CATHODIC PROTECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES
A. Cathodic Protection.

1.02 DESCRIPTION OF WORK
Installation of cathodic protection for DIP water main systems 16 inch diameter or greater (and their smaller contiguous appurtenances) installed with open-trench methods and within casings as identified in the contract documents.

A. Applicable Standards:


5. Underwriters Laboratories, Inc. (UL) – Standards for safety.

1.03 SUBMITTALS
A. Comply with Division 1- General Provisions and Covenants

B. Product Data
1. Submit manufacturer’s specifications, recommendations, and installation instructions for the following:
   a. Electrical Continuity Provisions for Ferrous Pipe (Materials and Testing Procedure)
   c. Electrical Isolation Devices
   d. Galvanic Anodes
   e. Wire, Cable, and Splices
   f. Exothermic Welds and Coating Materials

2. Reference for each item submitted in shop drawings per corresponding article and paragraph in Part 2 of this specification.
1.04 SUBSTITUTIONS  
Comply with Division 1- General Provisions and Covenants of SUDAS Specifications.

1.05 DELIVERY, STORAGE, AND HANDLING  
A. Comply with Division 1 – General Provisions and Covenants.

B. Provide adequate care to protect cathodic protection materials from damage during handling, storage, hauling, and installation.

1.06 SCHEDULING AND CONFLICTS  
Comply with Division 1 – General Provisions and Covenants

1.07 SPECIAL REQUIREMENTS  
Contractor must obtain cathodic protection installation training from the City of Cedar Rapids Water Department prior to commencing work.

1.08 MEASUREMENT AND PAYMENT  
A. Cathodic Protection:  
1. Measurement: Lump sum item: no measurement will be made.

2. Payment: Payment will be the contract lump sum price. Full payment will not be made until system testing is completed and performance per Section 3.09 is met.

3. Includes: Lump sum price includes all material, labor and equipment to install cathodic protection system, monitoring systems and testing for acceptance.

B. Galvanic Anode Installation  
1. Measurement: Each anode installation will be counted.

2. Payment: Payment will be at the unit price for each anode installation.

3. Includes: Anode, excavation, bond cable, connection to pipe, and backfill.

C. Corrosion Monitoring Test Station Installation:  
1. Measurement: Each test station installation will be counted.

2. Payment: Payment will be at the unit price for each test station installation.

3. Includes: Excavation, connection to pipe, testing, and backfill.
PART 2 – PRODUCTS

2.01 Approved Material Suppliers for Cathodic Protection Systems:
   A. Mesa Products, Inc., (918-627-3188).
   B. BK Corrosion, LLC, (713-225-0349).
   C. T. Christy Enterprises, (800-258-4583).

2.02 Electrical Continuity Provisions – Ferrous Pipe
   A. Insulated Stranded Copper Cable
      1. Bond cables:
         a. Factory-made with formed copper sleeves at both ends of the bond cable using the
            manufacturer’s proper-sized hammer dies.
         b. Fabricated by the same manufacturer as the exothermic weld equipment used to
            connect the cable to the structure.
      2. Construct cable of stranded copper equipped with a high molecular weight polyethylene
         insulation. Insulation per ASTM D1248 – Specification for Plastic Molding and Extrusion
         Materials, Type 1, Class C, Grade 5 and be configured as follows:
         a. No. of Strands: 7.
         b. Outer Jacket Thickness: 0.110 inches.
         c. Length: 18 inches (min.) Additional length may be necessary to bypass valves.
      3. Manufacturers:
         a. Continental Industries (918-627-5210), thermOweld® Jumper Bonds.
         b. ERICO Products, Inc. (440-248-0100), Cadweld® Bonds – Formed Terminal.
         c. Approved equal.

2.03 Corrosion Monitoring Test Stations
   A. Non-Metallic Post-Type Test Stations
      1. Mounted on a polyethylene (PE) conduit post with crossbar anchor.
      2. Capped terminal board with wire/cable binding posts for ready access.
         a. Terminal Board: Polycarbonate plastic (clear).
         b. Test Station Cap: Polycarbonate plastic (color coded by test station type).
         c. Conduit Post: UV stabilized polyethylene (white).

      3. Approved manufacturers:
         a. Tinker & Rasor Company (909-890-0700), Model T-3.
         b. Approved equal.
B. Flush-Mounted Test Station Enclosures
1. Contained in heavy-duty polymer concrete, flush-to-grade utility enclosure able to withstand incidental traffic.

