

**SECTION 32 3119 - DECORATIVE METAL FENCES AND GATES****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Swing gates.
2. Horizontal-slide gates.
3. Gate operators, including controls.

**B. Related Requirements:**

1. Section 03 3053 "Miscellaneous Cast-in-Place Concrete" for concrete bases for gate operators, drives, and controls and post concrete fill.
2. Section 32 3116 "Welded Wire Fences and Gates" for accessible egress gates

**1.2 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at each Project site.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

- B. Shop Drawings: For fencing and gates.

1. Include plans, elevations, sections, gate locations, post spacing, and mounting attachment details, and grounding details.
2. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
3. Wiring Diagrams: Include diagrams for power, signal, and control wiring.

- C. Samples: For each fence material and for each color specified.

1. Provide Samples 12 inches in length for linear materials.
2. Provide Samples 12 inches square for bar grating and sheet or plate materials.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

- B. Product Test Reports: For decorative metallic-coated-steel tubular picket fences, including finish, indicating compliance with referenced standard and other specified requirements.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For gate operators to include in maintenance manuals.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Include 10-foot length of fence complying with requirements.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Wind Loading:
  - 1. Fence Height: 0 to 15 feet.
  - 2. Wind Exposure Category: B.
  - 3. Design Wind Speed: 120 mph.
- B. Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

### 2.2 SWING GATES

- A. Gate Configuration: As indicated.
- B. Gate Frame Height: 96 inches.
- C. Gate Opening Width: 36 inches.
- D. Automated vehicular gates shall comply with ASTM F2200, Class II.
- E. Galvanized-Steel Frames and Bracing: Fabricate members from square tubes 2-1/2 by 2-1/2 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet or formed from 0.105-inch nominal-thickness steel sheet and hot-dip galvanized after fabrication.

- F. Frame Corner Construction: Welded and 5/16-inch-diameter, adjustable truss rods for panels 5 feet wide or wider.
- G. Additional Rails: Provide as indicated, complying with requirements for fence rails.
- H. Infill: Comply with requirements for adjacent fence.
- I. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.
- J. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than 5 feet wide. Provide center gate stops and cane bolts for pairs of gates. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.
- K. Hinges: BHMA A156.1, Grade 1, suitable for exterior use.
  - 1. Function: 39 - Full surface, triple weight, antifriction bearing.
  - 2. Material: Wrought steel, forged steel, cast steel, or malleable iron; galvanized.
  - 3. District Standard: King Architectural Metals 9" Barrel Hinge #44-2009E
- L. Mortise Locks: BHMA A156.13, Grade 1, suitable for exterior use.
  - 1. Material: Brass or bronze.
  - 2. Levers: Cast, forged, or extruded brass or bronze.
  - 3. Mounting Box: Configuration necessary to enclose locks. Fabricate from 1/8-inch-thick, steel plate; galvanized.
- M. Exit Hardware: BHMA A156.3, Grade 1, Type 1 (rim exit device), with push pad actuating bar, suitable for exterior use.
  - 1. Function: Entrance by lever only when released by key or access card..
  - 2. Mounting Channel: Bent-plate channel formed from 1/8-inch-thick, steel plate. Channel spans gate frame. Exit device is mounted on channel web, recessed between flanges, with flanges extending 1/8 inch beyond push pad surface.
- N. Cane Bolts: Provide for inactive leaf of pairs of gates. Fabricated from 3/4-inch- diameter, round steel bars, hot-dip galvanized after fabrication. Finish to match gates. Provide galvanized-steel pipe strikes to receive cane bolts in both open and closed positions.
- O. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.
- P. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A123/A123M. For hardware items, hot-dip galvanize to comply with ASTM A153/A153M.
- Q. Metallic-Coated-Steel Finish: High-performance coating.
- R. Steel Finish: High-performance coating.

## 2.3 HORIZONTAL-SLIDE GATES

- A. Gate Configuration: As indicated.
  - 1. Basis of Design: AMERISTAR FENCE PRODUCTS “PassPort II Gate - Steel Roll Gate System”
- B. Gate Frame Height: As indicated.
- C. Gate Opening Width: As indicated.
- D. Automated vehicular gates shall comply with ASTM F2200, Class II.
- E. Galvanized-Steel Frames and Bracing: Fabricate members from square tubing.
  - 1. Frame Members: Square tubes 2 by 2 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet or formed from 0.105-inch nominal-thickness steel sheet and hot-dip galvanized after fabrication.
  - 2. Bracing Members: Square tubes 2 by 2 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet or formed from 0.105-inch nominal-thickness steel sheet and hot-dip galvanized after fabrication.
- F. Frame Corner Construction:
  - 1. Welded frame with panels assembled with bolted or riveted corner fittings and 5/16-inch-diameter, adjustable truss rods for panels 5 feet wide or wider.
- G. Additional Rails: Provide as indicated, complying with requirements for fence rails.
- H. Infill: Comply with requirements for adjacent fence.
- I. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.
- J. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.
- K. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A123/A123M. For hardware items, hot-dip galvanize to comply with ASTM A153/A153M.
- L. Metallic-Coated-Steel Finish: High-performance coating.
- M. Steel Finish: High-performance coating.

