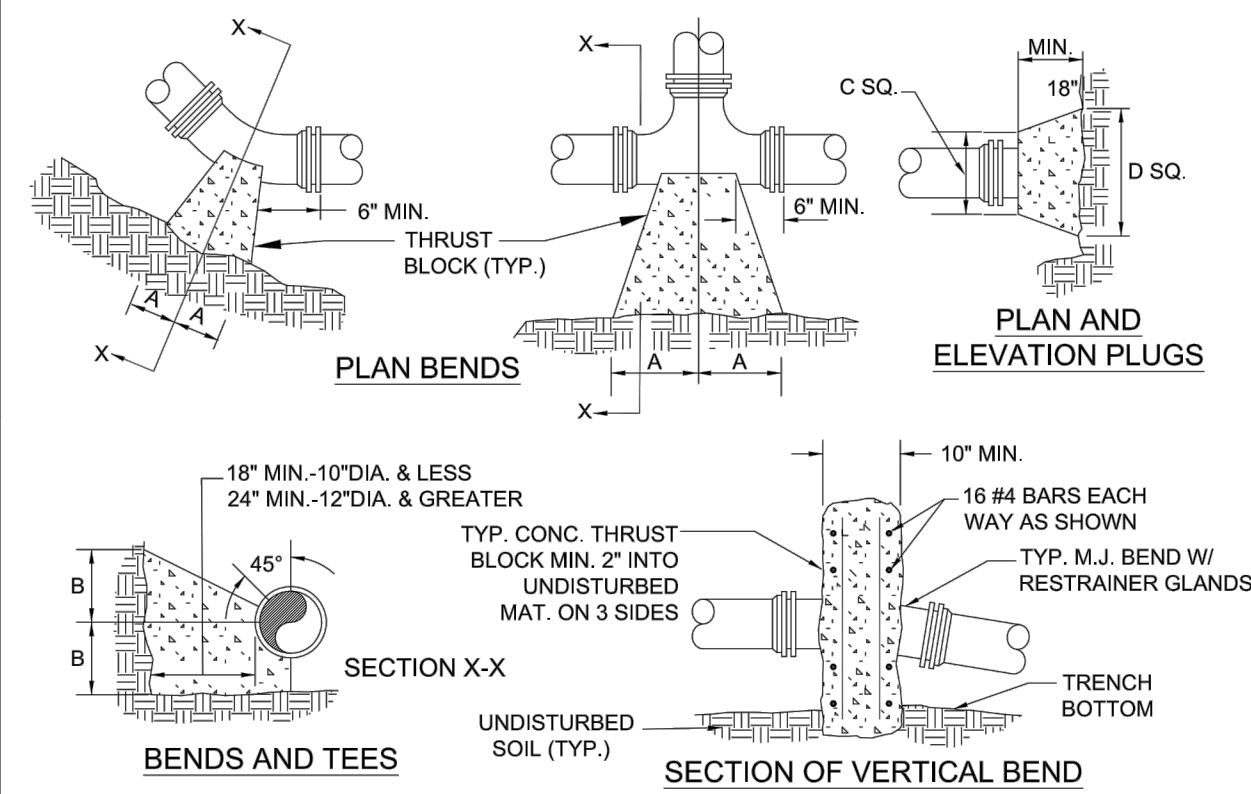


-
- VARIES (NO OBSTRUCTIONS)
- 2 - 2 1/2" NOZZLES
- 1 - 4 1/2" PUMPER NOZZLE (FACING THE ROAD)
- AVK MODEL 2780, AFC MODEL 9-84-B-5, MUELLER CENTURION A423, KENNEDY K81D OR EQUIVALENT.
- FINISHED GRADE
- 3" MIN. COVER
- 2'X2'X4" CONCRETE PAD
- VALVE BOX (W/ ADAPTOR) IF OUTSIDE PAVEMENT OR VALVE VAULT UNDER PAVEMENT
- STANDARD INSTALLATION INCLUDES FOSTER ADAPTER OR APPROVED EQUAL
- WATER MAIN
- CONCRETE THRUST BLOCK (IF REQUIRED)
- TEE - MAIN LINE SIZE x 6" TO VALVE AND HYDRANT
- APPROVED M.J. LAND RESTRAINT (NON-CORROSIVE) THREADED ROD AND NUTS TRACER WIRE SEE GENERAL DETAIL
- M.J. FITTINGS SHALL NOT BE ENCASED IN CONCRETE
- 0.5 CY CLEAN STONE VDOT #57 FOR DRAINAGE
- CONTINUOUS SECTION OF PIPE
- CONTINUOUS SECTION OF PIPE
- CONCRETE BASE AND THRUST BLOCK (REQUIRED) AGAINST UNDISTURBED SOIL, CONCRETE SHALL NOT COVER HYDRANT DRAIN
- 4' TO 6' ABOVE CURB OR EDGE OF PAVEMENT

FIRE HYDRANT ASSEMBLY

02/10/15



1. FOR VERT. BEND DOWN IN EXCESS OF 11 1/4" BEND, ANCHORAGE SHALL BE DESIGNED BY ENGINEER.
2. FOR VERT. BEND UPWARD, BLOCKING TO BE SIMILAR TO THAT FOR HORIZ. BEND.
3. GLANDS & BOLTS SHALL BE PROTECTED FROM CONCS. WITH PLASTIC SHEETING WHEN POURING THRU THOSE BLOCKS.
4. ALL THRU BLOCKS & SUPPORT CONCRETE SHALL BE 3000 PSI READY MIX CONCRETE.