2. Open bottom polymer concrete body with minimum compressive strength of 87 MPa.

3. Cover:
   a. Heavy duty polymer concrete with non-skid surface.
   b. Compressive strength capacity: 20,000 pounds per ASNI/SCTE 77/T15 applications.
   c. Stainless steel hex hold-down bolts at opposite corners with 1” lettered “CP TEST”.
   d. Manufacturers:
      1) Duravault LLC. (909-267-9657) Model PC132412STB.
      2) New Basis, Inc. (951-787-0600) Model PCA132412S.

C. Pre-packaged Copper-Copper Sulfate (Cu-CuSO₄) Reference Electrodes:
1. Element: Copper rod encapsulated in proprietary backfill electrolyte containing high purity copper sulfate crystals and chloride ion trap to prevent contamination of the electrolyte.

2. Service life: 20 years minimum.

3. Lead Wire: No. 14 RHH-RHW (yellow) stranded copper wire. No splicing.

4. Manufacturers:
   a. Borin Manufacturing, Inc. (310-822-1000) Model SRE-007-CUY.
   b. GMC Electrical, Inc. (909-947-6016) Model CU-1-UGPC.
   c. Approved equal.

D. Calibrated Wire Shunts
1. Color-coded calibrated wire shunts for connection of the system’s anode header cable and structure return connection circuits.

2. Manufacturers:
   a. Tinker & Rasor Company (909-890-0700), 0.01-ohm wire shunt with yellow mounting plate rated at 8 amps.
   b. Approved equal.

2.04 Electrical Isolation Devices
Products in this section supersede content of SUDAS Section 3020 Trenchless Construction for watermain utilizing cathodic protection.

A. Plastic Pipe Inserts: Use in soil not contaminated with hydrocarbons.
1. High Density Polyethylene (HDPE) Pipe Inserts:
   a. Fabricate by fusing two PE x MJ pipe adapters back to back.
   b. Type III, Grade P345 Polyethylene Material per ASTM Specification D-1248 (PE 3408).
   c. Minimum pressure class/SDR rating: Class 200/SDR 11.
   d. Design to work with Mechanical Joint Ductile Iron Pipe.
   e. Stainless steel stiffener ring on inside of MJ ends.
   f. AWWA C-111 flange connections at both ends.
g. Bolts: AWWA C111/ANSI A21.11
h. Mechanical Joint Gland Rings: Comply with AWWA C111 mechanical joint, manufactured of ductile iron compliant with AWWA C153.

2. Polyvinyl Chloride (PVC) Pipe Inserts:
   a. Insert spool pipe to be AWWA C900 or C905 PVC, 12 inch to 36 inch length.
   b. Connect using DIP to PVC restrained pipe coupling.
      1) EBAA Iron Series 3800
      2) Approved equal
   c. Coupling Sleeve: ASTM A536 DI or carbon steel with fusion bonded epoxy coating.
   d. Bolts: AWWA C111/ANSI A21.11
   e. Torque Limit: Restraint anchor screws with torque limiting feature to prevent overtightening.

B. Flange Isolation Kit (FIK) Assemblies: Use in soils contaminated with hydrocarbons.
   2. Components:
      a. Flange Gasket Retainer: Full-faced (Type E) G-10 epoxy glass.
      b. Sealing Elements: Ethylene propylene diene monomer (EPDM) quad O-Rings.
      c. Isolation Sleeves: 1/32-inch thick G-10 epoxy glass.
      d. Isolation Washers: Double 1/8-inch thick G-10 epoxy glass.
      e. Backup Washers: Double 1/8-inch thick Type 304 stainless steel.
   3. Manufacturers:
      b. Lamons® (713-222-0284) Model IsoGuard™.
      c. Approved equal

C. Petrolatum Tape-Wrap Encapsulation of Buried FIK
   1. Three-part cold-applied petrolatum tape coating.
      a. Primer:
         1) Solids Content: 100%
         2) Specific Gravity: 1.08
         3) Specific Volume: 26 cubic inches/pound
         4) Flash Point: > 356 °F
         5) Coverage: 10-22 sq. ft./pound
      b. Profiling Mastic:
         1) Solids Content: 100%
         2) Specific Gravity: 0.605
         3) Specific Volume: 46 cubic inches/pound
         4) Flash Point: 356 °F
         5) Coverage: Varies by application
      c. Low-Temperature Petrolatum Tape:
         1) Thickness: 46 mils
         2) Maximum Service Temperature: 122 °F
         3) Roll Width: 2 inches to 12 inches
4) Roll Length: 33 feet
5) Coverage with 55% Overlap: 87 sq. ft. of tape per 100 sq. ft. of pipe.

