

Section 004100

Bid Form

PROJECT NO. PSC#14.002.20LP/21C

BID FORM (SUBMIT IN DUPLICATE)

ADDITION AND RENOVATION OF GALENA ELEMENTARY SCHOOL

Owner: Board of Education of Kent County 5608 Boundary Avenue Rock Hall, Md 21661
Phone # 410-778-7121

Architect: Crabtree, Rohrbaugh & Associates, 100 West Road, Suite 402, Townson, MD 21204.

Date: _____

From Bidder: (Enter all information requested):

Legal Name: _____

Mailing Address: _____

Street Address: _____

Telephone: _____

Federal ID # _____

State of Maryland Contractor License

Number: _____

Expires: _____

The undersigned, having visited and carefully examined the site and carefully examined the Bid Announcement and Bid Documents proposes to furnish all labor, specific materials, and specified equipment necessary to construct and properly complete all the work required in strict

PSC NO. 14.002.20LP/21C

Addition and Renovations of Galena Elementary School
Kent County Public Schools

Re-issued in Addendum No. 3 – March 10, 2020

accordance with the aforesaid documents using only the specified manufacturers' materials and within the Contract time indicated in Section 01 10 00 General Requirements in this Bid and in accordance with all other terms and conditions of the Contract Documents for the Lump Sums as follows. Please note that this project is subject to State of Maryland Prevailing Wage Rates.

In Summary:

The Project consists of an addition and renovations of selected areas within the existing Galena Elementary School including new mechanical, electrical, plumbing and fire protection, fire alarm, technology and security systems, and new masonry and GWB on metal stud partitions and doors and frames, casework and finishes throughout the renovated areas. The existing built-up roofing system is to be replaced in its entirety with a two (2) ply cold applied modified bitumen roof system. Furthermore, the Project includes miscellaneous site improvements such as new concrete walks, storm water management and utilities and asphalt paving.

B. Generally, the new construction consists of load bearing masonry walls, structural steel beams, steel joists and metal deck, masonry veneer, exterior metal soffit systems, two (2) ply cold applied modified bitumen roof system, aluminum windows, storefront, exterior FRP doors in aluminum frames, exterior hollow metal doors and frames, casework and interior finishes along with the specified mechanical, electrical, plumbing and fire protection systems, fire alarm and technology and security systems.

Base Bid:

The Base Bid for the project will include the following:

1. New Kitchen and Cafeteria addition.
2. Kitchen and Cafeteria renovations including new Kitchen equipment.
3. Replace the existing roof in its entirety including all lower canopies.
4. Replace rooftop mechanical units.
5. Replace electric switchboard.
6. Provide new fire alarm system.
7. Provide heating and air conditioning in the Gymnasium and electric operated window roller shades with additional black out shades.
8. Provide new fire pump and fire pump room.
9. Provide emergency generator for fire pump.
10. Replace building wide ATC controls.
11. Provide back-flow preventer for sprinkler and domestic water lines.
12. Refer drawings and specifications for extent of work for items 1-11.
- 13. Refer specification Section 012100 – Allowances (issued this Addendum)**
14. Refer specification Section 012300 – Alternates for list of alternates.
15. Refer specification Section 013200 – Construction Progress Documentation for Phasing Narrative.
16. Base Bid-Reflects bidding with State of Maryland Prevailing Wage Rates: \$ _____
17. Please indicate your bid amount in words: _____

SCHEDULE OF ALLOWANCES:

Allowance No. 1: Lump Sum Allowance for Repairs to Existing Paved Entrance

1. Allowance No. 1 includes the cost for any repairs that may be necessary at the conclusion of the project for the existing paved entrance acting as a stabilized construction entrance for the Contractor.
2. Contractor shall include the following sum in their Base Bid amount: \$15,000

SCHEDULE OF GENERAL CONSTRUCTION (GC) ALTERNATES:

