALL BE CAPABLE OF WITHSTANDING INPUT TORQUE OF 200 FT/LBS IN OPENING OR CLOSING DIRECTIONS.
10. DRY TOP. THERE SHALL BE AN INTERNAL TOP HOUSING WITH TRIPLE O-RINGS TO SEAL OPERATING THREADS FROM THE WATERWAY AND ACCOMMODATE AN ANTI-FRICTION WASHER.
11. NOZZLE SECTION OF HYDRANTS SHALL BE DESIGNED TO PERMIT FIELD REPLACEMENT OF DAMAGED THREADS WITHOUT SPECIAL TOOLS, EXCAVATION, OR DISTURBING THE GROUND LINE JOINT. BRONZE NOZZLES ARE TO BE LOCKED INTO THE HYDRANT BARREL WITH LOCKING LUGS, AND BE SEALED BY HEAVY-DUTY O-RINGS. THREADING OF HOSE AND PUMPER NOZZLES SHALL CONFORM TO JEFFERSON UTILITIES SPECIFICATIONS. OPERATING NUT SHALL CONFORM TO N.S.T. SPECIFICATIONS.
12. HYDRANTS SHALL COMPLY WITH BOTH FACTORY MUTUAL RESEARCH CORPORATION, AND UNDERWRITERS LABORATORIES U.L. 246 STANDARDS.
13. FRICTION LOSS THROUGH HYDRANT SHALL NOT EXCEED 3 PSI AT 1,000 GPM THROUGH THE PUMPER NOZZLE. ABOVE FLOW TEST AND CERTIFICATION OF THIS FEATURE SHALL BE CONDUCTED BY AN INDEPENDENT TESTING LABORATORY AND BE IN ACCORDANCE WITH AWWA C502, LATEST REVISION.

14. ALL BELOW GROUND PORTIONS OF HYDRANTS (BARREL & SHOE) SHALL BE MANUFACTURED OF DUCTILE IRON. ALL BELOW GROUND JOINTS SHALL BE CONNECTED WITH TYPE 304 STAINLESS STEEL NUTS AND BOLTS ONLY.
15. HYDRANT SHOE SHALL HAVE ALL INTERNAL AND EXTERNAL SURFACES OF THE SHOE BODY COATED WITH A FUSION-BONDED EPOXY COATING, COMPLYING WITH ANSI/AWWA C550, APPLIED ELECTROSTATICALLY PRIOR TO ASSEMBLY.
16. DEPTH OF BURY OF HYDRANTS SHALL BE 4FT., GROUND LINE EXTENSIONS SHALL BE AVAILABLE IN 6" INCREMENTS THROUGH 36". CONTRACTORS SHALL BE RESPONSIBLE FOR THE HYDRANT'S FINISHED GRADE.
17. HYDRANTS SHALL BE AS MANUFACTURED BY AMERICAN FLOW CONTROL, MODEL B62-B OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **MECHANICAL JOINT TAPPING SLEEVES**

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1. TAPPING SLEEVES SHALL BE THE SPLIT TYPE MECHANICAL JOINT WITH SIDE AND END GASKETS MANUFACTURED OF DUCTILE IRON.
2. SLEEVES SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF ANSI/AWWA C110 A21.10 ANSI/AWWA C111 A21.11, AND ANSI B16.11 CLASS 125 FLANGES.
3. SLEEVES SHALL BE FOR APPLICATION ON CAST OR DUCTILE IRON AS REQUIRED.
4. WHEN SLEEVES ARE TO BE INSTALLED ON PIPE THAT IS LARGER THAN 12", FIELD VERIFICATION OF EXISTING PIPE'S OUTSIDE DIAMETER SHALL BE REQUIRED BY THE CONTRACTOR BEFORE ORDERING SAID SLEEVE.
5. SLEEVES SHALL BE SIMILAR TO THOSE MANUFACTURED BY AMERICAN FLOW CONTROL, OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **STAINLESS STEEL TAPPING SLEEVES**

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1. STAINLESS STEEL TAPPING SLEEVES SHALL BE MANUFACTURED OF 304 HEAVY GAUGE STAINLESS STEEL.
2. SLEEVE SHALL BE A SPLIT TYPE TIG WELDED AND FULLY PASSIVATED. IT SHALL HAVE A TWO-PIECE DESIGN FEATURING TIG WELDED 304 S.S. 5/8 N.C. THREAD AND HEAVY HEX NUTS AND BOLTS.

