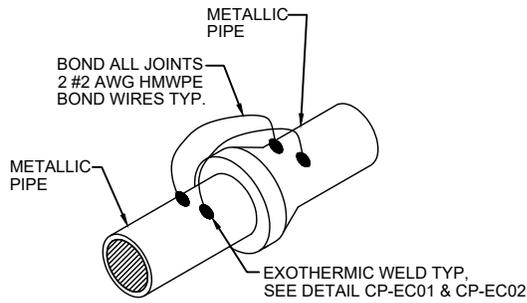


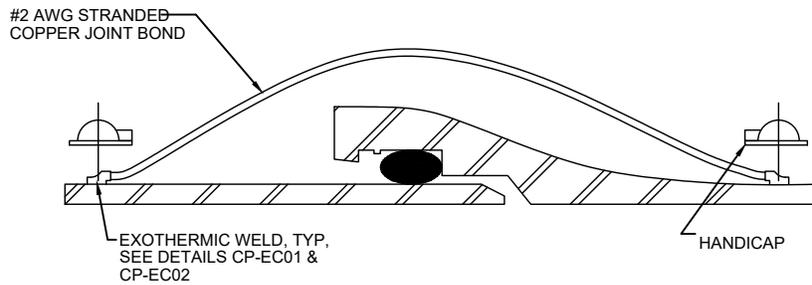
# CLEVELAND DIVISION OF WATER CONSTRUCTION STANDARDS

Primarily for use on mains 20" and larger

*Cathodic Protection  
Details*



REQUIRED AT MECHANICAL JOINTS



**NOTES:**

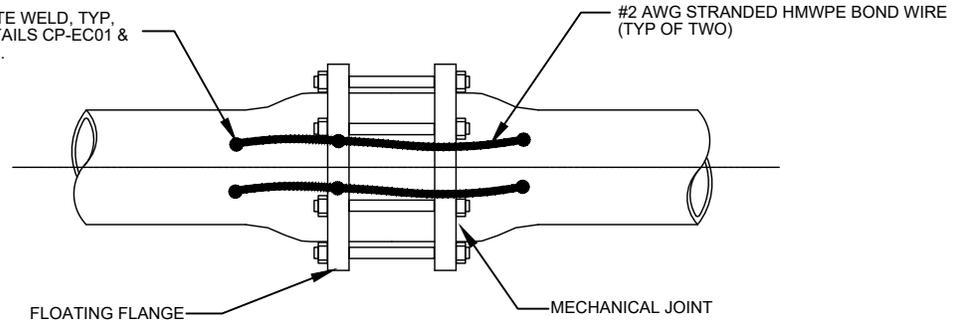
1. PUSH ON JOINT SHOWN. BOND INSTALLATION SIMILAR FOR MECHANICAL OR RESTRAINED PIPE JOINTS.
2. INSTALL 2 BOND WIRES AT EACH JOINT, UNLESS OTHERWISE SPECIFIED. TEST WELDS WITH HAMMER AND REMOVE ANY SLAG PRESENT, THEN COAT WITH ROYSTON HANDI-CAPS.

## MECHANICAL/DUCTILE IRON PIPE JOINT BOND

NOT TO SCALE

CP-B01	CORROSION PROTECTION DETAILS BONDING	N.T.S.	DATE: 11-19-2019
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THERMITE WELD, TYP,  
SEE DETAILS CP-EC01 &  
CP-EC02.



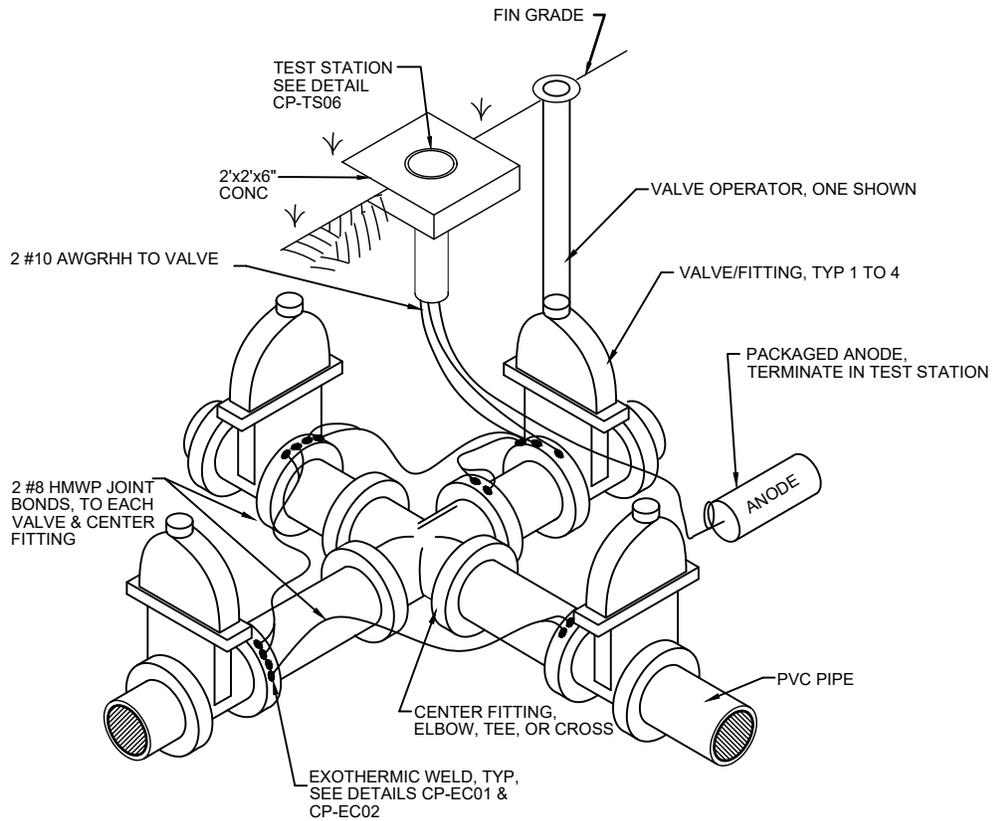
#2 AWG STRANDED HMWPE BOND WIRE  
(TYP OF TWO)