Add Alternate No. 1: GC-1 Language Support Program

1. GC-1 Language Support Program: State the change in the contract amount to be ADDED to the base bid to provide all labor and materials for renovations associated with the Language Support Program. Renovations to include a new Language Support Classroom, Calming and Sensory rooms, changing area, toilet room with shower, and includes (2) 24" diameter tubular daylighting devices in the Language Support Classroom. Alternate also includes all mechanical, electrical and plumbing work associated with the new spaces. See drawings for additional information.
2. Please indicate your bid amount for Add Alternate #1: _____

Add Alternate No. 2: GC- 2 Renovations to the Media Center

1. GC-2 Renovations to the Media Center: State the change in the contract amount to be ADDED to the base bid to provide all labor and materials for renovations associated with the Media Center. Renovations to include two new offices, includes relocation of promethean board, removal of an existing power pole and includes (2) 24" diameter tubular daylighting devices in each office. Alternate also includes new carpet tile throughout the existing Media Center. This alternate also includes the demolition of the existing folding partition between the Media Center and adjacent classroom and replacing it with a new metal stud partition (see plan). The promethean board on the existing folding partition on the classroom side to be removed and re-installed on the new metal stud partition including all data and electrical requirements. Alternate also includes all mechanical, electrical and plumbing work associated with the new spaces and wall. See drawings for additional information.
2. Please indicate your bid amount for Add Alternate #2: _____

Add Alternate No. 3: GC-3 ADA Compliant Toilet Rooms

1. GC-3 ADA Compliant Toilet Rooms: State the change in the contract amount to be ADDED to the base bid to provide all labor and materials to renovate two existing single compartment toilet rooms to be ADA compliant. See drawings for additional information.
2. Please indicate your bid amount for Add Alternate #3: _____

Add Alternate No. 4: GC-4 Provide Painted Metal Round Ductwork In lieu of Round DuctSox

1. GC-4 Provide Painted Metal Round Ductwork In lieu of Round Ductsox in the Gymnasium: State the change in the contract amount to be ADDED to the base bid to provide painted metal insulated round ductwork in the Gymnasium in lieu of round ductsox. See mechanical drawings for additional information.
2. Please indicate your bid amount for Add Alternate #4: _____

SCHEDULE OF UNIT PRICES

Unit Price No. 1: UP-1 Remove Asbestos-Containing Floor Tile and Mastic

1. Unit Price No. 1 shall include the cost for removing and properly disposing of asbestos containing floor tile and mastic. The Contractor shall assume that all mobilization, insurance, notification, profit etc. are to be included in the unit cost price. The contractor shall also assume that the work will be performed during the scope of the contracted asbestos abatement work.
2. Unit of Measurement: Square foot.
3. Please indicate your bid amount for Unit Price #1: _____/S.F.

Unit Price No. 2: UP-2 Remove Asbestos-Containing Residual Wall Mastic

1. Unit Price No.2 shall include the cost for removing and properly disposing of asbestos containing residual wall mastic. The Contractor shall assume that all mobilization, insurance, notification, profit etc. are to be included in the unit cost price. The contractor shall also assume that the work will be performed during the scope of the contracted asbestos abatement work.
2. Unit of Measurement: Square foot.
3. Please indicate your bid amount for Unit Price #2: _____/S.F.

Unit Price No. 3: UP-3 Self-Leveling Concrete Underlayment

1. Unit Price No.3 shall include the cost for furnishing and installing self-leveling concrete underlayment in locations agreed upon in the field between the General Contractor, Architect, and Owner. Refer specification Section 035413 – Self-Leveling Concrete Underlayment for additional information.
2. Unit of Measurement: Square foot.
3. Please indicate your bid amount for Unit Price #3: _____/S.F.

Unit Price No. 4: UP-4 Replace Damaged Economy Roof Deck with Gypsum Topping

1. Unit Price No. 4 shall include the cost for removing and disposing of damaged roof deck and replacing with new formboard and gypsum topping to match existing per Structural drawings. See detail for additional information.
2. Unit of Measurement: Square foot.
3. Please indicate your bid amount for Unit Price #4: _____/S.F.