3. BOLT THREADS SHALL BE COATED TO PREVENT GALLING, AND BE TIG WELDED TO PREVENT LOSS. SLEEVE SHALL HAVE A S.S. LIFTER BAR ALLOWING A POSITIVE LOCKING HOLD, AND EASY ASSEMBLY.
4. SLEEVES SHALL INCORPORATE A FULL CIRCUMFERENTIAL GASKET SEAL FOR POSITIVE PRESSURE SEALING. THE GASKET SHALL BE OF VIRGIN SBR COMPOUND FOR WATER SERVICE.
5. SLEEVE SHALL BE APPLICABLE FOR INSTALLATION ON A.C., P.V.C. SDR SIZES, P.V.C. C909 SIZES, DUCTILE IRON, OR CAST IRON PIPING SYSTEMS.
6. A 3/4" N.P.T. TEST PLUG FOR TEST SHALL BE INCORPORATED IN EACH SLEEVE.
7. FLANGES SHALL BE MANUFACTURED OF CARBON STEEL.
8. SLEEVES SHALL BE SIMILAR TO FAST AS MANUFACTURED BY THE FORD METER BOX CO., INC.
9. THE USE OF STAINLESS STEEL TAPPING SLEEVES SHALL NOT BE ALLOWED ON A SIZE ON SIZE APPLICATION AND ONLY BY WRITTEN PERMISSION BY AN OFFICER OF JEFFERSON UTILITIES.

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**C H E C K   V A L V E S — R E S I L I E N T   S E A T E D**

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1. SWING CHECK VALVES IN SIZES 4" THROUGH 12" SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA C508 RESILIENT SEATED DESIGN. VALVES SHALL BE MANUFACTURED OF DUCTILE IRON MEETING OR EXCEEDING ASTM A536 65-45-12 AND RATED FOR 250-PSI COLD WATER WORKING PRESSURE.
2. VALVES SHALL HAVE A DUCTILE IRON DISC FULLY ENCAPSULATED WITH EPDM RUBBER. THE DISC TRAVEL TO CLOSURE SHALL NOT BE MORE THAN 35 DEGREES AND SHALL SEAL DROP TIGHT AT PRESSURES ABOVE 5 PSIG.
3. VALVES SHALL BE COATED WITH FUSION BONDED EPOXY ON ALL INTERNAL AND EXTERNAL FERROUS SURFACES. THE VALVE SHALL BE SO DESIGNED AS THAT THE DISC SHALL BE THE ONLY ALLOWABLE MOVING PART AND SAID DISC SHALL BE REVERSIBLE SO EITHER SIDE WILL SEAL EQUALLY. THE VALVE SHALL HAVE 100% UNOBSTRUCTED FLOW AREA FREE OF POCKETS AND VOIDS.
4. A FACTORY INSTALLED BACK FLUSHING ACTUATOR CAN BE FURNISHED AS AN OPTION FOR PRIMING PUMPS, BACK FLUSHING, DRAINING LINES, AND SYSTEM TESTING. OPTIONS SHALL BE SHOWN ON DRAWINGS AND OR BID ITEMS.
5. VALVES SHALL BE EQUAL TO AMERICAN FLOW CONTROL SERIES 2100 DUCTILE IRON RESILIENT SEATED CHECK VALVE OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

## **AIR AND VACUUM VALVES**

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1. COMBINATION AIR RELEASE AND AIR VACUUM VALVES SHALL HAVE CAST IRON BODIES WITH STAINLESS STEEL FLOATS. OTHER INTERNAL PARTS SHALL BE EITHER STAINLESS STEEL OR BRONZE.
2. VALVES SHALL BE SIZED APPROPRIATELY FOR EACH APPLICATION. VALVES FOR LINES 3" THROUGH 8" SHALL BE 1" AS MANUFACTURED BY VAL-MATIC, MODEL NO. 201 C, OR APPROVED EQUAL. VALVES FOR LINES 10" THROUGH 24" SHALL BE 2" AS MANUFACTURED BY VAL-MATIC, MODEL NO. 202 C, OR APPROVED EQUAL.
3. INSTALLATION SHALL BE PER DETAIL DRAWING.