FLOATING FLANGE

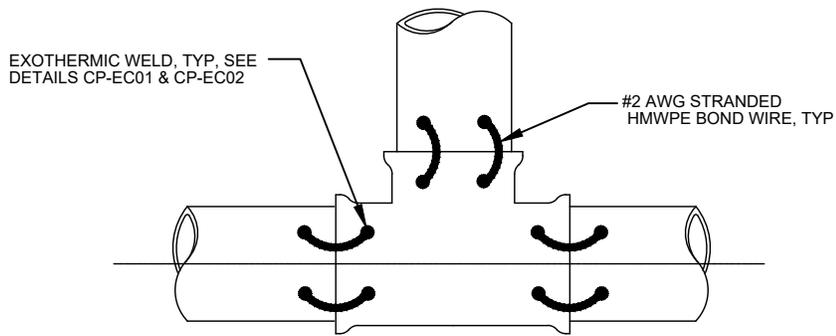
MECHANICAL JOINT

## MECHANICAL COUPLING JOINT BOND

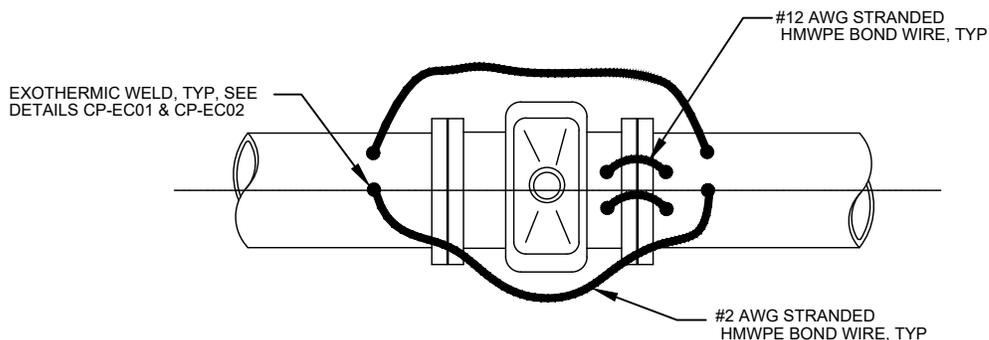
NOT TO SCALE



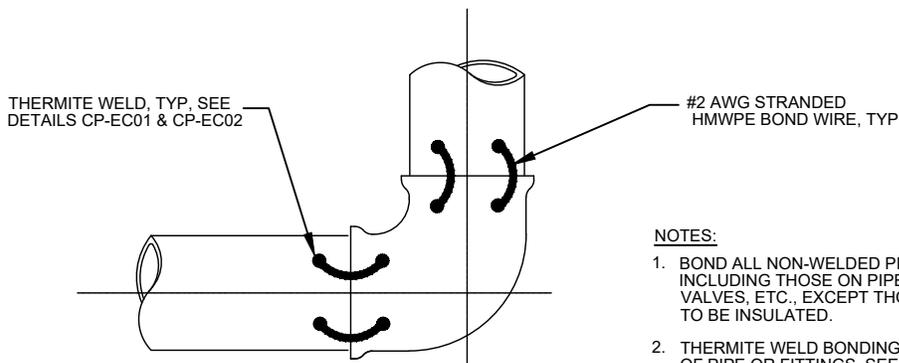
**BONDING GROUP OF FITTINGS**  
**NOT TO SCALE**



TYPICAL BONDING OF TEE



TYPICAL BONDING OF VALVE

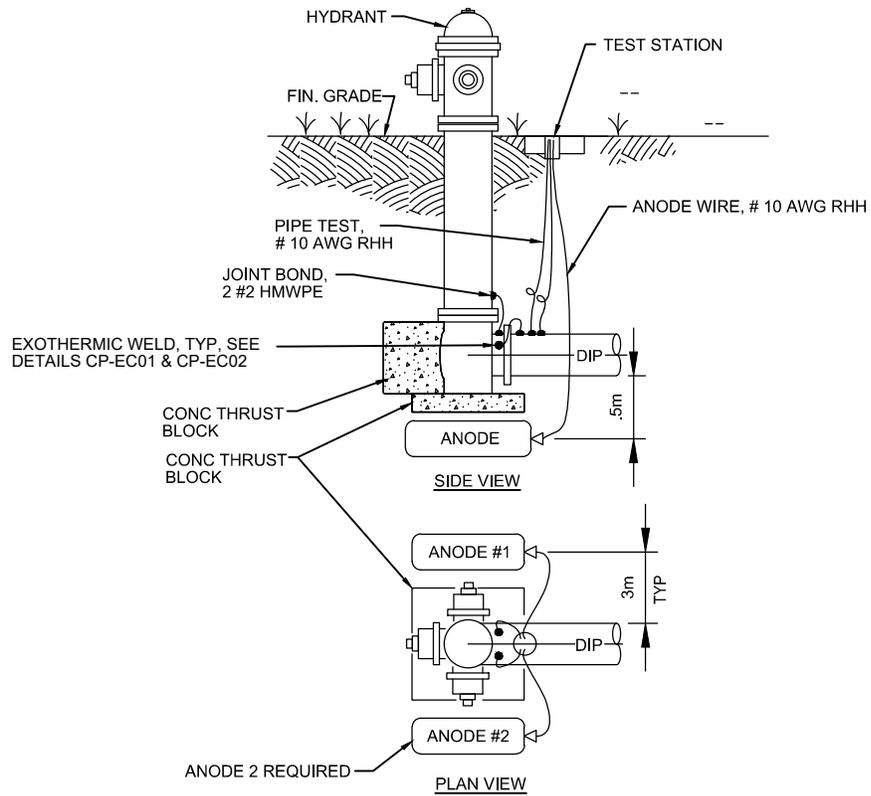


TYPICAL BONDING OF FITTING

NOTES:

1. BOND ALL NON-WELDED PIPE JOINTS, INCLUDING THOSE ON PIPE, FITTINGS, VALVES, ETC., EXCEPT THOSE SPECIFIED TO BE INSULATED.
2. THERMITE WELD BONDING WIRES TO TOP OF PIPE OR FITTINGS, SEE DETAILS CP-EC01 & CP-EC02.