Unit Price No. 5: UP-5 Add Roof Drain

1. Unit price shall include the cost of furnishing and installing one 4" roof drain as specified in specification Section 075500. Cost to include cutting hole in the roof, providing underdeck and secondary clamps as required, cast iron dome and minimum 10' of cast iron horizontal rain water conductor piping and tie-in to adjacent roof drain.
2. Unit of Measurement: Each.
3. Please indicate your bid amount for Unit Price #5: _____/Each

Unit Price No. 6: UP-6 Add Through Wall Roof Scupper

1. Unit price shall include the cost of furnishing and installing one approximately 5" high (2 brick courses) x 8" wide through wall scupper through the existing masonry parapet. Cost to include cutting the hole the full thickness of the wall and providing a stainless steel scupper insert set in full bed of sealant along with required base and counter flashings as indicated on drawings.
2. Unit of Measurement: Each.
3. Please indicate your bid amount for Unit Price #6: _____/Each

Unit Price No. 7: UP-7 Add 24" Diameter Tubular Daylighting Device

1. Unit price shall include the cost for furnishing and installing one tubular daylighting device. Cost to include cutting hole in existing roof deck, provide steel support between joists, provide roof curb and provide base and metal counter flashing the perimeter of the roof curb. The cost to also include cutting opening in existing ceiling and provide new angle support for ceiling tile perimeter of daylighting device. The Contractor shall assume in their price that this work will occur over Summer, 2020.
2. Unit of Measurement: Each.
3. Please indicate your bid amount for Unit Price #7: _____/Each

Unit Price No. 8: UP-8 Additional Duplex Receptacle Outlet

1. Unit price shall include one electrical duplex receptacle outlet, outlet box, wall plate and wiring within fifty wire feet of a source of power. Unit price shall re-flect the outlet being installed during the normal course of installation and shall include all conduit, labeling, terminations and testing.
2. Unit of Measurement: Each.

3. Please indicate your bid amount for Unit Price #8: _____/Each

Unit Price No. 9: UP-9 Additional Data Outlet

1. Unit price shall include one data outlet, outlet box, with two data CAT6 jacks and 300 lineal feet each of two data CAT6 cables. Unit price shall reflect the outlet being installed during the normal course of installation and shall include all conduit, backboxes, labeling, terminations and testing.
2. Unit of Measurement: Each.
3. Please indicate your bid amount for Unit Price #9: _____/Each

Unit Price No. 10: UP-10 Additional Exit Sign

1. Unit price shall include one single faced ceiling mounted exit sign and related backbox, 200 feet of conduit and 600 feet of #12 wiring. Exit Sign, conduit and wiring to be as specified in Division 26 specifications. Unit price shall reflect the backbox being installed during the normal course of installation and shall include all conduit, labeling, terminations and testing.
2. Unit of Measurement: Each.
3. Please indicate your bid amount for Unit Price #10: _____/Each

Unit Price No. 11: UP-11 Additional Fire Alarm Strobe/Speaker

1. Unit price shall include one Fire Alarm Strobe/Speaker and related backbox, 200 feet of conduit and wiring. Fire alarm device, conduit and wiring to be as specified in Division 28 specifications. Unit price shall reflect the backbox being installed during the normal course of installation and shall include all conduit, labeling, terminations and testing.
2. Unit of Measurement: Each.
3. Please indicate your bid amount for Unit Price #11: _____/Each

Unit Price No. 12: UP-12 Additional Fire Alarm Pull Station

1. Unit price shall include one Fire Alarm Horn/Strobe and related backbox, 200 feet of conduit and wiring. Fire alarm device, conduit and wiring to be as specified in Division 28 specifications.
2. Unit of Measurement: Each.