## 2.4 GATE OPERATORS

- A. Gate Operators:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Liftmaster CSW24UL (Swing) or CSL24ULWK (slide) or comparable product by one of the following:
  - a. DoorKing, Inc.
  - b. Viking Access Systems.
- B. Provide factory-assembled automatic operating system designed for gate size, type, weight, and operation frequency. Provide operation control system with characteristics suitable for Project conditions, with remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.
  1. Provide operator designed so motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
  2. Provide operator with UL approval.
  3. Provide electronic components with built-in troubleshooting diagnostic feature.
  4. Provide unit designed and wired for both right-hand/left-hand opening, permitting universal installation.
- C. Comply with NFPA 70.
- D. UL Standard: Manufacturer and label gate operators to comply with UL 325.
- E. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators on gates that must provide emergency access.
- F. Motor Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, within installed environment, with indicated operating sequence, and without exceeding nameplate rating or considering service factor. Comply with NEMA MG 1 and the following:
  1. Voltage: 24-V dc.
  2. Horsepower: Not less than 1/2
  3. Enclosure: Totally enclosed.
  4. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
  5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
  6. Phase: One.
- G. Gate Operators: Concrete base mounted and as follows:
  1. Mechanical Slide Gate Operators:
    - a. Duty: Heavy duty, commercial/industrial.
    - b. Gate Speed: Minimum 60 feet per minute.
    - c. Frequency of Use: Continuous duty.
    - d. Operating Type: Roller chain, with manual release.
    - e. Drive Type: Enclosed worm gear reducers, roller-chain drive.

2. Mechanical Swing Gate Operators:
  - a. Duty: Heavy duty, commercial/industrial.
  - b. Gate Speed: 90-degree opening in 13 to 15 seconds.
  - c. Frequency of Use: Continuous duty.
  - d. Operating Type: Swing arm.
  - e. Drive Type: Enclosed worm gear reducers, 2 commercial oil bath gearboxes with 900:1 wormgear reduction running in synthetic oil bath. Hardened output shafts designed for high cycle applications with frequent loop reversals.
  
- H. Remote Controls: Electric controls separated from gate and motor and drive mechanism, with NEMA ICS 6, Type 4 enclosure for concrete base mounting, and with space for additional optional equipment. Provide the following remote-control device(s):
  1. Card Reader: Functions only when authorized card is presented. Programmable, multiple-code system, permitting four different access periods; face-lighted unit fully visible at night.
    - a. Reader Type: Proximity, compatible with District access-card system.
    - b. Features: Timed anti-passback and capable of monitoring and auditing gate activity.
  
  2. Radio Control: Digital system consisting of code-compatible universal receiver for each gate, located where indicated, with remote antenna with coaxial cable and mounting brackets designed to operate gates. Provide twenty programmable transmitter(s) with multiple-code capability permitting validating or voiding of not less than 10,000 codes per channel configured for the following functions:
    - a. Transmitters: button operated, with open and close function.
    - b. Channel Settings: Four independent channel settings controlling separate receivers for operating more than one gate from each transmitter.
  
  3. Internet Gateway and Remote Access features:
    - a. LiftMaster 828LM Internet Gateway: Allows remote monitoring from Internet-enabled computer or smartphone.
    - b. LiftMaster 829LM Garage and Gate Monitor: Allows remote monitoring and operation.
    - c. LiftMaster IPAC – Internet Protocol Access Control Entry System
  
- I. Vehicle Loop Detector: System includes automatic closing timer with adjustable time delay, timer cutoff switch, and loop detector designed to open and close gate. System includes electronic detector with adjustable detection patterns, adjustable sensitivity and frequency settings, and panel indicator light designed to detect presence or transit of a vehicle over an embedded loop of wire and to emit a signal activating the gate operator. System includes number of loops consisting of multiple strands of wire, number of turns, loop size, and method of placement, as recommended in writing by detection system manufacturer for function indicated, at location indicated on Drawings.