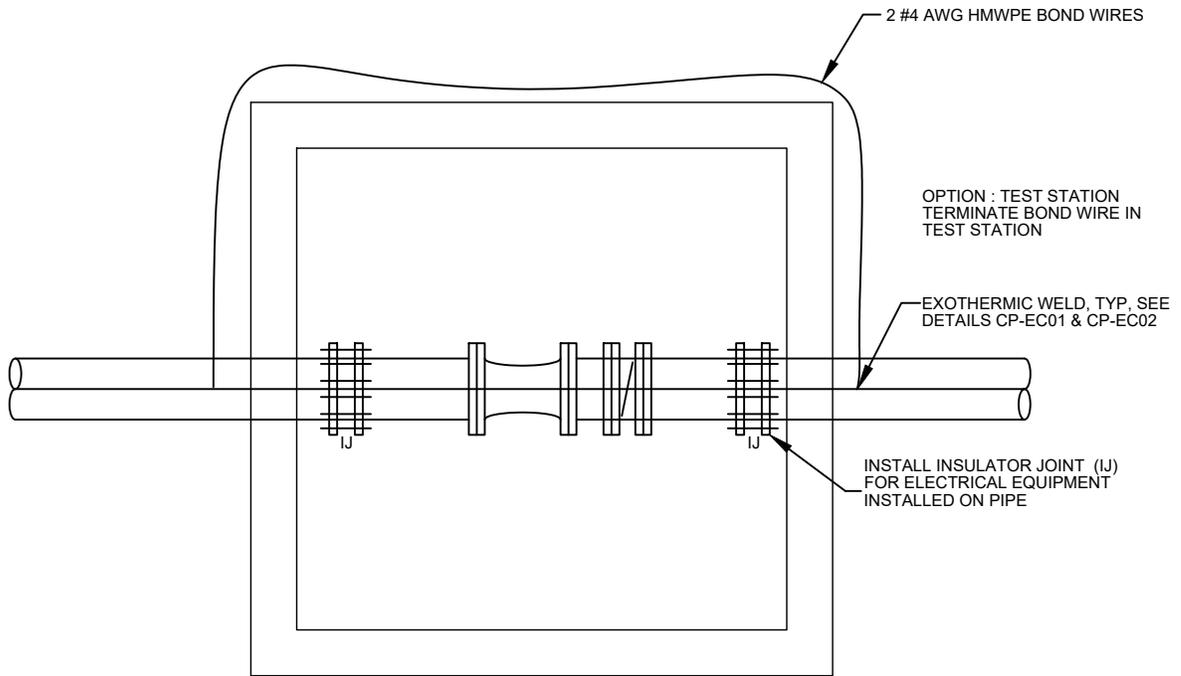
**DUCTILE IRON MECHANICAL JOINT VALVE**  
 NOT TO SCALE



**NOTES:**

1. INSTALL ANODES AS DIRECTED. MAKE JOINT BOND EXOTHERMIC WELDS TO PIPE HORIZONTAL, THEN INSTALL ASSEMBLY.

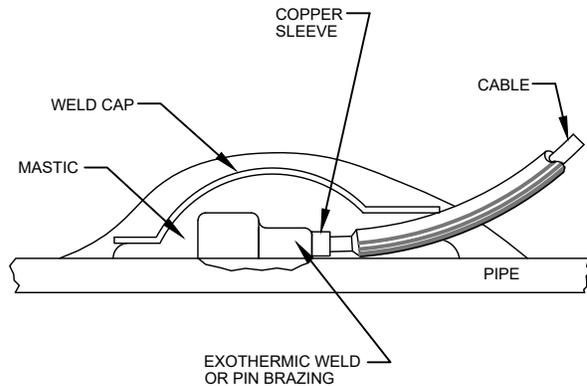
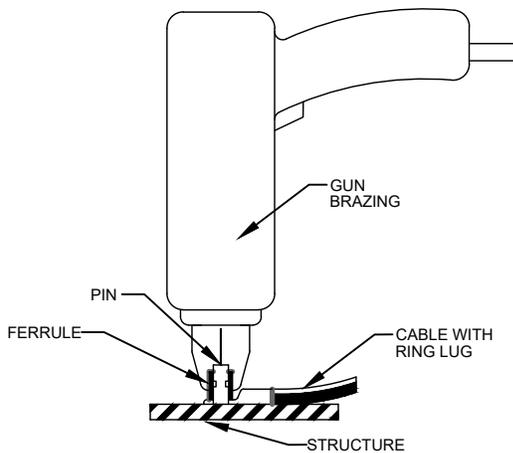
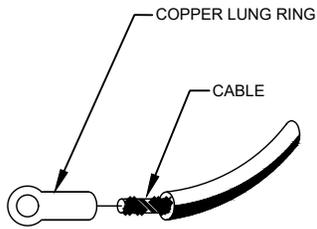
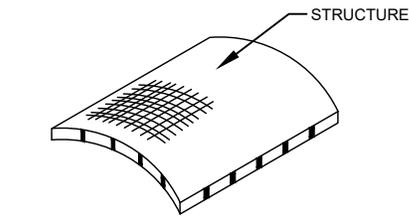
**FIRE HYDRANT BONDING**  
NOT TO SCALE



NOTES:

1. ISOLATE PIPE FROM STRUCTURAL STEEL AT VAULT PENETRATION.

**VAULT BONDING**  
NOT TO SCALE



**NOTES:**

1. DEGREASE AND CLEAN STRUCTURE TO BARE, BRIGHT METAL WITH MECHANICAL DEVICES.
2. STRIP WIRE INSULATION AND ATTACH FROM WIRE AND ATTACH A BAC M1 COMPRESSION TERMINAL OR ENGINEER APPROVED EQUAL.
3. LOAD THE BRAZING GUN WITH A DIRECT BRAZING PIN AND FERRULE. USE A THREADED TYPE CONNECTION FOR ABOVE-GROUND USE ONLY.
4. BRAZE THE CABLE TO THE PIPE. EXTRA MATERIAL REQUIRED FOR DI OR CI PIPE.
5. TEST BRAZE BY BREAKING OFF THE SHANK OF THE PLAIN PIN WITH A HAMMER.
6. COVER CONNECTION WITH MASTIC FILLED WELD CAP AND BITUMASTIC COATING 80% SOLIDS BY VOLUME OVER WELD CAP AND ALL EXPOSED METAL.
7. ALL WELDS SHALL BE A MINIMUM OF 6" APART.
8. ALLOW WELD COATING TO CURE PER MANUFACTURER'S RECOMMENDATIONS BEFORE BURIAL.

**NOTE:**

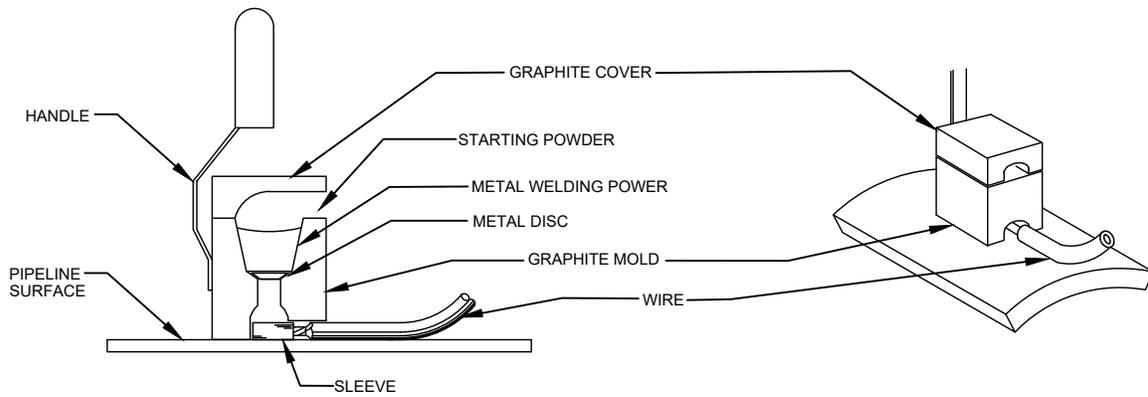
1. ALL BELOW GRADE OR SUBMERGED CONNECTIONS SHALL BE MADE WITH PIN BRAZING OR EXOTHERMIC WELDING, SEE DETAILS CP-EC01, CP-EC02, & CP-EC03.