## **SAMPLING STATIONS**

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1. SAMPLING STATIONS SHALL BE 4' DEPTH OF BURY, 3/4" F.I.P. INLET AND A 3/4" HOSE OR UNTHREADED NOZZLE. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM-CAST HOUSING. WHEN OPENED, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND THE WATER WILL FLOW IN AN ALL BRASS WATERWAY. ALL WORKING PARTS WILL ALSO BE OF BRASS, AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING. A COPPER VENT TUBE WILL ENABLE EACH STATION TO BE PUMPED FREE OF STANDING WATER TO PREVENT FREEZING AND TO MINIMIZE BACTERIA GROWTH.
2. CONTRACTOR SHALL SUPPLY ONE PUMP (S) FOR EVERY TWO-SAMPLING STATION (S) INSTALLED.
3. THE EXTERIOR PIPING WILL BE GALVANIZED. SAMPLING STATIONS SHALL BE AS MANUFACTURED BY KUPFERLE FOUNDRY, OR APPROVED EQUAL.
4. INSTALLATION SHALL BE PER DETAILED DRAWING.

## **BALL CURB STOPS**

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1. CURB STOPS IN SIZES 3/4" THROUGH 2" COMING IN CONTACT WITH POTABLE WATER SHALL BE MANUFACTURED FROM **NO-LEAD ALLOY** UNS/CDA No C89833 AND CONFORM TO AWWA C800 AND ASTM B-584.
2. CURB STOPS SHALL BE THE BALL TYPE. THE BALL SHALL BE FLUOROCARBON COATED BRASS, SEATING AGAINST BUNA-N-RUBBER SEATS.
3. VALVES SHALL BE WATER TIGHT AGAINST FLOW IN EITHER DIRECTION.

4. THE STEM SHALL BE HELD IN PLACE BY A BRONZE RING, AND SHALL EXERT NO OTHER FORCE ON IT, EXCEPT TO OPEN OR CLOSE THE BALL VALVE.
5. EACH VALVE SHALL HAVE A SUBSTANTIAL T-HEAD FOR THE OPERATION OF OPENING AND CLOSING WITH A ¼ DEGREE TURN OF A STANDARD SLOTTED TEE HANDLE CURB WRENCH.
6. STOPS OR LUGS FOR CONTROLLING THE MOTION OF THE T-HEAD SHALL BE ENCLOSED AND PROPERLY POSITIONED TO LINE UP THE WATERWAY THROUGH THE BALL WITH THE WATER PASSAGE THROUGH THE VALVE BODY.
7. STEM SEALS SHALL CONSIST OF TWO (2) O-RINGS.
8. WHEN CURB VALVES ARE USED AS BLOW-OFF VALVES, THE END CONNECTIONS SHALL BE F.I.P.
9. FORD B44 COMPRESSION MODEL ON WATER SERVICES ¾” – 2” OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.
10. BALL CURB VALVES SHALL BE MANUFACTURED BY FORD METER BOX CO., INC OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **CURB BOXES**

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1. CURB BOXES FOR CURB STOPS ¾” THROUGH 1” SHALL BE MANUFACTURED OF CAST IRON.
2. THEY SHALL HAVE A MINIMUM WALL THICKNESS OF, ¼”. CLEAR SHAFT OPENING SHALL BE NOT LESS THAN 2 3/4 “.
3. LIDS SHALL HAVE A PENTAGON BOLT AND SHALL BE MARKED “WATER”.
4. BOXES SHALL BE SCREW TYPE ADJUSTABLE FROM 24” X 36”, OR 36” X 48”, AS REQUIRED.
5. WHEN GREATER DEPTHS ARE ENCOUNTERED, THE USE OF MIDDLE PIECE EXTENSIONS SHALL BE REQUIRED.
6. BOXES SHALL BE OF THE TWO-PIECE DESIGN, WITH A DOG HOUSE BOTTOM.
7. ALL PIECES SHALL HAVE A PROTECTIVE COATING OF COAL TAR EPOXY.
8. CURB BOXES SHALL BE MANUFACTURED SCREW TYPE ADJUSTABLE, AS MANUFACTURED BY TYLER PIPE OR BINGHAM TAYLOR OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