5. THRUST BLOCKS WITH "B" DIMENSION GREATER THAN 30" SHALL HAVE THE RESTRAINED PIPE INSTALLED WITH A MINIMUM OF 4" OF COVER. REFER TO "MINIMUM BEND RADIUS" OF PIPE JOINTS DESIGN LENGTHS" DETAIL FOR WHEN THRUST BLOCKS ARE REQUIRED TO BE USED.
7. WHEN A THRUST BLOCK IS REQUIRED BUT NOT FEASIBLE TO CONSTRUCT, THRUST COLLAR SHALL BE USED. SEE "THRUST COLLAR" DETAIL.

PRESSURE = 200psi
BEARING = 2000psf
R OF SAFETY = 1.5

| PIPE SIZE | 90° BEND | | 45° BEND | | 22½° BEND | | 11½° BEND | | TEE | | PLUG | |
|--------------|----------|-----|----------|-----|-----------|-----|-----------|-----|------|-----|------|-----|
| | A | B | A | B | A | B | A | B | A | B | C | D |
| 4" | 8" | 12" | 8" | 8" | 6" | 6" | 6" | 11" | 9" | 10" | 6" | |
| 6" | 18" | 12" | 8" | 10" | 8" | 8" | 8" | 8" | 11" | 10" | 12" | 18" |
| 8" | 18" | 13" | 10" | 10" | 8" | 8" | 8" | 8" | 11" | 12" | 12" | 24" |
| 10" | 20" | 16" | 12" | 14" | 8" | 12" | 8" | 12" | 14" | 16" | 16" | 30" |
| 12" | 20" | 16" | 12" | 14" | 8" | 12" | 8" | 12" | 14" | 16" | 16" | 30" |
| 16" | 26" | 20" | 16" | 18" | 11" | 13" | 11" | 13" | 18" | 20" | 20" | 36" |
| 24" | 82" | 42" | 62" | 30" | 44" | 22" | 22" | 16" | 82" | 42" | 82" | 42" |
| 30" | 185" | 42" | 100" | 42" | 52" | 42" | 40" | 30" | 185" | 42" | 185" | 42" |