**PIN BRAZING**  

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**NOT TO SCALE**

CP-EC01	CORROSION PROTECTION DETAILS BELOW GRADE ELECTRICAL CONNECTIONS	N.T.S.	DATE: 11-19-2019
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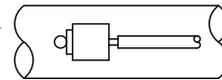
STEP 1. GRIND STRUCTURE CONNECTION AREA (3"x3") TO BARE SHINY METAL AND CLEAN.



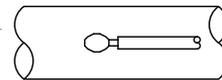
STEP 2. STRIP INSULATION FROM WIRE. ATTACH SLEEVE.



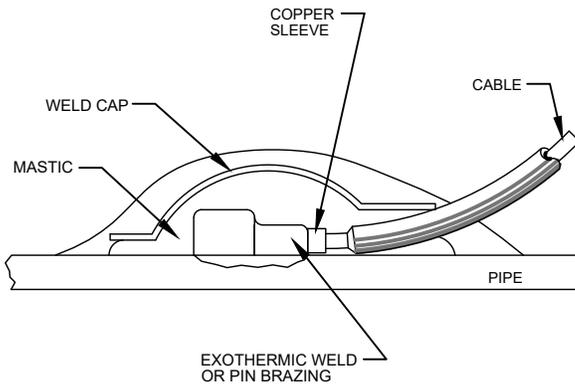
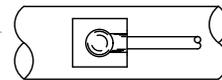
STEP 3. HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR & IGNITE WITH FLINT GUN.



STEP 4. REMOVE SLAG FROM CONNECTION AND PEEN WELD FOR SOUNDNESS.



STEP 5. COVER CONNECTION AND EXPOSED STRUCTURE SURFACE WITH A WELD CAP AND BITUMINOUS COATING COMPOUND.



**NOTES:**

1. PROCEDURE SHOWN ABOVE IS TO BE USED AS A GENERAL GUIDE ONLY. CONSULT MANUFACTURER'S LITERATURE FOR SPECIFIC INSTALLATION INSTRUCTIONS. ALL WELDS SHALL BE A MINIMUM OF 6-INCHES APART. EXOTHERMIC WELDS ARE NOT PERMITTED ON STEEL WITH A THICKNESS LESS THAN 0.110 INCHES.
2. ALL BELOW GRADE OR SUBMERGED CONNECTIONS SHALL BE MADE WITH PIN BRAZING OR EXOTHERMIC WELDING, SEE DETAILS CP-EC01, CP-EC02, AND CP-EC03.

## EXOTHERMIC WELD WIRE CONNECTION

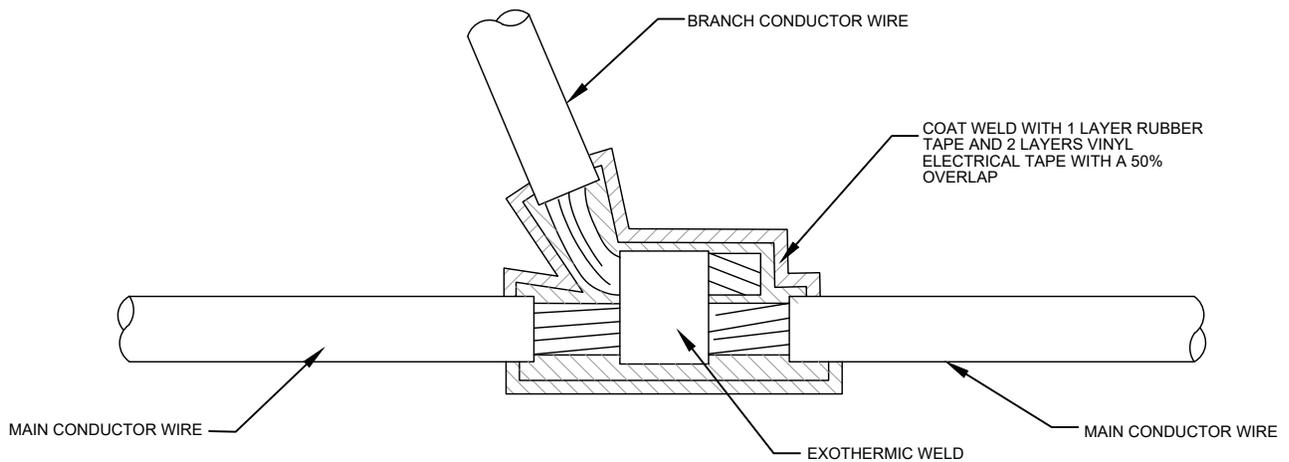
NOT TO SCALE

CP-EC02

CORROSION PROTECTION DETAILS  
BELOW GRADE ELECTRICAL  
CONNECTIONS

N.T.S.

DATE: 11-19-2019



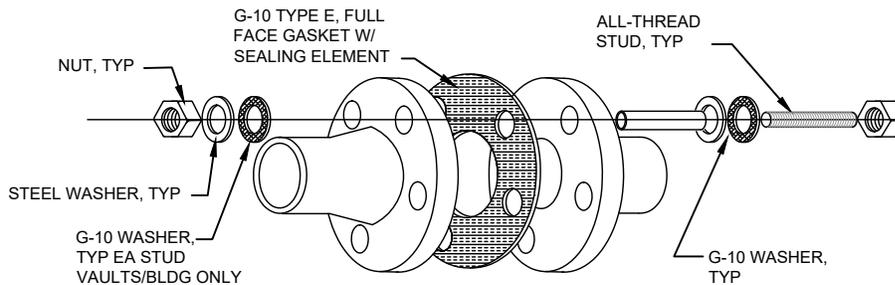
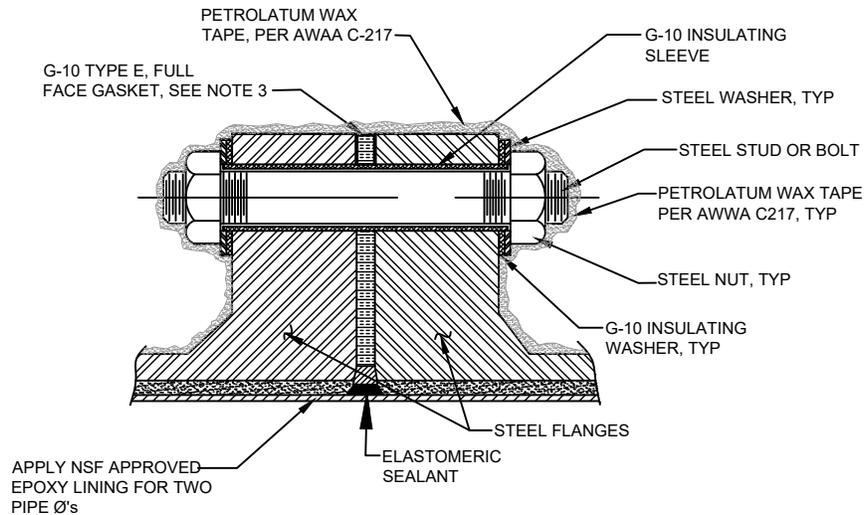
NOTES:

1. MAKE NO MECHANICAL CONNECTIONS BELOW GRADE.
2. ALL TAPE WRAP SHALL HAVE AT MINIMUM A 50% OVERLAP.
3. FOR POSITIVE WIRING, PLACE SPLICE IN 3M WYE EPOXY SPLICE KIT.
4. ALL BELOW GRADE OR SUBMERGED CONNECTIONS SHALL BE MADE WITH PIN BRAZING OR EXOTHERMIC WELDING, SEE DETAILS CP-EC01, CP-EC02, AND CP-EC03.

## EXOTHERMIC WELD WIRE SPLICE

NOT TO SCALE

CP-EC03	CORROSION PROTECTION DETAILS BELOW GRADE ELECTRICAL CONNECTIONS	N.T.S.	DATE: 11-19-2019
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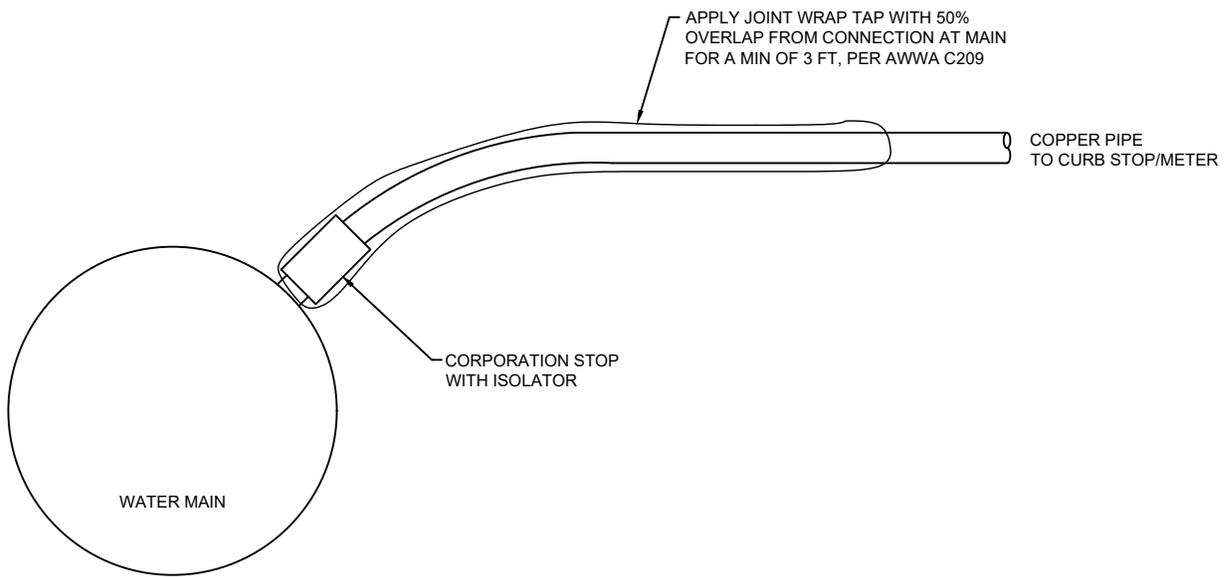


**NOTES:**

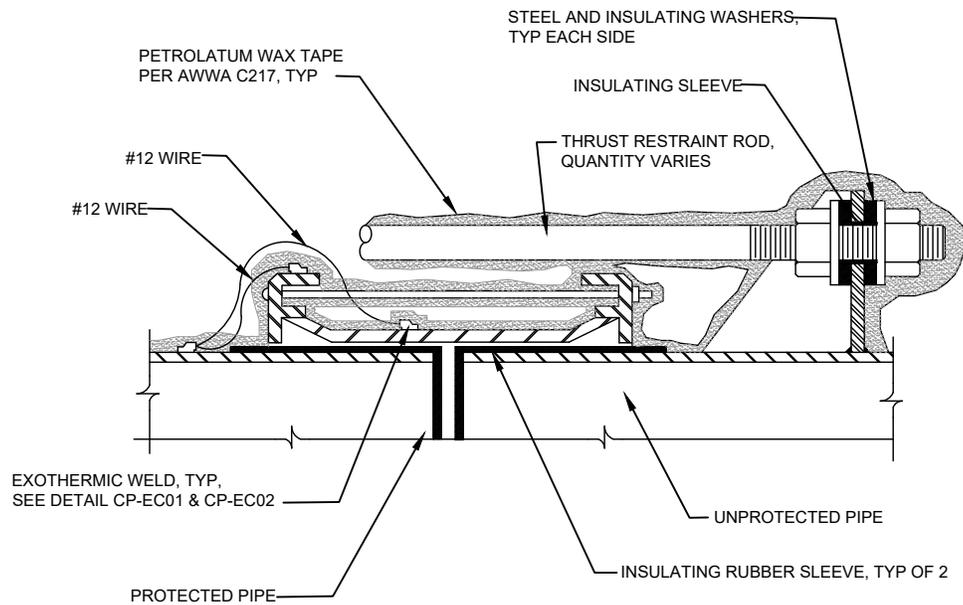
1. TEST INSULATING FLANGE BEFORE APPLYING WAX TAPE AND BEFORE BURIAL.
2. EXTEND WAX TAPE 12" BEYOND FLANGE FACE OR 12" ONTO PIPE COATING, WHICHEVER IS GREATER.
3. EXTEND FULL FACE GASKET 1/8" BEYOND STEEL CAN ID. FILL REMAINING ANNULUS BETWEEN LINING W/ NSF APPROVED ELASTOMERIC SEALANT COMPATIBLE W/ LINING MATERIAL.
4. FOR DIRECT BURY APPLICATIONS, INSTALL SINGLE INSULATOR WASHER ON UNPROTECTED SIDE. IN VAULTS/BUILDINGS PLACE INSULATING WASHER ON BOTH SIDES.