1. Loop detector on exit-side only.
- J. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately function as follows:
1. Action: Reverse gate in both opening and closing cycles, and hold until clear of obstruction.
  2. Action: Stop gate in opening cycle and reverse gate in closing cycle, and hold until clear of obstruction.
  3. Internal Sensor: Built-in torque or current monitor senses gate is obstructed.
  4. Sensor Edge: Contact-pressure-sensitive safety edge, profile, and sensitivity designed for type of gate and component indicated, in locations as follows. Connect to control circuit using gate edge transmitter and operator receiver system.
    - a. Along entire gate leaf leading edge.
    - b. Along entire gate leaf trailing edge.
    - c. Across entire gate leaf bottom edge.
    - d. Along entire length of gate posts.
    - e. Along entire length of gate guide posts.
    - f. Where indicated on Drawings.
  5. Photoelectric/Infrared Sensor System: Designed to detect an obstruction in gate's path when infrared beam in the zone pattern is interrupted.
- K. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.
- L. Emergency Release Mechanism: Quick-disconnect release of operator drive system of the following type, permitting manual operation if operator fails. Design system so control-circuit power is disconnected during manual operation.
1. Type: Mechanical device, key, or crank-activated release.
  2. Locate activating device/key/crank in Knox-box for emergency vehicle access.
- M. Operating Features:
1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features with capability for monitoring and auditing gate activity. Provide unit that is isolated from voltage spikes and surges.
  2. System Integration: With controlling circuit board capable of accepting any type of input from external devices.
  3. Master/Slave Capability: Control stations designed and wired for gate pair operation.
  4. Automatic Closing Timer: With adjustable time delay before closing and timer cutoff switch.
  5. Open Override Circuit: Designed to override closing commands.
  6. Reversal Time Delay: Designed to protect gate system from shock load on reversal in both directions.

7. Maximum Run Timer: Designed to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.
8. Clock Timer: 24-hour Seven-day programmable for regular events.

N. Accessories:

1. Warning Module: Audio Visual, strobe-light alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving; compliant with the United States Access Board's ADA-ABA Accessibility Guidelines and CBC Chapter 11B requirements.
2. Battery Backup System: Battery-powered drive and access-control system, independent of primary drive system.
  - a. Fail-Secure: Gate cycles on battery power, then fail-safe when battery is discharged.
3. Fire (Knox) box.
4. Instructional, Safety, and Warning Labels and Signs: According to UL 325 and Manufacturer's standard for components and features specified.
5. Equipment Bases/Pads: Precast concrete, depth not less than 12 inches, dimensioned and reinforced according to gate operator component manufacturer's written instructions and as indicated on Drawings.

## 2.5 ALUMINUM

- A. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.
- B. Extrusions: ASTM B221, Alloy 6063-T5.
- C. Tubing: ASTM B429/B429M, Alloy 6063-T6.
- D. Plate and Sheet: ASTM B209, Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B247, Alloy 6061-T6.
- F. Castings: ASTM B26/B26M, Alloy A356.0-T6.

## 2.6 STEEL AND IRON

- A. Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.
- C. Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Bar Grating: NAAMM MBG 531.

1. Bars: Hot-rolled steel strip, ASTM A1011/A1011M, Commercial Steel, Type B.
  2. Wire Rods: ASTM A510/A510M.
- E. Uncoated Steel Sheet: Hot-rolled steel sheet, ASTM A1011/A1011M, Structural Steel, Grade 45 or cold-rolled steel sheet, ASTM A1008/A1008M, Structural Steel, Grade 50.
- F. Galvanized-Steel Sheet: ASTM A653/A653M, structural quality, Grade 50, with G90 coating.
- G. Aluminum-Zinc, Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, with AZ60 coating.
- H. Castings: Either gray or malleable iron unless otherwise indicated.
1. Gray Iron: ASTM A48/A48M, Class 30.
  2. Malleable Iron: ASTM A47/A47M.

## 2.7 COATING MATERIALS

- A. Epoxy Zinc-Rich Primer for Uncoated Steel: Complying with MPI #20 and compatible with coating specified to be applied over it.
- B. Epoxy Primer for Galvanized Steel: Epoxy primer recommended in writing by topcoat manufacturer.
- C. Epoxy Intermediate Coat for Uncoated Steel: Complying with MPI #77 and compatible with primer and topcoat.
- D. Intermediate Coat for Uncoated Steel: Epoxy or polyurethane intermediate recommended in writing by primer and topcoat manufacturer.
- E. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.

## 2.8 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 03 3000 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi, 3-inch slump, and 1-inch maximum aggregate size.
- C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M and specifically recommended by manufacturer for exterior applications.