## **BALL VALVE EXTENSION STEMS**

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1. ALL BALL VALVES 1 ¼" THROUGH 2 ½" SHALL HAVE EXTENSION STEMS EXTENDING TO WITHIN APPROXIMATELY ONE FOOT OF FINISHED GRADE.
2. VALVE EXTENSION STEMS SHALL BE FACTORY ASSEMBLED USING A .625" DIAMETER STEEL ROD MEETING ASTM A-36-84A. THE TOP AND BOTTOM PIECE SHALL BE SLOTTED TO ACCOMMODATE THE VALVE AND THE VALVE OPERATING WRENCH.
3. THESE PIECES SHALL BE OF HIGH TENSILE DUCTILE IRON, FACTORY PINNED, AND WELDED IN PLACE. THE PIECES SHALL BE ASSEMBLED SO THE OPERATOR CAN TELL WHETHER THE POSITION OF THE VALVE THAT IS OPERATING IS OPEN OR CLOSED.
4. THE STEM SHALL ALSO BE FITTED WITH A STEEL ALIGNMENT RING 4" IN DIAMETER POSITIONED APPROXIMATELY 4" FROM THE TOP OF THE STEM. IT SHALL BE ASPHALTUM PAINT COATED.
5. THE STEM SHALL BE FURNISHED WITH BRASS COTTER PIN FOR ATTACHMENT TO THE VALVE.
6. THE CONTRACTOR SHALL FURNISH FOUR EACH 4' TEE HANDLE CURB TEES PER CONTRACT.

## **ROADWAY VALVE BOXES**

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1. VALVE BOXES FOR VALVES 1½" THROUGH 3" SHALL BE MANUFACTURED OF CAST IRON HAVE A MINIMUM WALL THICKNESS OF ¼". THE CLEAR SHAFT OPENING SHALL BE NOT LESS THAN 4½".
2. LIDS SHALL BE DROP TYPE, ADJUSTABLE FROM 36" X 48" AS REQUIRED. WHEN GREATER DEPTHS ARE ENCOUNTERED, THE USE OF MIDDLE PIECE EXTENSIONS SHALL BE REQUIRED.
3. BOXES SHALL BE OF THE TWO PIECE DESIGN, WITH AN ARCHED BOTTOM.
4. ALL PIECES SHALL HAVE A PROTECTIVE COATING OF COAL TAR EPOXY.
5. VALVE BOXES SHALL BE SCREW TYPE AS MANUFACTURED BY TYLER PIPE BINGHAM TAYLOR OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

## **SERVICE PIPING**

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1. SERVICE TUBING IN SIZES 1" THROUGH 2" SHALL BE POLYETHYLENE TUBING, CONFORMING TO ALL APPLICABLE REQUIREMENTS IN THE LATEST REVISION OF THE FOLLOWING STANDARDS:
2. POLYETHYLENE EXTRUSION COMPOUND FROM WHICH THE TUBING IS EXTRUDED SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS FOR PE-3408 HIGH MOLECULAR WEIGHT POLYETHYLENE MATERIAL AS DESCRIBED IN ASTM D1248.
3. POLYETHYLENE TUBING SHALL BE RATED FOR USE WITH WATER AT 73.4 DEGREES FARENHEIT AT A HYDROSTATIC DESIGN STRESS OF 800 PSI AND A WORKING PRESSURE OF 250 PSI, SDR-9 COPPER TUBE SIZE (CTS-OD) ASTM D3035.
4. THE TUBING SHALL BE HOMOGENEOUS THROUGHOUT AND FREE OF VISIBLE CRACKS, HOLES, FOREIGN INCLUSIONS OR OTHER DEFECTS. IT SHALL BE UNIFORM IN COLOR, OPACITY, DENSITY AND OTHER PHYSICAL PROPERTIES.
5. EACH BIDDER MUST BE ABLE TO FURNISH A CERTIFICATION FROM THE MANUFACTURER OF THE TUBING THAT THE MANUFACTURER IS FULLY COMPETENT AND CAPABLE OF EXTRUDING PE TUBING OF UNIFORM TEXTURE AND STRENGTH THAT WILL FULLY COMPLY WITH THE PROPERTIES SPECIFIED HEREIN.
6. TUBING SHALL BE MANUFACTURED WITH CONSISTANT OUTSIDE DIAMETERS TO INSURE THE COMPATABILITY OF AWWA C800 SERVICE LINE FITTINGS.
7. TUBING INTENDED FOR WATER SERVICE SHOULD BE BURIED AT LEAST 42" BELOW THE FINISHED GROUND SURFACE.
8. BACKFILL MATERIALS WITH PARTICLE SIZE RECOMMENDED IN ASTM-D2774 SHOULD BE USED AND COMPACTED PER THAT STANDARD.
9. TUBING SHALL BE AS MANUFACTURED BY ADS, ENDOT, OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.
10. WHEREVER FEASIBLE, SERVICE LINES SHALL BE ONE CONTINUOUS PIECE FROM THE CORPORATION STOP TO THE METTER SETTING.