## INSULATED FLANGE JOINT

NOT TO SCALE



**COPPER SERVICE LINE**  
 NOT TO SCALE

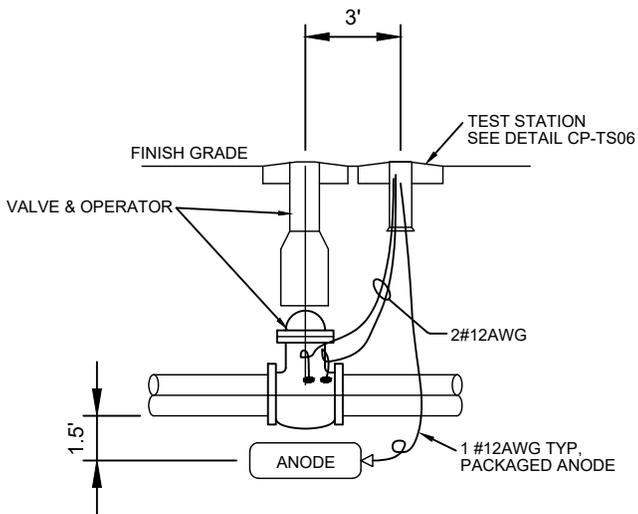


**NOTES:**

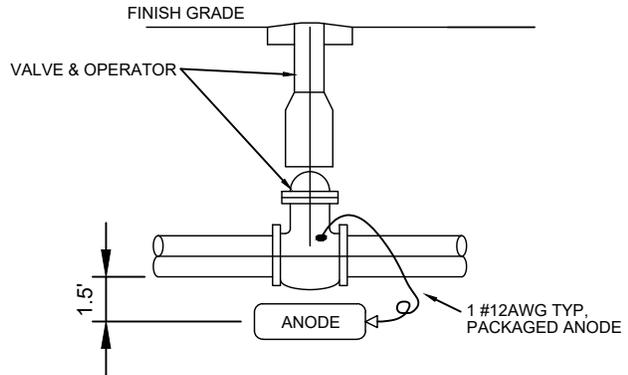
1. TEST INSULATING FLANGE BEFORE APPLYING WAX TAPE AND BEFORE BURIAL.
2. EXTEND WAX TAPE 12" BEYOND FLANGE FACE OR 12' ONTO PIPE COATING, WHICHEVER IS GREATER.

## INSULATED FLEXIBLE COUPLING

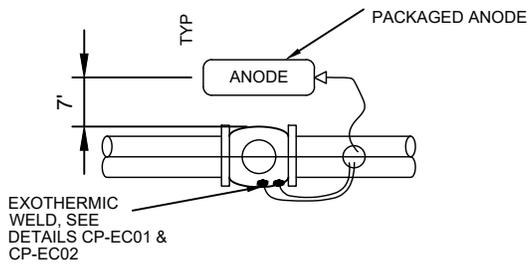
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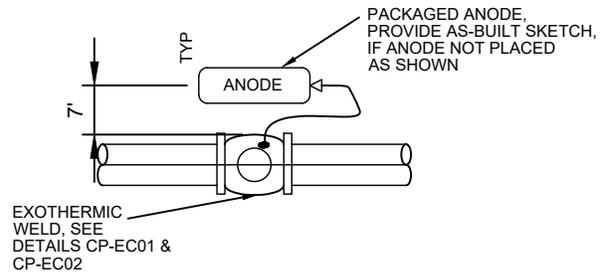
SIDE VIEW