THRUST BLOCK REQUIREMENTS

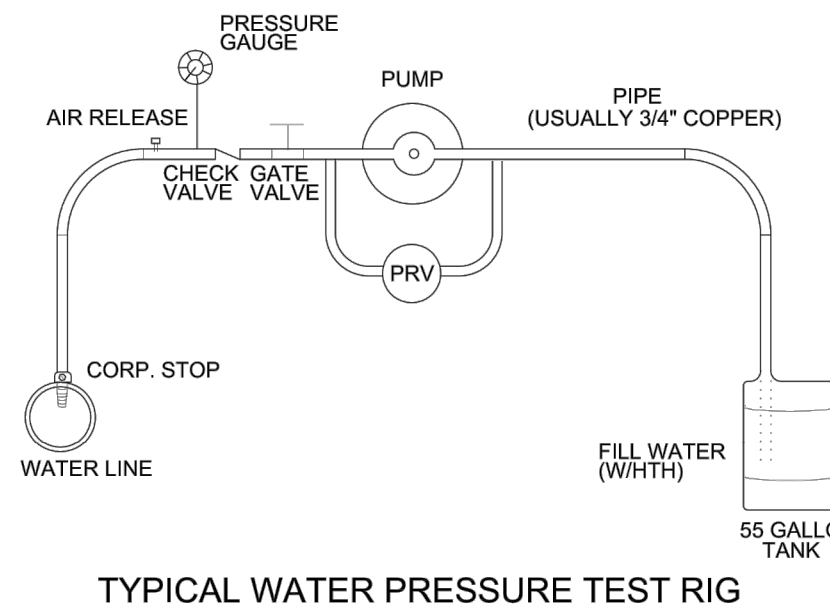
W-18

| FACTOR OF SAFETY = 1.5 | | | | | | | | | | | |
|------------------------|------------|----------|----------|--------------|--------------|-----------------------|---------------------|------------------|-----------|---------------|---------------|
| PIPE SIZE | PIPE MAT'L | 90° BEND | 45° BEND | 22 1/2° BEND | 11 1/2° BEND | VALVE / PTEE (NOTE 2) | TEE BRANCH (NOTE 3) | REDUCER (NOTE 4) | 45° VERT. | 22 1/2° VERT. | 11 1/2° VERT. |
| 6" | D.I. | 28' | 21' | 6' | 3' | 50' | 26' | 26' | 21' | 10' | 5' |
| 8" | D.I. | 36' | 21' | 8' | 4' | 65' | 41' | 27' | 27' | 13' | 7' |
| 10" | D.I. | 43' | 21' | 9' | 5' | 77' | 53' | 26' | 32' | 16' | 8' |
| 12" | D.I. | 51' | 21' | 10' | 5' | 91' | 57' | 27' | 32' | 16' | 8' |
| 6" | PVC | 29' | 21' | 8' | 4' | 78' | 25' | 40' | 38' | 18' | 9' |
| 8" | PVC | 37' | 21' | 8' | 4' | 102' | 49' | 43' | 42' | 21' | 10' |
| 10" | PVC | 44' | 21' | 9' | 5' | 122' | 68' | 41' | 51' | 25' | 12' |
| 12" | PVC | 51' | 21' | 11' | 6' | 143' | 89' | 42' | 60' | 29' | 15' |

- LARGER THAN 12" DIAMETER: IF UNDER 100 PSI WORKING PRESSURE, RESTRAINED JOINT(S) ARE TO BE USED. IF EQUAL TO OR OVER 100 PSI WORKING PRESSURE, BOTH THRUST BLOCK(S) AND RESTRAINED JOINT(S) SHALL BE USED (UNLESS OTHERWISE APPROVED BY THE PARTICIPATING UTILITY).
- FOR RESTRAINED JOINT PIPING REQUIREMENTS AT FITTING R.J. PVC AND R.J. DIP MAY BE USED INTERCHANGEABLY WITH APPROVAL FROM PARTICIPATING UTILITY. CONTRACTOR MUST PLAN ACCORDINGLY FOR THE DIFFERENCE IN PVC AND DIP BELL AND SPIGOT DIMENSIONS.