2. Manufacturers:
   b. Approved equal.

D. Electrically Isolating Corporation Stops
   1. Construction:
      a. All brass conforming to AWWA Standard C800 (ASTM B-62 and ASTM B-584).
      b. Solid one-piece tee-head and stem with EPDM O-ring in stem.
      c. Ball-style valve with molded EPDM seat
      d. Factory-assembled nylon insulator between the body assembly and flared copper/nut service line. Individual or field-installed threaded nylon or plastic components are not acceptable.
      e. Metal threaded components. All assembly threads secured with adhesive to prevent unintentional disassembly and to render unit leak resistant to 300 psi working pressure.
   2. Manufacturers:
      a. Mueller Company (770-206-4200), Model N35000N Insulated Ball Corporation Assembly.
      b. A.Y. McDonald (800-292-2737), Model 74701B Corporation Stop with #74755DB Copper Flare x Female Copper Flare Dielectric Bushing.

E. Casing Spacers
   1. Meet requirements of SUDAS 3020 2.03 B.2.
   2. Manufacturers:
      a. Cascade Waterworks Manufacturing Co. (800-426-4301), Model CCS.
      b. Advance Products and Systems, Inc. (337-233-6116), Model SSI.
      c. The BWM Company (828-247-0630), Model SS-Pipe Size.
      d. Approved equal.

F. Pipe Penetration Sleeve Seals:
   1. Modular mechanical type of expanding, interlocking links.
      a. Links: Synthetic rubber.
      b. Fasteners: Zinc-coated steel.
   2. Manufacturers:
      a. GPT, Inc. (303-988-1242) Model Link-Seal®.
      b. Advance Products and Systems, Inc. (337-233-6116), Model Innerlynx®.
      c. Approved equal.

G. Casing End Seals
   1. Wrap-around style
      b. Hold-down Banding: 1/2-inch wide Type 304 SS worm gear banding.
2. Manufacturers:
   b. Advance Products and Systems, Inc. (337-233-6116), Model AM End Seal.
   c. Approved equal.

2.05 Pre-packaged Galvanic Anodes:

A. Magnesium Anodes:
   1. Capable of delivering a minimum efficiency of 500 amp-hours per pound of magnesium.

2. Metallurgy:
   a. Aluminum: 0.01% (max.)
   b. Manganese: 0.50% - 1.3%
   c. Copper: 0.02% (max.)
   d. Nickel: 0.001% (max.)
   e. Iron: 0.03% (max.)
   f. Other (each): 0.05% (max.)
   g. Other (total): 0.30% (max.)
   h. Magnesium: Balance

3. Packaged Magnesium Anode Backfill
   a. Package within a cotton sack in a special chemical backfill having the following proportions:
      1) Ground hydrated gypsum: 75%
      2) Powdered bentonite: 20%
      3) Anhydrous sodium sulfate: 5%
   b. Grain size gradation:

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   c. No voids between anode ingot and backfill.

4. Anode Lead Wire
   a. No. 12 AWG solid copper with Type TW (red) thermoplastic insulation. 10 foot minimum length.

   b. Connection to Anode Core
      1) Cast magnesium anodes with a minimum 20-gauge galvanized steel core.
      2) Recess one end of the anode to expose the core for silver-soldering the lead wire.
      3) Fill silver-soldered lead wire connection and anode recess with electrical potting compound before packaging.
5. Physical Parameters

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<th>Anode Weight (#)</th>
<th>Nominal Package Dimensions (in.)</th>
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<td>98</td>
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<tr>
<td>Diameter</td>
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6. Manufacturers:
   b. BK Corrosion, LLC, (713-225-0349).
   c. T. Christy Enterprises, (800-258-4583).
   d. Approved equal.

2.06 Wire, Cable and Splices

A. Anode Header Cable and Structure Return Connection (Direct Burial)
   1. High molecular weight polyethylene insulated stranded copper.