SIDE VIEW



PLAN VIEW



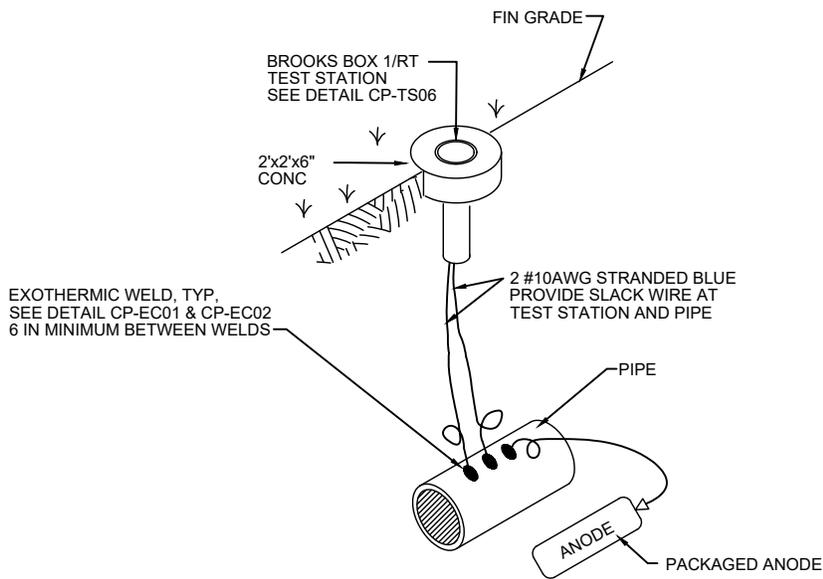
PLAN VIEW

FITTING WITH TEST STATION

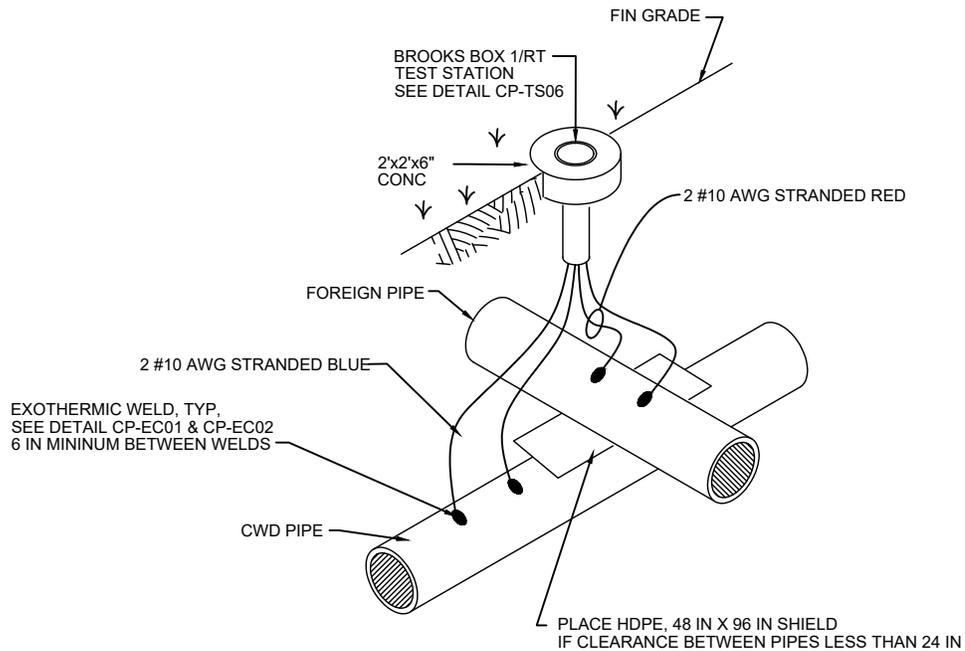
FITTING WITH DIRECT CONNECT ANODE

FITTING GALVANIC CP

NOT TO SCALE



**GALVANIC TEST STATION**  
NOT TO SCALE

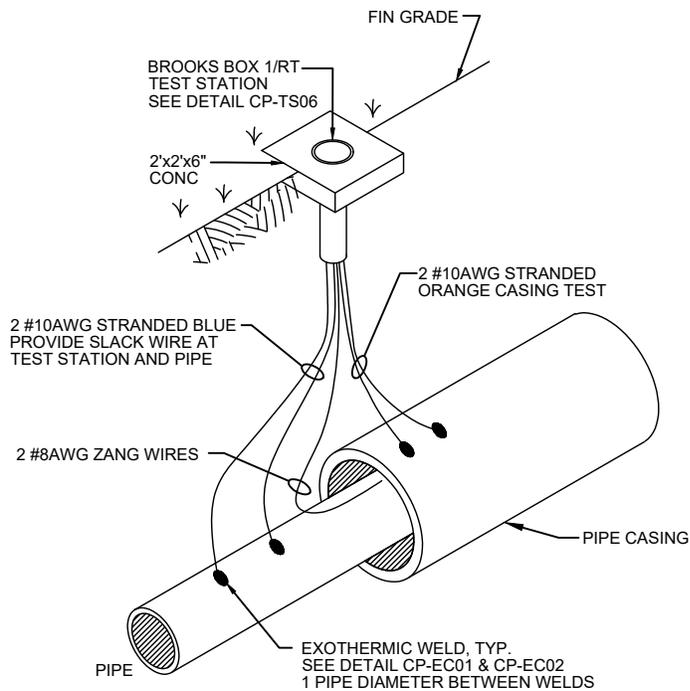


NOTES:

1. MAKE CONNECTIONS TO FOREIGN PIPE ONLY WITH OWNERS APPROVAL

## TEST STATION AT FOREIGN PIPELINE CROSSING

NOT TO SCALE

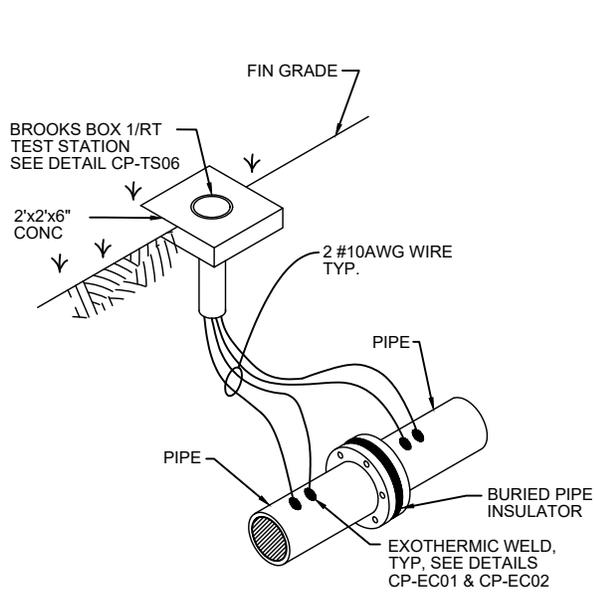


**NOTES:**

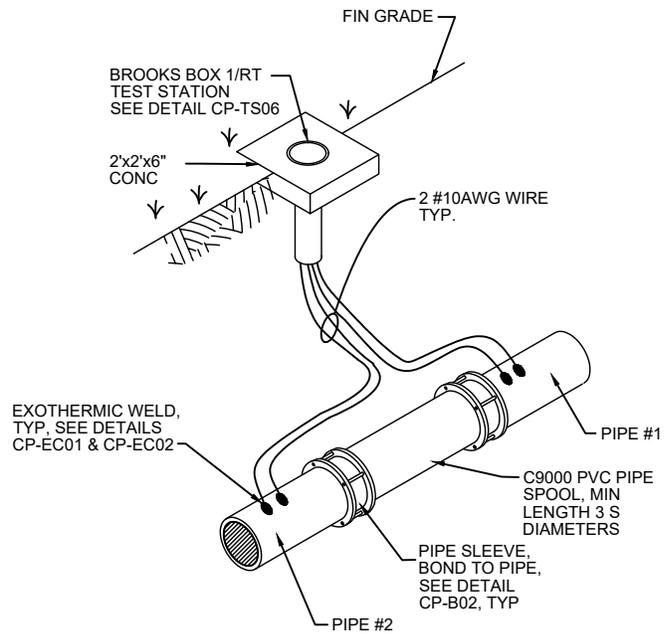
1. CASING/TUNNEL SHALL BE STRAIGHT, WITH ADEQUATE CLEARANCE TO PREVENT SHORTS TO PIPE. PIPE SHALL BE INSTALLED WITH APPROVED CASING ISOLATORS. INSTALL TRACKS FOR CASING ISOLATORS IF CASING IS NOT SMOOTH. TEST CASING/PIPE ISOLATION BEFORE BACKFILL, ANY SHORTS WILL REQUIRE REPAIR OR REPLACEMENT AT CONTRACTORS EXPENSE. SEAL CASING ENDS TO PREVENT WATER INTRUSION. ZANG WIRES ARE USED FOR FOR FUTURE TESTING OR BONDING.