## **SERVICE LINE FITTINGS**

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1. SERVICE LINE FITTINGS SHALL BE MANUFACTURED FROM AWWA C800 RED BRASS MEETING UNS/CDA NO. 89833 NO LEAD BRASS.
2. FOR COPPER TUBING, FITTINGS SHALL BE COMPRESSION PACK JOINT TYPE.
3. FOR COPPER TUBE SIZE (CTS) AND IRON PIPE SIZE (IPS) POLY TUBING THEY SHALL BE COMPRESSION TYPE.



4. COMPRESSION JOINT SHALL CONSIST OF A COMPRESSION NUT SEALED BY A BEVELED BUNA-N GASKET LOCKED IN PLACE BY A STAINLESS STEEL SET SCREW.
5. COMPRESSION NUT FOR C.T.S., I.P.S., AND COPPER TUBING SHALL BE MACHINED WITH GROOVES IN A SPLIT-CLAMPING DEVICE FOR GRIPPING TUBING AND TAPPED FOR A STAINLESS STEEL SLOTTED SET SCREW.
6. ALL FITTINGS SHALL BE SO DESIGNED AS TO PERMIT FULL CONTINUITY ON METAL TUBING OR GALVANIZED PIPE.
7. WHEN POLY TUBING IS INSTALLED, STAINLESS STEEL INSERT STIFFENERS SHALL BE USED.
8. REFER TO SERVICE TUBING SPECIFICATIONS AND OR PLANS FOR TYPE AND SIZE OF SERVICE LINES REQUIRED.
9. CERTIFICATIONS OF COMPLIANCE WITH AWWA C800 SHALL BE REQUIRED ON ALL SERVICE LINE EQUIPMENT.
10. FITTINGS SHALL BE SIMILAR TO THOSE MANUFACTURED BY THE FORD METER BOX CO., INC. OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **C O R P O R A T I O N   S T O P S**

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1. BALL CORPORATION STOPS COMING IN CONTACT WITH POTABLE WATER SHALL BE MANUFACTURED FROM **NO-LEAD ALLOY** UNS/CDA No C89833 AND CONFORM TO AWWA C800 AND ASTM B-584. CORPORATION STOPS SHALL BE OF **NO-LEAD ALLOY** UNS/CDA No C89833 AND CONFORM TO AWWA C800 AND ASTM B-584. THE BALL SHALL BE FLUOROCARBON COATED AND SHALL BE HELD IN POSITION BY, AND SEAL AGAINST, SEATS OF BUNA-N RUBBER. SEATS SHALL BE SECURED IN PLACE BY AN EPOXY ADHESIVE.
2. CORPORATION STOPS SHALL BE DESIGNED TO CREATE MINIMUM RESISTANCE TO FLOW. THE WATERWAY SHALL BE NO SMALLER THAN THE NOMINAL SIZE OF THE VALVE. VALVES SHALL BE WATERTIGHT AT ANY PRESSURE UP TO 300 PSI.
3. EACH STOP SHALL BE DESIGNED SO THAT THEY MAY BE INSTALLED IN MAINS UNDER PRESSURE USING STANDARD TAPPING MACHINES.
4. CORPORATION STOPS IN SIZES ¾" THROUGH 2" SHALL BE AVAILABLE FROM THE SAME MANUFACTURER. FB1000-3NL, FB1000-7NL
5. CORPORATION STOPS SHALL HAVE THREADS CONFORMING TO AWWA STANDARD C800. THE INLET THREADS SHALL BE AWWA. THE OUTLET CONNECTIONS SHALL BE COMPRESSION PACK JOINT COPPER.