MINIMUM THRUST RESTRAINT OF PIPE JOINTS DESIGN LENGTHS

02/10/15



TYPICAL WATER PRESSURE TEST RIG

TYPICAL WATER PRESSURE TEST RIG

01/01/14

| Nominal Pipe Size (inches) | Deflection Angle - θ (degree) | Maximum Offset - S* (Inches) | | Approximate Radius of Curve - R* Produced by Succession of Joints | |
|----------------------------------|--|---------------------------------|--------------------------|--|--------------------------|
| | | Joint Length 18-Ft | Joint Length 20-Ft | Joint Length 18-Ft | Joint Length 20-Ft |
| 3 | 5" | 19 | 21 | 205 | 230 |
| 4 | 5" | 19 | 21 | 205 | 230 |
| 6 | 5" | 19 | 21 | 205 | 230 |
| 8 | 5" | 19 | 21 | 205 | 230 |
| 10 | 5" | 19 | 21 | 205 | 230 |
| 12 | 5" | 19 | 21 | 205 | 230 |
| 14 | 3" | 11 | 12 | 340 | 380 |
| 16 | 3" | 11 | 12 | 340 | 380 |
| 18 | 3" | 11 | 12 | 340 | 380 |
| 20 | 3" | 11 | 12 | 340 | 380 |
| 24 | 3" | 11 | 12 | 340 | 380 |
| 30 | 3" | 11 | 12 | 340 | 380 |

* SEE FIGURE 4.
For 14-inch and larger push-on joints, maximum deflection angle may be larger than shown above. Consult the manufacturer.

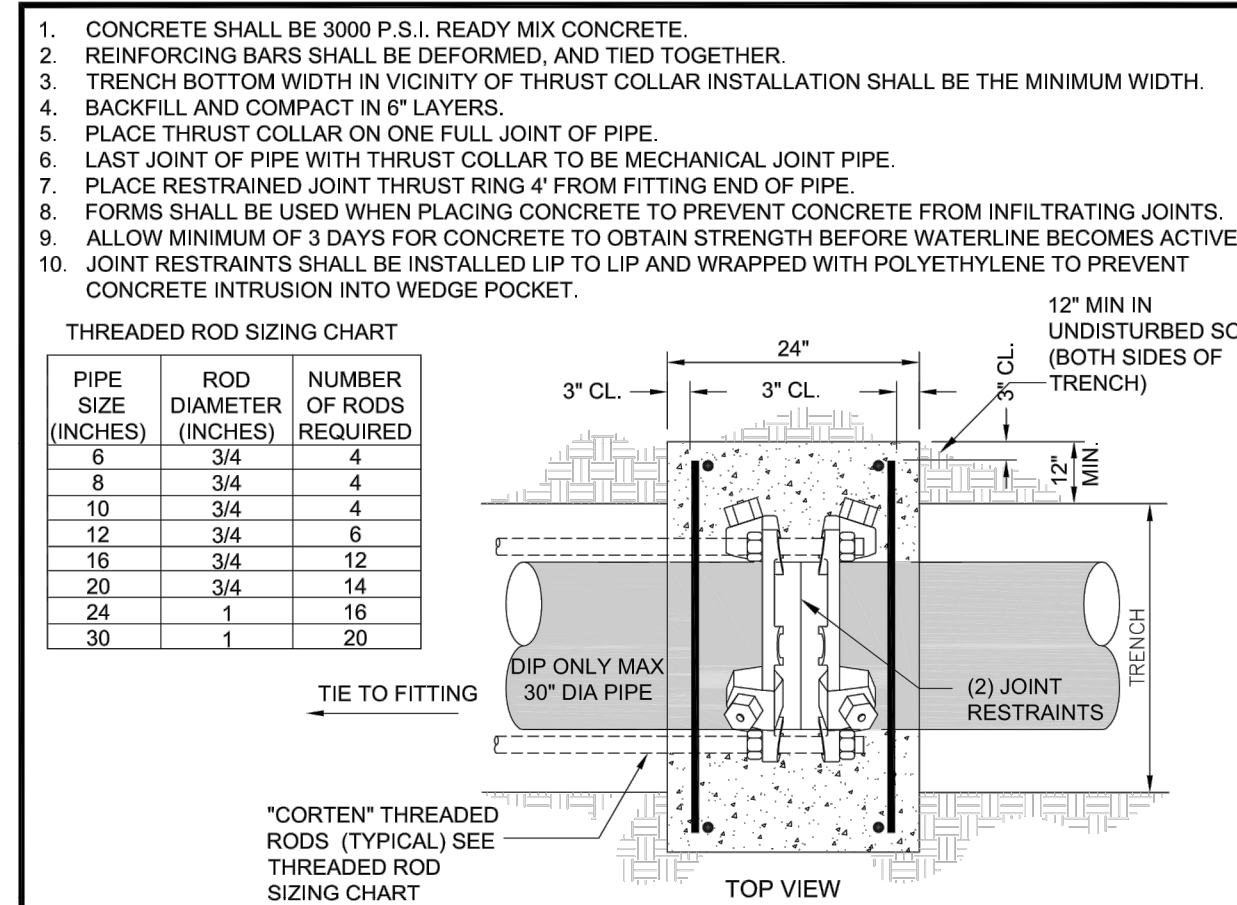
INSTALLATION OF DUCTILE IRON WATER MAINS
TABLE 4 AWWA C600-05
Maximum Joint Deflection Full Length of Pipe - Mechanical Joint Pipe