2. DC cables:
   a. No. of Strands: 7
   b. Outer Jacket: 0.110" thickness
   c. Anode Header Cable: No. 8 AWG (red)
   d. Structure Return Connection: No. 8 AWG (blue)

B. Test Wires for CP System Monitoring (Direct Burial)
   1. Cross-linked polyethylene (XLPE) Type RHW-2 and USE-2 for use at 600 volts or less for all underground structure connections.
      a. Insulation: Per NEC for direct burial, general-purpose applications at a maximum continuous operating temperature of 90 degrees C in either wet or dry locations.

   2. Conductors: Class B stranded annealed uncoated copper per UL Standard 854 and 44.

   3. Primary Insulation: 0.045” thickness.

   4. Gauge and Structure Color Code: #12 AWG (colors as shown on drawings)

   5. Manufacturers:
      b. Omni Cable Corp. (800-292-6664).
      d. Approved equal.

C. Compression Crimp Splice Connectors
   1. Copper compression.
      a. Sized per manufacturer’s recommendations.
2. Manufacturers:
   b. Approved equal.

D. Splice Encapsulation Material:
   1. Three-part system consisting of rubber and plastic tape sealed with a waterproof coating.

2. Manufacturers:
   a. 3M Electrical Products (1-888-364-3577) - Scotch Brand 23 Rubber Splicing Tape.
   b. 3M Electrical Products (1-888-364-3577) - Scotch Brand 33+ Vinyl Electrical Tape.
   c. 3M Electrical Products (1-888-364-3577) - Scotchkote Electrical Coating.
   d. Approved equal.

2.07 Exothermic Welds and Coating Materials:
For all structure connections within the DC cathodic protection system circuit.

A. Weld furnace, metal charges (weld shots), and wire sleeve sizes per manufacturer’s recommendations. Do not mix products from different manufacturers.
   1. For connections to horizontal ductile iron or cast iron structures, use a maximum of 32-gram weld metal charge and furnaces designated specifically for cast iron.
   2. For connections to horizontal carbon steel structures, use a maximum of 25-gram weld metal charge and furnaces designated specifically for carbon steel.

3. Manufacturer:
   a. Continental Industries (918-627-5210), Model thermOweld®.
   b. ERICO Products, Inc. (440-248-0100), Model Cadweld®.
   c. Approved equal.

B. Covering of Welds
   1. Pre-fabricated plastic sheet with an igloo-shaped dome and entry tunnel filled with an oil-and gas-resistant elastomeric rubber.

2. Manufacturers:
   a. Continental Industries (918-627-5210), Model thermOcap® PC.
   b. Chase Corporation (781-332-0700), Model Royston Handy Cap® IP.
   c. Approved equal.

PART 3 – EXECUTION

3.01 General

A. Examine the areas and conditions under which cathodic protection materials are to be installed and notify Engineer in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Install all cathodic protection components and equipment according to the CR-5910 Figures.
3.02 Installation of Electrical Continuity Provisions – Ferrous Pipe

A. General: Install factory-made cable bonds across all non-welded ferrous pipe joints except at pipe joints specifically required to be electrically isolated and/or valve bodies.

B. Method:
   1. Inspect each bond cable to ensure a continuous electrical conductor with no cuts or tears in the cable insulation.
   2. Attach bond cable to water main by the exothermic welding process per Article 3.07.

C. Visual Inspection of bond cables:
   1. Inspect all electrical continuity bond cable connections by visually examining each exothermic weld connection for strength and suitable coating prior to backfilling.

D. Installation Continuity Testing:
   1. Verify continuity of bonded joints prior to backfilling using the following procedure:
      a. Measure the electrical potential at each side of selected bonded connections with a portable copper/copper-sulfate reference electrode (CSE) and a digital voltmeter having at least 10 mega-ohm input impedance.
      b. Place the CSE into the soil within 18-inches of the bonded connection and do not move the CSE.
      c. Connect the red meter lead to the CSE and the black meter lead to the pipe (not the cable). Ensure a secure direct contact to the pipe by using an awl or similar tool.
      d. Measure and record the DC voltage between the CSE and the pipe on EACH side of the bonded connection.
      e. The two DC voltage readings must be identical to indicate an acceptable connection.
      f. Document data for the job record. Make data available for daily review by the Engineer. Summarize and submit all data to the Engineer at the completion of the project.

E. Acceptance Criterion: If, in the opinion of the Engineer, any exothermic weld is deficient, the Contractor shall remove and replace the deficient welded connection at no expense to the City.