6. BALL-CORP CORPORATION STOPS SHALL BE AS MANUFACTURED BY THE FORD METER BOX CO., INC. OF WABASH, IN. OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **BRASS SERVICE SADDLES**

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1. BRASS SERVICE SADDLES FOR PVC PIPE SHALL BE MANUFACTURED FROM AWWA C800 WATER WORKS BRASS OF 85, 5, 5, 5, PER ASTM B-62.
2. THEY SHALL BE MACHINED TO RIGID SPECIFICATIONS AND ALLOW AMPLE WIDTH TO PROVIDE GREATER DISTRIBUTION OF CLAMPING PRESSURE TO AVOID DEFORMING OF THE PIPE.
3. BRONZE SADDLES IN SIZES 4" THROUGH 8" SHALL BE DESIGNED AS A SINGLE UNIT WITH THE UPPER AND LOWER CASTING PERMANENTLY HINGED TOGETHER WITH A SILICON BRONZE PIN. THE TIGHTENING DEVICE OF THE SADDLE SHALL BE A SLOTTED HEX HEAD SILICON BRONZE BOLT AS TO PREVENT OVER-TORQUE WITH THE LOWER CASTING BEING TAPPED.
4. BRONZE SADDLES IN 10" THROUGH 12" SHALL BE DESIGNED AS A TWO PIECE UNIT WITH THE UPPER AND LOWER CASTINGS BOLTED TOGETHER USING SILICON BRONZE BOLTS WITH THE LOWER CASTING TAPPED FOR BOLTING.
5. OUTLET TAPS SHALL BE 3/4" THROUGH 2" HAVING AWWA TYPE THREADS.
6. FOR PVC PIPE 4" THROUGH 12" S90 SERIES SADDLES AS MANUFACTURED BY FORD METER BOX CO., INC. OR EQUAP AS PRE-APPROVED BY JEFFERSON UTILITIES.

#### **EPOXY COATED DUCTILE SERVICE SADDLES**

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1. SERVICE SADDLES FOR DUCTILE IRON PIPE, WHEN REQUIRED, SHALL BE MANUFACTURED OF EPOXY COATED DUCTILE IRON ACCORDING TO ASTM A536.
2. SADDLES SHALL BE DOUBLE STRAP TYPE, WITH STRAPS MANUFACTURED OF 304 STAINLESS STEEL.
3. GASKETS SHALL BE BUNA-N RUBBER, ACCORDING TO ASTM D2000 80 MS BG506.
4. OUTLET SHALL BE TAPPED WITH AWWA THREADS.
5. SADDLES SHALL BE FORD SERIES FC-202 AS MANUFACTURED BY THE FORD METER BOX CO., INC. OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

## **WATER METER COPPERSETTER**

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1. COPPERSETTERS FOR 5/8" X 3/4" & 1" WATER METERS SHALL, BE MANUFACTURED AND EQUIPPED WITH, THE FOLOWING FEATURES.
2. METER SETTERS SHALL BE MANUFACTURED WITH 3/4" OR 1 1/8" O.D. TYPE K COPPER TUBING, TO AND FROM THE UNITS INLET AND OUTLET VALVES, WITH 1" INLET AND OUTLET C.T.S. PACK JOINT COMPRESSION CONNECTIONS.
3. COPPERSETTER SHALL HAVE A MINIMUM HEIGHT OF 12" OR 15" AND BE EQUIPPED WITH A BRACING EYE IN THE BASE SEPARATION BAR, SIZED TO ACCOMIDATE A 3/4" DIAMETER BY 12" LONG, BRASS PIPE NIPPLE
4. EACH COPPERSETTER SHALL HAVE AN INLET ANGLE BALL VALVE WITH PADLOCK WINGS AND SADDLE NUT FOR 5/8" X 3/4" WATER METERS.
5. EACH OUTLET VALVE SHALL BE AN ANGLE DUAL CARTRIDGE STYLE CHECK VALVE FOR USE IN METER SETTING EQUIPMENT WITH THE FOLLOWING DESIGN CHARACTERISTICS:
6. VALVE DESIGN SHALL CONSIST OF TWO INDEPENDENT CARTRIDGE CHECK VALVES MOUNTED IN LINE FOR MAXIMUM PROTECTION OF BACKFLOW AND EASE OF MAINTENANCE.
7. EACH VALVE MUST CARRY THE ASSE 1024 APPROVAL STAMPED IN PLAIN VIEW ON THE BODY OF EACH VALVE.
8. THE MANUFACTURER MUST BE ABLE TO PROVIDE A FULL RANGE OF 3/4" AND 1" DUAL CARTRIDGE STYLE CHECKS FOR METER SETTINGS.
9. THE SAME MANUFACTURER AS THE SETTER OR YOKE MUST MANUFACTURE EACH VALVE.
10. VALVE BODIES MUST BE MANUFACTURED FROM RED BRASS CONFORMING TO AWWA C800 STANDARDS. UNS/CDA NO. 89833 NO LEAD BRASS.
11. VALVES MUST BE ABLE TO ATTACH DIRECTLY TO THE OUTLET OF SPECIFIED WATER METER.
12. CARTRIDGES SHALL BE REMOVABLE FOR INSPECTION AND REPLACEMENT THROUGH THE TOP OF THE DUAL CHECK, ACCESSIBLE VIA A REMOVABLE SEALED O-RING THREADED CAP.
13. THE DESIGN MUST FACILITATE THE REMOVAL OF EACH CARTRIDGE WITHOUT THE NEED FOR SPECIAL TOOLS.
14. EACH CARTRIDGE SHALL BE IDENTICAL IN DESIGN TO ALLOW INTERCHANGING OF CHECKS AND DISMISS THE POSSIBILITY OF FAULTY INSTALLATION.
15. THERE SHALL BE AN O-RING SEAL BETWEEN THE OUTSIDE OF EACH CHECK CARTRIDGE TO SEAL AGAINST THE INSIDE OF THE VALVE BODY.