## 2.9 GROUNDING MATERIALS

- A. Comply with requirements of Section 26 0526 "Grounding and Bonding for Electrical Systems."
- B. Grounding Conductors: Size as indicated on Drawings. Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
  - 1. Material above Finished Grade: Copper.
  - 2. Material on or below Finished Grade: Copper.
  - 3. Bonding Jumpers: Braided copper tape, 1-5/8 inch wide and 1/16 inch thick, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.
- C. Grounding Connectors and Grounding Rods: Comply with UL 467.
  - 1. Connectors for Below-Grade Use: Exothermic-welded type.
  - 2. Grounding Rods: Copper-clad steel.
    - a. Size: 5/8 by 96 inches.

## 2.10 STEEL FINISHES

- A. Surface Preparation: Clean surfaces according to SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning." After cleaning, apply a conversion coating compatible with the organic coating to be applied over it.
- B. Powder Coating: Immediately after cleaning, apply manufacturer's standard two-coat finish consisting of epoxy primer and TGIC polyester topcoat to a minimum total dry film thickness of not less than 8 mils. Comply with coating manufacturer's written instructions.
  - 1. Color and Gloss: As indicated by manufacturer's designations.
- C. Primer Application: Apply zinc-rich epoxy primer immediately after cleaning, to provide a minimum dry film thickness of 2 mils per applied coat, to surfaces that are exposed after assembly and installation, and to concealed surfaces.
- D. High-Performance Coating: Apply intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.
  - 1. Match approved Samples for color, texture, and coverage. Remove and refinish, or recoat work that does not comply with specified requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
  - 1. Construction layout and field engineering are specified in Section 01 7300 "Execution."

### 3.3 DECORATIVE FENCE INSTALLATION

- A. Install fences according to manufacturer's written instructions.
- B. Install fences by setting posts as indicated and fastening rails and infill panels to posts. Peen threads of bolts after assembly to prevent removal.
- C. Post Excavation: Drill or hand-excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 24 inches plus 3 inches for each foot or fraction of a foot that fence height exceeds 4 feet.
- D. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
  - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
  - 2. Concrete Fill: Place concrete around posts and sleeves and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
    - a. Exposed Concrete: Extend 2 inches above grade. Finish and slope top surface to drain water away from post.
    - b. Concealed Concrete: Top 2 inches below grade to allow covering with surface material. Slope top surface of concrete to drain water away from post.
  - 3. Posts Set in Concrete: Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.

4. Posts Set into Voids in Concrete: Form or core drill holes not less than 3/4 inch larger than outside diagonal dimension of post.
  - a. Extend posts at least 5 inches into concrete.
  - b. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink grout, mixed and placed to comply with grout manufacturer's written instructions. Finish and slope top surface of grout to drain water away from post.

### 3.4 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

### 3.5 GATE OPERATOR INSTALLATION

- A. General: Install gate operators according to manufacturer's written instructions, aligned and true to fence line and grade.
- B. Excavation for Support Posts, Pedestals, and Concrete Bases: Hand-excavate holes for bases in firm, undisturbed soil to dimensions and depths and at locations as required by gate operator component manufacturer's written instructions and as indicated.
- C. Concrete Bases: Cast-in-place or precast concrete, depth not less than 12 inches, dimensioned and reinforced according to gate operator component manufacturer's written instructions and as indicated on Drawings.
- D. Vehicle Loop Detector System: Cut grooves in pavement and bury and seal wire loop according to manufacturer's written instructions. Connect to equipment operated by detector.
- E. Comply with NFPA 70 and manufacturer's written instructions for grounding of electric-powered motors, controls, and other devices.

### 3.6 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 1500 feet except as follows:
  1. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.
    - a. Gates and Other Fence Openings: Ground fence on each side of opening.
      - 1) Bond metal gates to gate posts.

- 2) Bond across openings, with and without gates, except at openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.
  - C. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2 unless otherwise indicated.
  - D. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.
  - E. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
  - F. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
    1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
    2. Make connections with clean, bare metal at points of contact.
    3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
    4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
    5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
  - G. Bonding to Lightning-Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning-protection down conductor or lightning-protection grounding conductor, complying with NFPA 780.

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
  1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance not less than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.
  2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.

3. Report: Prepare test reports of grounding resistance at each test location certified by a testing agency. Include observations of weather and other phenomena that may affect test results.

### 3.8 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Automatic Gate Operators: Energize circuits to electrical equipment and devices. Adjust operators, controls, safety devices, alarms, and limit switches.
  1. Hydraulic Operators: Purge operating system, adjust pressure and fluid levels, and check for leaks.
  2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  3. Test and adjust controls, alarms, and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lubricate hardware, gate operators, and other moving parts.

### 3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain gates.

END OF SECTION 32 3119