Please indicate your bid amount for Unit Price #12: _____/Each

Unit Price No. 13: UP-13 Replace Damaged Insulrock Roof Deck

1. Unit Price No. 13 shall include the cost for removing and disposing of damaged roof deck and replacing with new insulrock roof panel to match existing per Structural drawings. See detail for additional information.
2. Unit of Measurement: Square foot.
3. Please indicate your bid amount for Unit Price #13: _____/S.F.

ADDENDA

Receipt of any Addenda if issued should acknowledged below:

Addendum No. 1 _____ Dated _____ Sign _____

Addendum No. 2 _____ Dated _____ Sign _____

Addendum No. 3 _____ Dated _____ Sign _____

WARRANTY TO THE LUMP SUM

The undersigned affirms that the above Base Bid represent the entire Cost of the Project in accordance with the Bid Documents and that no claim will be made on account of any increase in wage, scales, material price, taxes, fasts, cost indexes or any other rate affection the construction industry and/or this Project.

If the undersigned received written notice of the acceptance, at his designed address, within ninety (90) days after Bid opening (or later if Bid has not been withdrawn), the undersigned agrees to execute and deliver a Contract and Bonds in accordance with the Bid as accepted, within ten (10) days after receiving notice or forfeit the amount of the Bid Bond

LIQUIDATED DAMAGES

The Owner may retain the sum of Seven Hundred and Fifty Dollars (\$750.00) per calendar day in excess of the date of Substantial Completion of December 16, 2020 and then Final Completion by January 15, 2021. Final completion includes issuance of Use and Occupancy Permit.

BIDDERS' ORGANIZATION (Strike out conditions that do not apply):

1. A Partnership
2. A Joint Venture
3. A Corporation organized under the laws of the State of Maryland

Checklist

1. The following checklist of items is to be included with the Bid Proposal Form and shall be completed by the Bidder:
 - a. Bid Bond
 - b. Bidders/Contract Affidavit
 - c. MBE Utilization and Fair Solicitation Affidavit
 - d. MBE Participation Schedule

SIGNATURE AND SEAL

Signature of:

X _____ Partner if the Bidder is a Partnership

X _____ Officer if the Bidder is a Corporation

Registered Maryland Contractor No.

SUBSCRIBED AND SWORN to before me on this _____ day of _____, 20__.

X _____

NOTARY PUBLIC

My Commissioners Expires: _____, 20____

END OF SECTION

March 4, 2020

Kreigh Kirby
Kent Board of Education
5608 Boundary Avenue
Rock Hall, MD 21661

Determination # 42734

Dear Mr. Kirby:

Please see the additional wage rate(s) that has been issued for the above referenced project.

<u>CLASSIFICATION</u>	<u>BASIC HOURLY RATE</u>	<u>FRINGE BENEFITS</u>
Ironworker – Fence Erector	\$28.23	\$19.64
Ironworker – Ornamental	\$31.77	\$21.52
Ironworker – Reinforcing	\$45.00	\$0.00
Ironworker – Structural	\$40.62	\$4.40

If you have any additional questions, please do not hesitate to contact me directly at 410-767-2365 or via email at katrina.williams@maryland.gov.

Sincerely,
Katrina Williams
Katrina Williams
Prevailing Wage Unit

cc:
Wage and Hour Investigator

Rate 22-2020

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.

1.3 DEFINITIONS

- A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCE

- A. At the conclusion of the project a scope of work for repairs to be made to refurbish the existing paved entrance acting as a stabilized construction entrance. The Contractor will provide a price for the scope of work.
- B. If the price to do the work exceeds the allowance, a debit change order to be written to cover the additional costs. If the price to do the work is less than the allowance a credit change order to be written for the difference in cost.
- C. It may be determined by the Owner at the conclusion of the project that they do not want to include the cost of repairs to the existing paved entrance in the project. In that case the Contractor, by change order, will credit the total amount of the Allowance back to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Lump Sum Allowance for Repairs to Existing Paved Entrance
 - 1. Description: Lump Sum Allowance for any repairs that may be necessary at the conclusion of the project for the existing paved entrance acting as a stabilized construction entrance for the Contractor.
 - 2. Include the sum of **\$15,000**.