16. CARTRIDGE CHECK ASSEMBLIES SHALL BE MANUFACTURED OF ACETYL PLASTIC WITH STAINLESS STEEL SPRINGS.
17. FOR 3/4" VALVES THE P.S.I. DROP SHALL BE, NO MORE THAN 7.5 P.S.I. AT 15 G.P.M.
18. THE MANUFACTURER, MUST UPON REQUEST, SUBMIT A NOTARIZED CERTIFICATION OF CONFORMANCE TO THE ABOVE MATERIAL STANDARDS.
19. COPPERSETTER SHALL BE AS MANUFACTURED BY THE FORD METER BOX CO., INC. OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.
20. 5/8 X 3/4 SHALL BE MODEL VBHC72-12W-44-33-BE-NL
21. 1" SHALL BE MODEL VBHC74-15W-44-44-BE-NL
22. BRASS COMPONENTS SHALL MEET UNS/CDA NO. 89833 NO LEAD BRASS.

#### **WATER METER CUSTOM SETTERS**

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1. CUSTOM METER SETTERS FOR 1 1/2" AND 2" METERS SHALL BE EQUIPPED WITH THE FOLLOWING FEATURES:
2. SETTERS SHALL BE PROVIDED WITH A BALL VALVE WITH PADLOCK WINGS. THE OUTLET SHALL HAVE AN ASSE APPROVED DUAL CHECK. THE DUAL CHECK VALVE SHALL HAVE NO MORE THAN 10 P.S.I. PRESSURE DROP AT A FLOW RATE OF 80 G.P.M.
3. OPTIONAL FEATURES OF BRACING EYE, SEAL HOLES, PADLOCK WINGS, AND METER SUPPORT BRACKETS SHALL BE FURNISHED ON EACH SETTER.
4. THE HEIGHT OF THE SETTER SHALL BE 15".
5. SETTERS SHALL HAVE TYPE K COPPER TUBING SIZED TO ALLOW A FULL FLOW TO AND FROM THE METER.
6. THE INLET CONNECTION SHALL BE F.I.P. WITH AN OUTLET CONNECTION OF F.I.P.
7. EACH SETTER SHALL HAVE A BUILT-IN BY-PASS VALVE AND PIPING LOCATED AT THE BASE OF EACH SETTER. THE VALVE SHALL BE A BALL VALVE EQUIPPED WITH PADLOCK WINGS.
8. TWO-INCH SETTERS SHALL BE VBHH77-15BHC-11-77-NL, AND ONE AND ONE HALF INCH SETTERS SHALL BE VBHH76-15BHC-11-66-NL AS MANUFACTURED BY THE FORD METER BOX CO., INC. OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.
9. BRASS COMPONENTS SHALL MEET UNS/CDA NO. 89833 NO LEAD BRASS.

## **METER BOX COVERS**

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1. METER BOX COVERS FOR 5/8" THROUGH 3/4" METER SETTINGS SHALL BE CAST IRON RAISED STYLE LOCKING LIDS WITH STANDARD PENTAGON NUTS.
2. LID SHALL BE 18" INSIDE DIAMETER WITH AN 11 1/2" LID AND A 4" DEPTH. LID TO HAVE 1-3/4" HOLE TO ALLOW RF ANTENA AND HAVE CENTER RECESSED TO ALLOW FLUSH MOUNTING THROUGH LID.
3. LID SHALL HAVE A STANDARD BRONZE PENTAGON NUT AND BOLT WITH A HARD CAST IRON LOCKING WORM.
4. LID SHALL BE SIMILAR TO THE AYM METER BOX COVER. INC., STYLE 74M32ARG FOR GROUND APPLICATION.