F. Backfilling of Bond Cables:
   1. Perform backfilling in a manner to prevent damage to the bond cables and connections to the water main.
   2. If construction activity damages a bond cable, the Contractor shall remove and replace the bond cable at no expense to the City.

3.03 Installation of Corrosion Monitoring Test Stations

A. General: Install required number of test stations at locations noted in the CP Installation Schedule included in the contract documents or as directed by the Engineer.
B. Reference Electrode:
1. Keep permanent reference electrodes dry and protect from freezing before installation.
2. Remove plastic or paper shipping bags from around the reference electrode prior to installation.
3. Place reference electrode in native soil within 12 to 36 inches of the water main.

C. Test Wires:
1. Provide test station lead wires that are continuous with no cuts or tears in the insulation covering the conductor.
2. Attach test leads to the water main by the exothermic welding process.
3. Connect all test station wires to one side of the terminal board using the test station manufacturer’s standard binding posts at the locations shown in the details for the type of test station specified.
4. Install wire shunt plate and shorting bars to the opposite side of terminal board from the incoming wires.
5. Install wire shunt plate last to permit easy removal from terminal board without having to disassemble other test station wire and cable connections.

D. Terminal Board and Test Stations within Flush-Mounted Enclosure:
1. Route all test station wires through the mounting pipe and to an area along the water main that will not accumulate standing water or allow the test station to be silted over.
2. Install the test station terminal board on top of the mounting pipe and extend the pipe vertically to allow at least 24” below bottom of the enclosure.
3. Install the top of test station head and color-coded cap to allow a separation from the underside of the enclosure cover. Permanently mark as-built pipeline stationing number on test station cap or mounting post.
4. Set the top of the enclosure flush to final grade outside of vehicular traffic areas and support with a minimum 6” gravel base to support and drain the inside of the enclosure.
5. Fasten the two hold-down bolts of the enclosure lid but do not over tighten.
6. Thoroughly backfill and compact the soil surrounding the enclosure to prevent settling and voids.
7. Drive a vertical 12-inch long steel rebar flush into the ground and immediately alongside the enclosure to facilitate locating with a magnetic sensing device.

E. Terminal Board and Test Stations on Mounting Post:
1. Route all test station wires through the mounting pipe and run to an area along the water main that will not accumulate standing water.
2. Install the test station terminal board on top of the mounting pipe and extend the pipe vertically to a height of at least 36” to 42” above final grade.

3. Install the top of test station head and color-coded cap. Permanently mark as-built pipeline stationing number on test station cap or mounting post.

4. Thoroughly backfill and compact the soil surrounding the mounting post to prevent settling and voids.

5. Install Owner-supplied bollard/post in areas with high vegetation that could obscure test station’s polyethylene mounting post.

6. Affix Owner-supplied adhesive identification label to test station’s mounting pipe.

F. Post-Installation Backfilling:
   1. Protect test leads during the backfilling operation to avoid damage to the wire insulation and integrity of the conductor.

   2. Protect permanent reference electrode during backfilling to avoid damage to the electrode and its lead wire.

   3. If, in the opinion of the Engineer, the installation of the test station wires or the reference electrode is deficient, the Contractor shall remove and replace these components at no expense to the City.

3.04 Installation of Electrical Isolation Devices
A. General: Install the required number of electrical isolation devices at the locations shown in the contract documents provided or as directed by the Engineer. The water main intended for cathodic protection shall be electrically isolated at the following locations:
   1. At all copper water service laterals at the corporation stop.

   2. At all metallic casing sleeves beneath road or rail crossings.

   3. At all connections to existing metallic water mains or at connections to new water mains that are not intended for cathodic protection.

3.05 Installation of Pre-packaged Galvanic Anodes
A. General: Install the required number of anodes at the locations shown in the contract documents or as directed by the Engineer.

B. Method:
   1. Remove plastic or paper shipping bags from around prepackaged anodes prior to installation.

   2. Install in the manner and at the dimensions from the water main as shown in the contract documents. Make field modifications only with the approval of the Engineer.

   3. Handle galvanic anodes in such a manner to avoid damaging anode materials and wire connections.
4. Attach anode lead wire to insulated header cable or route lead wire directly to pipe or test station as required.