END OF SECTION 012100

SECTION 323113 – CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Chain-Link Fences: Industrial.
 - 2. Gates: swing.
- B. Related Sections include the following:
 - 1. Division 03 Section Cast-in-Place Concrete for concrete post fill.
 - 2. Division 26 Sections for electrical service and connections for motor operators, controls, limit and disconnect switches, and safety features and for system disconnect switches.
 - 3. Division 31 Section "Earth Moving" for site excavation, fill, and backfill where chain-link fences and gates are located.
- C. Alternates: Refer to Division 01 Section "Alternates" for description of Work in this Section affected by alternates.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:
 - a. Wind Speed: 80 mph.
 - b. Fence Height: 8 feet.
 - c. Line Post Group: IA, ASTM F 1043, Schedule 40 steel pipe.
 - d. Wind Exposure Category: B.
 - 2. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 8 feet high, and post spacing not to exceed 10 feet.

- B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
 - 1. Fence and gate posts, rails, and fittings.
 - 2. Chain-link fabric, reinforcements, and attachments.
 - 3. Gates and hardware.
 - 4. Gate operators, including operating instructions.
- B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.
- C. Samples for Initial Selection: Manufacturer's color charts or 6-inch lengths of actual units showing the full range of colors available for components with factory-applied color finishes.
- D. Samples for Verification: For each type of chain-link fence and gate indicated.
 - 1. Polymer coating, in 6-inch lengths on shapes for posts, rails, wires, and gate framing.
- E. Product Certificates: For each type of chain-link fence, and gate, signed by product manufacturer.
 - 1. Strength test results for framing according to ASTM F 1043.
- F. Qualification Data: For Installer.
- G. Field quality-control test reports.
- H. Maintenance Data: For the following to include in maintenance manuals:
 - 1. Polymer finishes.
 - 2. Gate operator.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1. Engineering Responsibility: Preparation of data for chain-link fences and gates, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 1. Testing Agency's Field Supervisor: Person currently certified according to NETA ETT, or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. UL Standard: Provide gate operators that comply with UL 325.
- E. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators serving as a required means of access.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 1. Include 8 ft length of fence complying with requirements.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.
- B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of utility services.
2. Do not proceed with interruption of utility services without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements.

2.2 CHAIN-LINK FENCE FABRIC

- A. General: Height indicated on Drawings. Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Steel Wire Fabric: Polymer-coated wire with a diameter of 0.148 inch.
 - a. Mesh Size 1-3/4 inches.
 - b. Polymer Coating: ASTM F 668, Class 1 over metallic-coated steel wire.
 - 1) Color: Black or as selected by Architect from manufacturer's full range, complying with ASTM F 934.
 - c. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.
2. Selvage: Knuckled at both selvages.

2.3 INDUSTRIAL FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:
1. Group: IA, round steel pipe, Schedule 40.
 2. Fence Height: 8 feet.
 3. Strength Requirement: Light industrial according to ASTM F 1043.
 4. Post Diameter and Thickness: According to ASTM F 1043.
 5. Post Size and Thickness: According to ASTM F 1043.
 - a. Top Rail: 1.66 inches.
 - b. Line Post: 2.375 inches.
 - c. End, Corner and Pull Post: 2.875 inches.
 - d. Swing Gate Post: According to ASTM F 900.

6. Coating for Steel Framing:

a. Metallic Coating:

- 1) Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating per ASTM A 653/A 653M.
- 2) Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
- 3) External, Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil- thick, zinc pigmented coating.
- 4) Type C, Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft. coating.
- 5) Coatings: Any coating above.

b. Polymer coating over metallic coating.

2.4 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations:

1. Location: Extended along top and bottom of fence fabric.

B. Metallic-Coated Steel Wire: 0.177-inch-diameter, marcelled tension wire complying with ASTM A 817, and ASTM A 824.

C. Aluminum Wire: 0.192-inch-diameter tension wire, mill finished, complying with ASTM B 211, Alloy 6061-T94 with 50,000-psi minimum tensile strength.