## **MONITOR COVERS**

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1. METER BOX COVERS FOR 1 1/2" AND 2" METER SETTINGS SHALL BE MANUFACTURED OF CAST IRON.
2. EACH COVER SHALL CONSIST OF A FLANGE CASTING TO FIT ON THE METER BOX, A RING WHICH IS CENTERED IN PLACE ON THE FLANGE BY A CIRCULAR BEAD, AND A TOP LID WITH A LIFTER WORM LOCK WITH A STANDARD PENTAGON BOLT.
3. LID SHALL BE INSTALLED IN NON-TRAFFIC SETTINGS ONLY.
4. THE CLEAR OPENING OF THE LID SHALL BE 20".
5. METER BOX COVER SHALL BE 36" IN DIAMETER AND HAVE A TAPT HOLE IN LID. MONITOR COVERS SHALL BE MODEL MC36-T AS MANUFACTURED BY FORD METER BOX, OR PRIOR APPROVED EQUAL.

## **METER BOXES- ALL SETTINGS**

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1. HEAVY WALL MAX SERIES BULLET METER BOXES
2. MAXIMUM SPACE BULLET STYLE METER BOXES SHALL BE MANUFACTURED TO MEET THE FOLLOWING REQUIREMENTS.
3. MANUFACTURED OF A ONE PIECE MOLDED CONSTRUCTION.
4. MANUFACTURED FROM A THREE LAYERED POLYETHYLENE.
5. DIMENSIONALLY TAPERED AT ITS TOP WITH AN EXPANDED BODY WITH THE MAXIMUM INSIDE DIMENSION STARTING AT APPROXIMATELY 6" DOWN FROM THE TOP OF BOX.

6. THE NOMINAL WALL THICKNESS SHALL BE NOT LESS THAN .550.
7. EACH BOX SHALL HAVE MOLDED IN THE WALL AN INSULATION LAYER HAVING A MINIMUM THERMAL TRANSFER VALUE OF 4.0 ACCORDING TO ASTM-C171 TO RESIST FROST JUMP.
8. THE VERTICAL FREE STANDING LOAD SHOULD BE A MINIMUM OF 25,000 LBS.
9. THE MINIMUM FREE STANDING HORIZONTAL DEFLECTION TEST SHALL BE NO LESS THAN AS FOLLOWS:
  - a. 18"X 22" X 30" NO MORE THAN 1"DEFLECTION AT 418 LBS
  - b. 20"X 24"X 30" NO MORE THAN 1"DEFLECTION AT 370 LBS
10. EACH BOX SHALL HAVE A TOP FLANGE FOR FRAME AND COVER SEATING AND BOTTOM FLANGE FOR ANTI-SETTLING AT ITS BASE.
11. THE BOX SHALL INCORPORATE A TOP LIP SHELF TO FACILITATE THE USE OF AN ADDITIONAL INSULATING DISC AS NEED MAY ARISE.
12. THE INTERIOR SHALL BE BRIGHT WHITE IN COLOR FOR LIGHT REFLECTION TO EASE METER READING AND PROVIDE LIGHT FOR MAINTENANCE WORK.
13. THE EXTERIOR SHALL BE BLACK IN COLOR TO RETARD UV DEGRADATION.
14. LOW TEMPERATURE BRITTLENESS NEGATIVE 76 DEGREES FAHRENHEIT.
15. THE MANUFACTURE SHALL BE ABLE TO PROVIDE GRADE BOX ADJUSTMENTS IN HEIGHTS OF 3" TO 12" WITH TAPERED RISERS TO ACCOMMODATE SCOPING INSTALLATIONS.

METER BOXES SHALL BE MANUFACTURED BY CARSON INDUSTRIES LLC, BINGHAM & TAYLOR OR EQUAL AS PRE-APPROVED BY JEFFERSON UTILITIES.

PARTICULAR APPLICATIONS SHALL BE AS FOLLOWS:

18"x 22"x 30"	5/8" x 3/4" METERS
18"x 22"x 30"	1" METERS
36"x 36"	1-1/2" & 2" METERS