5. Splices are not permitted within the length of a factory-fabricated anode lead wire.

6. Backfill installed pre-packaged anodes and compact to eliminate all voids.

7. In soils with low moisture content or granular soils with low cohesive strength, pour 5 gallons of water over the anode after backfilling and tamping have been completed to a point about 6 inches above the anode. After the water has been absorbed, complete backfilling to the ground surface level.

3.06 Installation of Wire, Cable and Splices

A. Install underground wires, cables, and connections at least 36 inches below final grade and at least of 6 inches from other underground structures.
   1. Crimp Connectors: Use for all spliced connections.

B. Contractor shall furnish a hand tool capable of generating a minimum of 9000 pounds of compressive force to install crimp connectors.
   1. Use only hand tools compatible with the manufacturer’s copper compression taps.

C. Waterproof sealing of splices:
   1. Refer to Figure CR 5910.321 for butt splices.
   2. Refer to Figure CR 5910.322 for wye splices.

3.07 Installation of Exothermic Welds and Coating Materials

A. Installation of Exothermic Welds:
   1. Refer to Figure CR 5910.108.
   2. Follow manufacturer’s instructions for proper use of welding equipment, weld metal charge size, and applicability to the structure.
   3. Do not use exothermic weld equipment if the graphite mold is wet.
   4. Use proper protective equipment when handing and performing exothermic welding.

B. Installation of Elastomeric Cover over Exothermic Welds:
   1. Refer to Figure CR 5910.108.
   2. Follow manufacturer’s instructions for proper storage and handling.
   3. Properly prepare pipe surface prior to application.

3.08 Post-Installation Testing of Cathodic Protection Systems

A. The City of Cedar Rapids Water Department will provide services of a NACE-certified Cathodic Protection Specialist for periodic field inspections and commissioning services of cathodic protection system in accordance with the following NACE International® reference standard and standard test method:

   Contractor to be present during commissioning test.

B. Costs for additional field tests or inspections that result from material or installation deficiencies caused by the Contractor shall be the Contractor’s responsibility.

FIGURES

CR 5910.101: Single Horizontal Anode Installation
CR 5910.102: Single Vertical Anode Installation
CR 5910.103: Continuity Bonding across Ductile Iron Pipe Joint
CR 5910.104: Continuity Bonding across Vertical Gate Valve
CR 5910.105: Continuity Bonding across Butterfly Valve or Horizontal Gate Valve
CR 5910.106: Insulated Rubber & Tape Butt Splice - Sacrificial Anode Cable Connections
CR 5910.107: Insulated Rubber & Tape Wye Splice - Sacrificial Anode Cable Connections
CR 5910.108: Exothermic Weld Procedure for Ferrous Pipe Material (Horizontal Only)
CR 5910.109: Anode Test Station Installation (Red Cap)
CR 5910.110: Anode Test Station - Terminal Board Connection Details
CR 5910.111: Casing Test Station Installation (Blue Cap)
CR 5910.112: Casing Test Station – Terminal Board Connection Details
CR 5910.113: Potential Test Station Installation (Green Cap)
CR 5910.114: Potential Test Station - Terminal Board Connection Details
CR 5910.115: Foreign Crossing (over watermain) Test Station Installation (White Cap)
CR 5910.116: Foreign Crossing (under watermain) Test Station Installation (White Cap)
CR 5910.117: Foreign Test Station - Terminal Board Connection Details
CR 5910.118: Isolation Test Station Installation (Orange Cap)
CR 5910.119: Isolation Test Station - Terminal Board Connection Details
CR 5910.120: Isolation Test Station Installation at Tapping Sleeve (Orange Cap)
CR 5910.121: Flush-Mounted Enclosure for Test Station Terminal Board & Wires
CR 5910.122: Post Type Test Station for Terminal Board & Wires
CR 5910.123: Electrical Continuity Test Procedure for Cable-Bonded Pipe Joints
CR 5910.124: Flange Isolation Kit-Sizing Data for Manufacturer’s Fabrication
CR 5910.125: PVC Pipe Insert for Pipe Diameter from 4” – 24”
CR 5910.126: HDPE Pipe Insert for Pipe Diameter up to 30”
CR 5910.127: Isolation (Ball Type) Corporation Stop
CR 5910.128: Isolation Service Fitting (Copper Flare) for ¾” to 2” Pipe
CR 5910.129: Electrical Isolation Devices for Metallic Casing Sleeves
CR 5910.130 Electrical Isolation at Pipe Entry with Reinforced Concrete Wall