| Nominal Pipe Size (inches) | Deflection Angle - θ (degree) | Maximum Offset - S* (Inches) | | Approximate Radius of Curve - R* Produced by Succession of Joints | |
|----------------------------------|-------------------------------------|---------------------------------|------------------------------|--|------------------------------|
| | | Joint Length - 18 Feet | Joint Length - 20 Feet | Joint Length - 18 Feet | Joint Length - 20 Feet |
| 3 | 8°-18" | 31 | 35 | 125 | 140 |
| 4 | 8°-18" | 31 | 35 | 125 | 140 |
| 6 | 7°-07" | 27 | 30 | 145 | 160 |
| 8 | 5°-21" | 20 | 22 | 195 | 220 |
| 10 | 5°-21" | 20 | 22 | 195 | 220 |
| 12 | 5°-21" | 20 | 22 | 195 | 220 |
| 14 | 3°-35" | 13.5 | 15 | 285 | 320 |
| 16 | 3°-35" | 13.5 | 15 | 285 | 320 |
| 18 | 3°-00" | 11 | 12 | 340 | 380 |
| 20 | 3°-00" | 11 | 12 | 340 | 380 |
| 24 | 2°-23" | 9 | 10 | 450 | 500 |

* SEE FIGURE 4.

DUCTILE IRON PIPE DEFLECTION ALLOWANCE TABLES

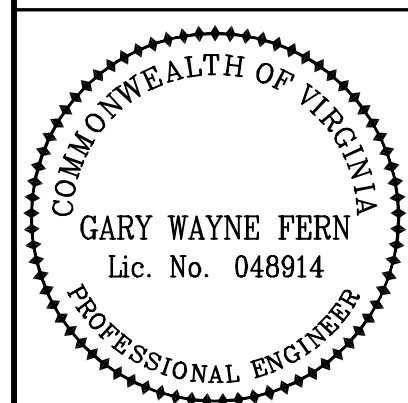
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THRUST COLLAR DETAIL

01/01/14

NOTE 1: FOR DETAIL W-19, IT IS NOTED THAT WORKING PRESSURES ON THIS PROJECT ARE <100 PSI.



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5204 BERNARD DRIVE
ROANOKE, VA 24018

VDOT PROJECT NUMBERS:
0115-080-R95, P101, C501 &
EN12-080-823, P101, R201, C501

VDOT UPC NUMBERS: 98220 & 103607

PLANTATION ROAD, BICYCLE, PEDESTRIAN, AND STREETSCAPE IMPROVEMENTS PROJECT

Drawing
DETAIL DRAWING
WVWA – WATER

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