2.5 INDUSTRIAL SWING GATES

A. General: Comply with ASTM F 900 for single and double swing gate types.

1. Metal Pipe and Tubing: Galvanized steel. Comply with ASTM F 1043 and ASTM F 1083 for materials and protective coatings.
2. Metal Pipe and Tubing: Aluminum. Comply with ASTM B 429 and ASTM F 1043 for materials and protective coatings.

B. Frames and Bracing: Fabricate members from round, galvanized steel tubing with outside dimension and weight according to ASTM F 900.

C. Frame Corner Construction:

1. Welded or assembled with corner fittings and 5/16-inch-diameter, adjustable truss rods for panels 5 feet wide or wider.

- D. Hardware: Latches permitting operation from both sides of gate, hinges, center gate stops and keepers for each gate leaf more than 5 feet (1.52 m) wide. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

2.6 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Post and Line Caps: Provide for each post.
 - 1. Line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: Attach rails securely to each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
 - 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
 - 2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.
- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading] rod and turnbuckle or other means of adjustment.
- H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
 - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
 - a. Hot-Dip Galvanized Steel: 0.148-inch-diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric].
- I. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.

2.7 CAST-IN-PLACE CONCRETE

- A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water for ready-mixed concrete complying with ASTM C 94.
 - 1. Concrete Mixes: Normal-weight concrete with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

- B. Materials: Dry-packaged concrete mix complying with ASTM C 387 for normal-weight concrete mixed with potable water according to manufacturer's written instructions.

2.8 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

2.9 FENCE GROUNDING

- A. Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
 - 1. Material above Finished Grade: Copper or Aluminum.
 - 2. Material on or below Finished Grade: Copper.
 - 3. Bonding Jumpers: Braided copper tape, 1 inch wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.
- B. 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 POLYMER FINISHES

- A. Supplemental Color Coating: In addition to specified metallic coatings for steel, provide fence components with polymer coating.
- B. Metallic-Coated Steel Tension Wire: PVC-coated wire complying with ASTM F 1664, Class 1.
- C. Metallic-Coated Steel Framing and Fittings: Comply with ASTM F 626 and ASTM F 1043 for polymer coating applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces.
 - 1. Polymer Coating: Not less than 10-mil-thick PVC] or 3-mil-thick polyester finish.
- D. Color: Black or as selected by Architect from manufacturer's full range], complying with ASTM F 934.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
 - 1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
 - 2. 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.

3.3 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.
 - 1. Install fencing on established boundary lines inside property line.

3.4 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. 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 to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
 - b. Concealed Concrete: Top 2 inches below grade to allow covering with surface material.
 - c. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
 - d. Posts Set into Voids in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert

posts, and fill annular space between post and concrete with anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 30 degrees or more.
- D. Line Posts: Space line posts uniformly at 8 feet o.c.
- E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.
 - 1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.
 - 1. Top Tension Wire: Install tension wire through post cap loops.
 - 2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- H. Bottom Rails: Install, spanning between posts.
- I. Chain-Link Fabric: Apply fabric to inside of enclosing framework. Leave 1 inch between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
- K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
 - 1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

- L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.

3.5 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. 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.

3.6 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 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 the grounding location, including the following:
 - 1. Each Barbed Wire Strand. Make grounding connections to barbed wire with wire-to-wire connectors designed for this purpose.
 - 2. Each Barbed Tape Coil: Make grounding connections to barbed tape with connectors designed for this purpose.
- 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 will be 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. Grounding-Resistance Testing: Engage a qualified independent testing and inspecting agency to perform field quality-control testing.
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 certified by a testing agency of grounding resistance at each test location. Include observations of weather and other phenomena that may affect test results.

3.8 ADJUSTING

- A. Gate: Adjust gate 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. Lubricate hardware, gate operator, and other moving parts.

END OF SECTION 323113