## TEST STATION PIPE CASING

NOT TO SCALE



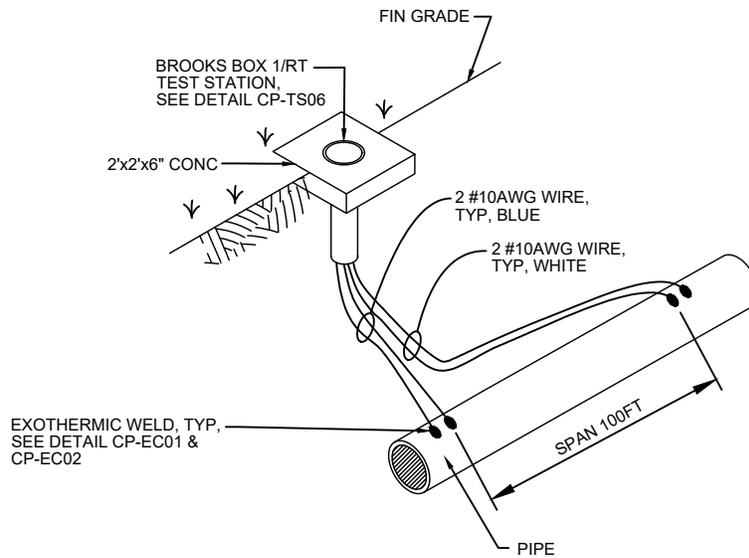
TEST STATION AT  
PIPELINE INSULATOR



TEST STATION WITH  
PVC PIPE SPOOL

**ISOLATION TEST STATION**  
NOT TO SCALE

CP-TS04	CORROSION PROTECTION DETAILS TEST STATION	N.T.S.	DATE: 11-19-2019
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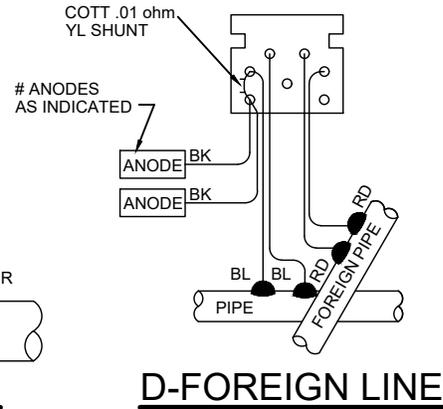
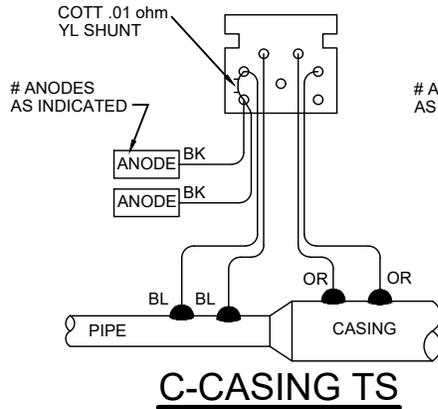
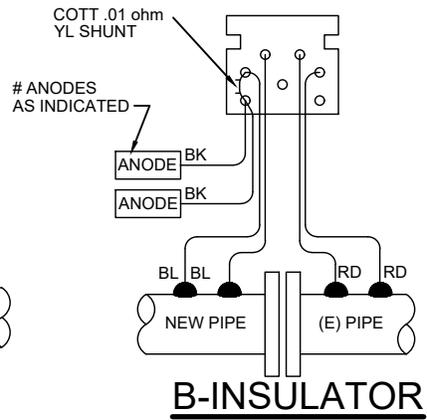
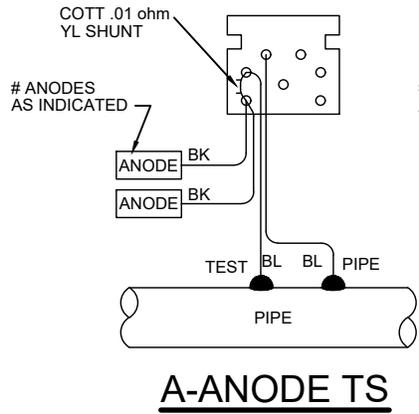


NOTES:

1. PIPE JOINTS MUST BE WELDED OR HAVE JOINT BONDS. LABEL IN TEST STATIONS AS "IR DROP TS" WITH PIPE SPAN INFORMATION.

**IR DROP TEST STATION**  
NOT TO SCALE

CP-TS05	CORROSION PROTECTION DETAILS TEST STATION	N.T.S.	DATE: 11-19-2019
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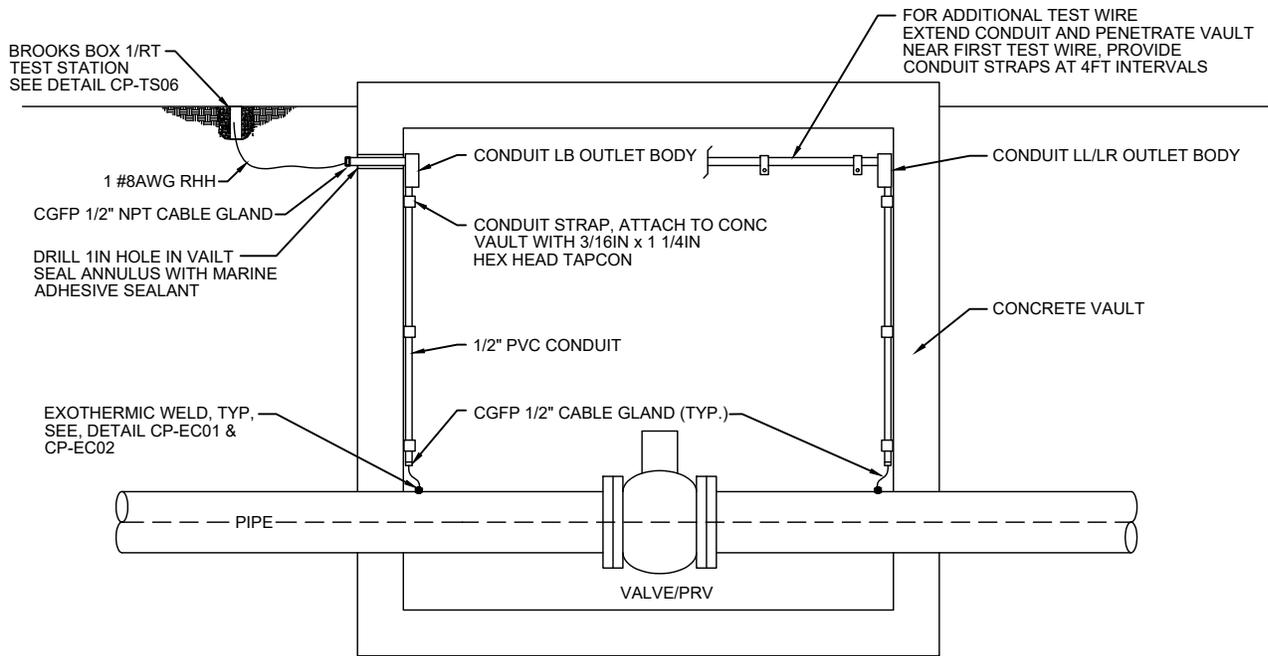
COLOR CODE:

PROVIDE 18" SLACK WIRE IN TS

1. GALVANIC ANODES: BK = BLACK
2. PIPELINE TEST WIRES: BL = BLUE
3. CASING TEST WIRES: OR = ORANGE
4. FOREIGN PIPELINES: RD = RED
5. INSULATED JOINTS: AS SHOWN

## **TEST STATION CIRCUIT BOARD**

NOT TO SCALE



**NOTES:**

1. FOR VAULTS WITH HAZARDOUS AREA CLASSIFICATION, ALL FITTINGS MUST BE GALVANIZED RIGID CONDUIT AND ALL FITTINGS RATED "EXPLOSION PROOF"
2. FOR INSULATED JOINTS PROVIDE ADDITIONAL #8AWG RHH WIRE AND CONDUIT.
3. PROVIDE CONDUIT SUPPORT WITHIN 6IN OF FITTINGS AND AT 4FT MIN INTERVALS, ROUTE CLEAR OF ACCESS HATCHES AND VALVE OPERATORS.

**VAULT TEST WIRES**  
NOT TO SCALE